

# portable

100/200 FOR USERS OF IBM PC AND compatibles

## PRESIDENTIAL NEWS

It's The Source For  
Interactive Inaugural

P. 14

## YOU CAN BE A TXTPRO

Do-It-Yourself Formatter  
Gives Output Options

P. 20

## A PREGNANT MOMENT

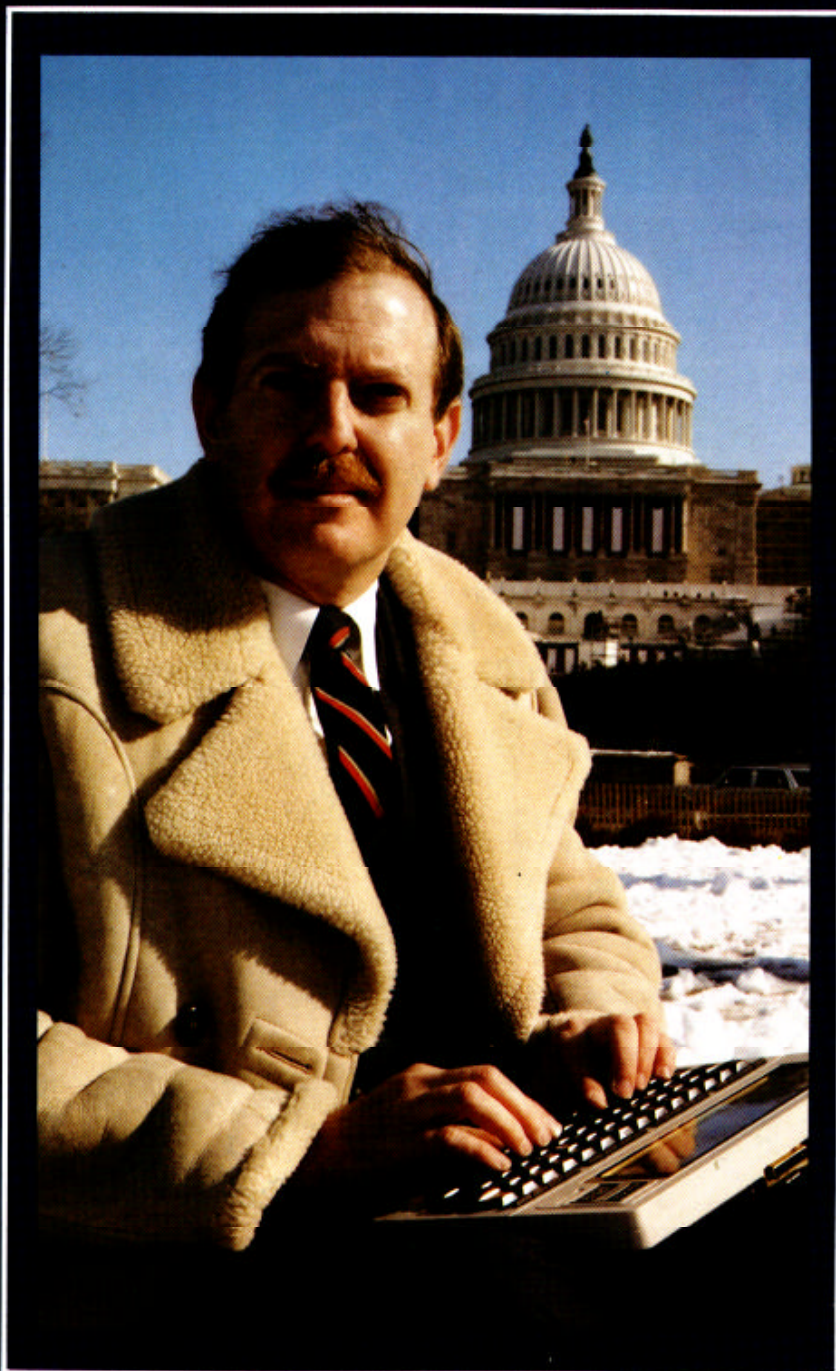
The Story Behind 100's  
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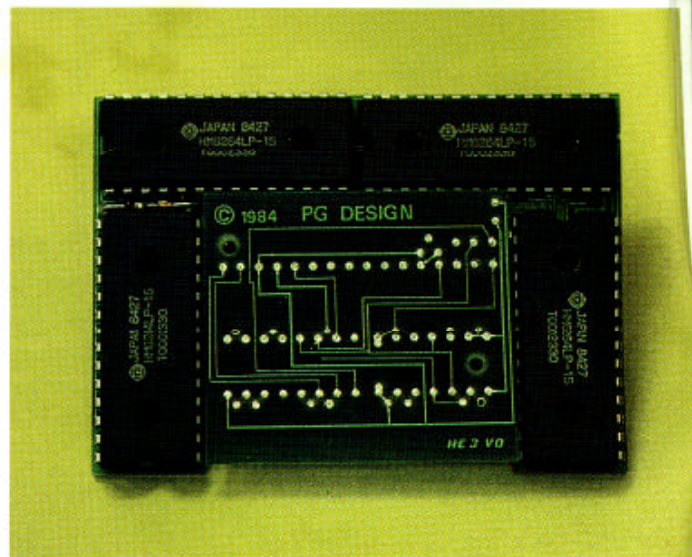
Event Trapping In  
Your 100's BASIC

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# 32K RAM CHIPS



## EXPAND YOUR MODEL 100 TO 64K

### Model 100-32K CMOS Expansion RAM.

**It's Like Having More Than One 32K Model 100 At One Keyboard!**

- **Expand Your** (8K, 16K, 24K, or 32K) **Model 100** to an additional 32K.
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- **Low power CMOS design**, enhances battery life.
- **Go beyond the memory range** by installing additional 32K modules without losing the data on the first 32K module.
- **Easy installation!** Installs into the expansion bus in the bottom of the **Model 100** - Then concealed once the cover is reinstalled.
- **High quality manufacturing and warranty.**
- The problem of "more memory" for the **Model 100** no longer exists. We've made a great computer near perfect!
- ~~List - 325.00~~ **NOW 250.00**  
(Just one half the cost of an additional **Model 100**).
- **New: Extended Basic** (Allows transfer of information between banks)
- **List - 34.95**

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*Micro-Computer Peripherals*

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Dealer Inquiries Invited

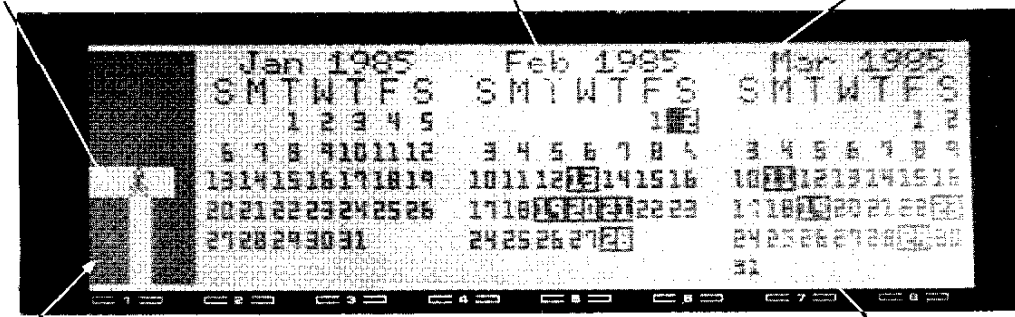
**"It's about time someone wrote this software."**

# We've done it with TMPC (The Most Precious Commodity)

Exclusive \*Floor Plan interface

Fast machine language program displays calendars in 1/2 second

Current day flashes, and can be changed with arrow keys



Fourteen other screens handle projects, print diaries, and monitor files

Appointments for indicated day displayed with a single keystroke

Your TRS-80 Model 100 probably saves you time already. So why not use it to *manage* your time? The **TMPC** software from Acroatix transforms your Model 100 into a command center for appointments and projects.

## More than a Calendar

Your Model 100 deserves more than a simple-minded replacement of a date book. The **TMPC** is designed around principles from Stephanie Winston's *The Organized Executive*, a popular self-improvement guide for anyone who wants to be better organized. Every **TMPC** feature has been carefully designed and tested to work for you.

Interested? Ask for our free demonstration program today. If you have a modem cable, we will

send it over the phone (see the box); the call takes about five minutes. Otherwise, send us \$3.00 for handling and we'll send a cassette with the sample. Discover the old-fashioned value in **TMPC's** space age design, and you'll agree that, "It's about time someone wrote this software."

TMPC by Acroatix  
\$49.95 + \$3.00 shipping  
Phone orders call  
1-800-448-4511 Ext. (353)  
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(operators take orders only)



COD orders accepted

AUTO LOG ON PROGRAM FOR:

## Free Sample

```
10 P#="16176575422" +
   "<==^D^D?1tmpcAM?s>"
20 M=VARPTR (P#)
30 A=PEEK (M+1) + 256*PEEK (M+2)
40 CALL 21200
50 CALL 21293, 0, A
60 LOAD "MDM:8N1D", R
```

**Note:** Before running this program, connect your Model 100 to a telephone with the Radio Shack modem cable (see page 76 of the owners manual). Set TELCOM status to M8N1D.

Massachusetts residents must remove the area code in line 10.

Ac' rō·ă'tix Incorporated  
P.O. Box 273 Wilmington, MA 01887

# portable

**100/200** VOLUME 2 NUMBER 7 APRIL 1985

COVER STORY



**100 HURLS INAUGURAL NEWS TO HUNGRY SOURCE ON-LINERS** . . . . . 14

*By Mike Greenly*  
 Play-by-play, color, analysis and post-game debate on the Presidential inauguration extravaganza were all instantaneously, electronically, interactively yours — that is, if you were a party to the Parti on The Source.

*Cover and feature story photos by Al Rickard*

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*By William T. Walters*

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# portable

100/200

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*Typography by*  
Camden Type 'n Graphics

*Editorial, Advertising,  
Business and Circulation  
Offices:*  
P.O. Box 250, Highland Mill  
Camden, ME 04843  
Telephone: (207) 236-4365  
CompuServe Information  
Service ID: 76703,372

PORTABLE 100/200 is copyrighted (1985) and published monthly by Camden Communications, Inc., formerly known as Computer Communications, a Maine corporation with offices at Highland Mill, Camden, ME 04843; James S. Povec, president; Carl Cramer, vice president.

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Subscriptions are \$32 for 12 issues. User Group subscription rates available. Rates for delivery outside the U.S. available upon request.

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ISSN 0738-7016

## ROM WITH A VIEW

**W**e took a call yesterday from one of our most loyal advertisers who had a concern about a letter to the editor that was critical of one of his products. He also raised a couple of unsettling issues (albeit unwittingly) as a by-product: the relationship of advertising to editorial and the responsibility of publisher to readers for advertised products.

The offending letter was scheduled to run in MAIL 100/200 along with an appropriate reply. The product in question had just received a favorable review in this magazine and several other letters to the editor were a testament to its value.

The letter writer was portrayed by the vendor as a chronic blackfly (a particularly obnoxious small insect that we in Maine know a great deal about) to his company. To our way of thinking, the letter was not damaging and certainly gave the vendor an additional opportunity to stress his company's dedication to technical assistance, guarantee of product, and customer service and satisfaction. However, in the seller's view, running the letter would be tantamount to burying him up to his neck in an anthill.

Neither letter nor its answer runs in these pages because we suggested the seller and the buyer work out their differences privately, which they both happily proceeded to do.

We're not sure that was the right decision. The mail column ought to be an open forum for the expression of opinion — even when those opinions are unpopular or unfair. Editorial consideration ought to be restricted to space requirements and whether the letters have pertinence to the readership. We don't want to put ourselves in the position of determining if someone is a kook or not; you'll provide that service.

A magazine's credibility is what its readers depend on. An advertiser has the right to have his message displayed as he desires in the space he has purchased. We have a responsibility to put that message in the most supportive environment possible of timely, useful and accurate information and to put it in front of the number of faces claimed for circulation.

But there's another point to be made here too. This particular vendor is one of a handful who have provided a product that supports Tandy's lap computer above and beyond what Tandy has a right to expect. These vendors share in a major way the responsibility for whatever success the Model 100 has enjoyed. They deserve our collective gratitude.

Now for the last issue raised in this incident of no worldly significance: vaporware. We receive letters each month complaining about the unavailability of advertised products (not just in the 100 marketplace, let us stress).

The selfsame vendor who starred in the vignette above has been advertising a product for the past several months that was so unready for market that we couldn't even lay our hands on a review copy.

But you wouldn't have known that from the ad. It didn't say "soon to come" or "coming attraction" or "watch these pages for availability". It in fact was considerably tackier. It said "available now directly from..."

Was he right in advertising it?

He's not alone in this practice. There are worse examples, and he mustn't be singled out for what is a pervasive and abhorrent practice in this industry — the promotion and advertising of product that is months away from delivery to customers without expressly saying that in the advertising. But it does bring us back to his original concern for the consumer's faith in mailorder software. Is there a corollary?

Who has the responsibility to the reader/consumer? Or is it just a matter of caveat emptor?

In our cover story, Mike Greenly takes us on another jaunt in electronic interactive journalism. If you had joined with him on his Parti conference on The Source for coverage of the presidential inauguration, it would have been like talking things over with Dan Rather as he delivers the news: "Well, Dan, I don't know as I quite agree with you on your assessment of how cold it is there at the Capitol at this time..."

We send this April issue to you hoping that spring is coming to you as fast as it is here on the Maine coast.

BAT



# GREAT IDEA BUT GRAMMAR NEEDS WORK

**T**hank you for your favorable review of our IDEA! outline processor in Portable 100/200, March '85 issue. But one point that shouldn't be overlooked is the name of the product. It's called IDEA!, not Idea.

Readers also should note that enhancements have been made to the product since we sent the preproduction copy to reviewer John Mello. The newer version includes a smaller version of the program (7.9K) on every tape for taking on the road. It has no limit to the amount of text that can be entered under a single file. An advance command has been added too, and we at Traveling Software have included a 160-page manual with each IDEA! shipped.

The review was unclear about print-formatting capabilities. IDEA! has an automatic word-wrap. The user can reset page lengths and margins between pages.

Kevin B. Smith, Software Engineer  
Traveling Software, Inc.

*Thank you for your kind words about John Mello's review on your Idea product. You have included information about the updating that will be helpful to readers.*

*You will, however, notice that I didn't bow to the naming altar, as you thought important.*

*The computer industry is second only to the federal government in its pernicious disregard for the English language. It should be indicted on two counts of language murder: premeditated and negligent homicide.*

*It's one thing for marketing and ad types to create names and logos for their products and to seek to trademark them as proprietary. It's entirely another for the rest of the world to give a damn about whether the*

*name of a particular product is in all caps with an exclamation point.*

*I suspect that we here aren't alone in waging a constant battle for the "correct" spellings of product titles. We should need an entire lexicon just for this industry, if we were to concern ourselves with whether the S in Wordstar is capitilized or not (and every case like it).*

*A certain amount of abbreviation, acronymization and anagrammatization becomes essential to the ease of readability of technically oriented narrative. However we bow to that only reluctantly, as wll.*

*The nature of publishing is such that we have a tough enough time as it is tending to good proofreading and the use of proper English without adding obfuscating jargon that tends to crop up around the subculture of any industry. Our ultimate challenge is clearly understood communication of information.*

*Therefore, we have adopted as an editorial policy that the names of products should be treated one way — the first letter of each separate (as opposed to run-on) word in a name will be capitalized.*

*And because we generally abhor exclamation points as being an unnecessary contrivance in most editorial contexts and most certainly as part of product names, no name will carry punctuation except when it is the last word in a phrase or clause demanding punctuation.*

*Therefore, from our vantage point, and while we dearly hold onto our very English editorial prerogatives, if would appear you have developed a very good Idea for which we heartily applaud you and wish you everY GREAT! SucCess. — BAT*

## Advertiser's Letter Takes The Heat

**B**ob Covington's letter (see Portable 100, Dec.84 issue) is a suprising reaction to an overall positive review of his product, Text Power 100. I am reluctant to buy any product whose manufacturer expresses fear in having it reviewed. A fair review in a specialized magazine is the best free advertising that a vendor could get at any price.

Steve Higbee  
Haiku, Maui, HI

**T**he disturbing attitudes exhibited by Bob Covington, producer of Text Power 100, in his letter to the editor convince me that I would have to be pretty desperate to buy his word processor.

He doesn't authorize valid reviews of his product and plays games with purchasers by withdrawing their license to use the product if it is reviewed. I can just imagine what kind of after-sale support he offers!

Paul M. Rashkind  
Miami, FL

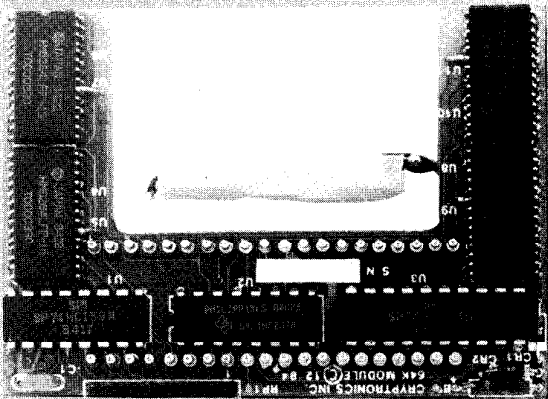
## Too Cutesy

**I** prefer the old format of Portable 100/200's New Products column. It was quick and to the point and gave pertinent information.

The new way is cutesy. Maybe this will settle down a bit over time, but I'm not interested in the personalities



# 64K RAM EXPANSION



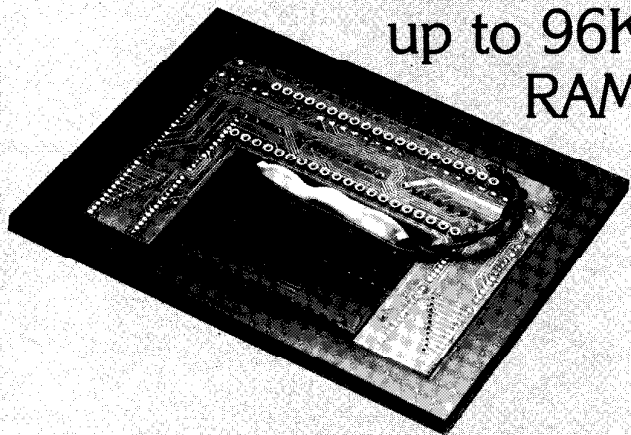
This expansion board uses low power CMOS static RAM to add 64K of internal memory to your Model 100. The board snaps into the compartment on the bottom of the Model 100 and is covered by the original cover. Since the ROM socket, located in the same compartment, is a valuable feature of your Model 100, the 64K board leaves it accessible. Any device can be connected to the expansion bus without removing the board.

PORTABLE COMPUTER  
SUPPORT GROUP

**11035 HARRY HINES BLVD. No. 207, DALLAS, TEXAS 75229**

PCSG provides hotline software support for Model 100. Call 1-214-351-0564. Available now directly from Portable Computer Support Group. We endeavor to continue as The Leader in Software for the Model 100.

Expand your Model 100  
up to 96K  
RAM



- ROM socket remains available for Lucid, write ROM, or DISK + ROM
- Installation instructions and test program included
- One year warranty includes battery
- NiCad battery recharges automatically
- Optional program allows transfer of data between banks

\$425

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30-Day money back trial MasterCard, VISA, or C.O.D.

of folks making or marketing new products. I am mainly interested in the best possible review of new products.

By the way, this letter was typed on a Model 100 and printed out on the new TTXPress truly portable, thermal printer. A handy and pretty smart machine.

Sue-Ellen Jacobs  
Seattle, WA

## Spreadsheet A Winner

The best software so far is Lucid, from PC&G. It is a tremendous aid to me and easy to use. I plan to continue buying their ROMs and personality modules. In the end, I sus-

pect their ROM system will supplant all business software I have.

Nolan Kim  
Riyadh, Saudi Arabia

## Caught in the Wycket of Stanwyck Prose

I am one of those redirected readers via the now defunct TRS-80 Microcomputer News. Portable 100/200 has become a very valuable asset in my working with this amazing little machine. It has the right mixture of coverage on a variety of issues: hardware and software reviews, programs and programming tips, and helpful advertisers.

I would like to confirm Peter Stanwyck's summary of Text Power 100: "The best formatter there is for the 100." I have just completed a book using TP 100 with a Dynax DX-15 daisy wheel printer — 30 files averaging 10K-plus resulting in 150-plus pages — entirely on a 24K Model 100 with no uploading to my Fancy-Star WP. Perhaps not an elegant way to do such a project, but the printer is photographing the results right now! Score another for the Model 100!

Harold Reyburn  
Phoenix, AZ

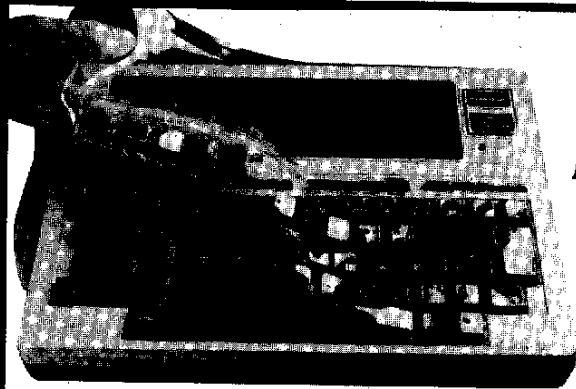
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### Hardware, Software, Accessories

No more hassles with customs clearance  
Write or phone for free price list  
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A service for Canadian users of:  
TRS Model 100, Olivetti M10, NEC PC8201A

## Canada Portable Computer



**NEW!**  
For Model 100  
NEC PC-8201

## SafeSkin™ KEYBOARD PROTECTOR

**Finally! A keyboard cover that remains in place during use!**

SafeSkin prevents costly downtime and repairs due to liquid spills, dust, smoke, cigarette ashes, paper clips, staples and other environmental hazards. SafeSkin is made of ultra-thin, ultra-tough, clear flexible plastic, molded to fit every key and contour, allowing normal key response and feel. This custom fit cover is easily removed for cleaning and gives years of dependable service. Available for the Model 100, NEC PC-8201, IBM PC, XT, AT, Apple, C64 and many other popular computer models. Send 29.95, Check or M.O., Visa & MC include expiration date. Specify computer type. Dealer inquiries invited. Free brochure available.

MERRITT COMPUTER PRODUCTS, INC.  
2925 LBJ Fwy., Suite 180 / Dallas, Texas 75234 / (214) 942-1142

I was interested to read in your December issue that the 100 is not usable for word processing, and that the specific word-processing program, Text Power 100, is flawed.

This came as a great disappointment to me, since the combination of the Model 100 and the TP 100 has allowed me to write long and complicated ads every month, without tying me to a typewriter or a desk computer.

There are several ways that TP 100 accomplishes tasks that may differ from established word-processing practice ... but there is no way that a regular word-processing program could accomplish all that the TP 100 does on the Model 100.

The merge function, which I didn't even know about when I bought the program, is alone worth the price of admission. It allows me to send a long form letter, personalized in five different ways, to my clients. It's im-



possible for the average person to tell that it's a computer letter.

Not acceptable for word processing? You could have fooled me.

Marty Pekar  
Flushing, NY

I totally disagree with Peter Stainwyck's December issue End User column.

I've been using mine for that function six to eight hours a day for the past year and it does a superb job. True, it needed programing to keep sentences from running off the printer, but after about ten months of struggle, I now have a word-processor program that will do anything the big machine in my office will do.

High Bennett  
Point Claire, Quebec

## Can't Get Enough of that Funkey Stuff

Over the years that I have been using micros, I have read many magazines and have seen changes, chiefly for the worst.

I let my subscription to Byte lapse when it became a paid catalog, consisting only of ads and hardware and software reviews. I am not interested in buying anything. My principal interest is in getting useful utilities and ideas for interesting things to do with my computers.

Jesse Bob Overholt's article Funkey Stuff-3 (see Portable 100, Sept. 84 issue) was excellent. While I have other programs which do most of what it does, one section was very valuable. That was the routine starting at line 5000 which backs up all files to cassette. It's less time consuming than backing up files on disks on my big computer.

Ralph B. Nottingham  
Deerfield Beach, FL

## Road Tested

Here's a story about the durability of the 100. Having left my computer at work, I called the office to ask a friend if he would mind bringing it to me on his way home. I'd forgotten that he rides a motorcycle.

Although he attempted to secure the Model 100, it nonetheless took a nose-dive when he rounded the corner at the end of my block. The computer slid off the motorcycle seat and 30 feet down the road, bouncing off the curb.

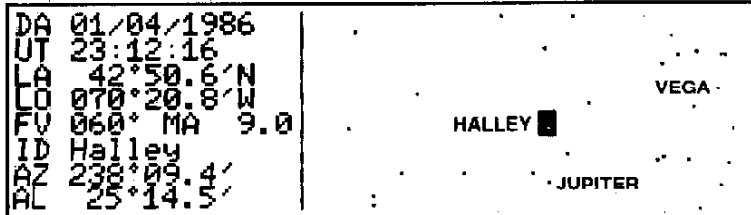
We were both in a panic. But much to my friend's surprise and to my relief, there didn't appear to be any serious damage other than

scrapes and dents. When I turned on the switch, I immediately received the menu, and the 100 did not display any internal injury symptoms. Glad to know that the 100 can take a scooting and keep on computing!

Ed Cleveland  
Los Angeles, CA

Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 130 on the reader service card. If it was of interest, circle 131, and if it wasn't, circle 132.

### COMET WATCHERS - NAVIGATORS



Spot Halley's Comet among the stars, planets, Moon, and Sun, displayed just as you see the sky, at any time, from any place. Point out any of 180 celestial bodies with the cursor. ASTRO shows name, brightness, direction, and altitude. Manual and cassette for 24K TRS-80/100. \$39.95 + \$2.00 S/H, Visa, M/C. Loquor Enterprises, 3 Heneage Lane, Hanover, NH 03755  
ASTRO - A PLANETARIUM IN YOUR LAP

825

# 24K RAM MEMORY MODULES

For Your  
**TANDY  
MODEL 200**

- Why not pay a lot less for additional 24K RAM Modules for your TANDY 200?
- Our price is only \$175 each! \$165 each if you order two or more per order! Radio Shack list price, nearly \$250 each.
- Our 24K RAM Module is the highest quality available; it comes with a money-back guarantee — If it doesn't perform perfectly, send it back and we will replace it or return your money.
- Easy to follow instructions. This upgrade is as easy as putting in new batteries!
- Immediate Delivery! Call us if you have any questions.
- Send check or money order — MasterCard & Visa accepted.
- Dealer inquiries welcome.

**\$175<sup>00</sup> each**

**PG DESIGN ELECTRONICS, INC.**

Micro-Computer Peripherals

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# ... AND CUT DOWN ON BETWEEN-PROGRAM SNACKS

**J**im Stutsman of Carrollton, Texas provides this issue's tip of the month. It seems that he accidentally dropped his 100 and found himself with a scratch on the display, a quarter of an inch wide and nearly two inches long.

"Wild thoughts raced through my head," Stutsman reports. "I needed an LCD transplant, or maybe a plexiglass graft. What could I do?"

Harking back to a tip he'd heard from an acquaintance in the optical business, Stutsman remembered that a paste made from mildly abrasive powder and water was often used to grind scratches out of plastic eyeglass lenses.

"Then I remembered a household hint I'd seen in the newspaper," he continues. "It said the lady of the house could safely clean her jewelry with toothpaste. Maybe the same thing would restore the pristine faceplate of my jewel among computers."

Sure enough, toothpaste and a damp towel removed the scratch. In just a few minutes, the screen was as good as new.

Here's Stutsman's unorthodox recipe:

1. Place a small, quarter-inch squeeze of toothpaste on the scratch.
2. Using a damp towel, rub gently in a circular pattern. Don't spend too much time in one place. Stay away from the black border — it's nearly impossible to get toothpaste out of the crack at the edge of the screen.
3. Using a second damp towel and a soft dry one (paper towels work fine), wipe the screen and check the damaged area. If scratches are still visible, go back to step one and repeat the process.

Radio Shack's Amy Arrutt had never heard of the procedure, but said as long as toothpaste didn't get

into the keyboard it seemed unlikely to damage the Model 100. "If it works," she said, "go for it!"

"Much research is yet to be done," Stutsman concludes, "but initial findings indicate that regular brushing can cause a 40 percent reduction in cavities on your Model 100."

## Follow the Bouncing Cursor

**H**ere's a simple program if you want to play with the flip-flop prompt as presented in the September 1984 Portable 100.

Just type in the ASCII value of the character you want and press ENTER. The most interesting effects are created by the solid off-center blocks, values 225 to 238 and 250 to 254. ASCII 255 just reverses.

Gordon Bennett  
Pointe Claire, Quebec

► Thanks for the program. For those of you who missed the September issue, try the program in listing one and watch the flashing prompt.

### listing one

```

10 CLS: INPUT "Character #":N
20 CLS: PRINT "Character #";CHR$(N)
30 PRINT@11,""
40 INPUT N: CLS: GOTO 20

```

## Learning to Speak 100ese

**I**called Tandy in Fort Worth about using machine language with the Model 100. They told me Radio Shack doesn't support it, and that my application would require an assembler — which Radio Shack doesn't sell.

Do you know of any vendors who are using machine language with the Model 100? I would like to find an assembler that could put machine language on an EPROM. I need to replace BASIC with a machine-language program of my client's design.

Dave Griffith  
Davenport, Iowa

► Your best bets are Portable Computer Support Group (11035 Harry Hines Blvd., No. 207, Dallas, TX 75229) and Polar Engineering (P.O. Box 7188, Nikishka, AK 99635). Both companies make expansion ROM chips that plug into the bottom of the 100. The ROMs contain machine-language programs that are switched into place over the normal Model 100 ROM when selected. They don't replace BASIC or the other programs, just complement them.

## 100 on the Big Screen

**A**s you know, Radio Shack's disk-video interface permits the user to view the 100's display in an 80 by 25 format instead of the normal 40 by eight. Do you know of anything that would allow me to adapt my 100 to a monitor to give me an 80 by 25 display?

Jack Albertson  
Irvine, California

► What you need is a hardware device that would take the Model 100 LCD input and convert it into a signal usable by a standard monitor. Unfortunately, I don't know of any such device currently on the market.



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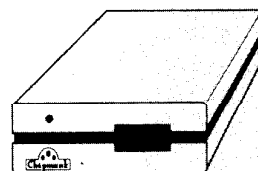


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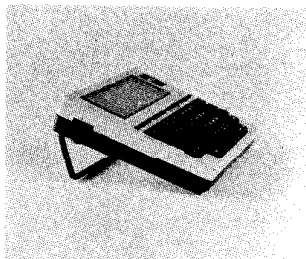
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RS42

## FULL-DUPLEX

### Tiny 100s and Big Macs

I routinely transmit files between my Model 100 and an Apple Macintosh. My problem involves the use of embedded printer codes that I put into text during editing.

The Mac uses a modified version of the MacTEP communications program, which permits all 256 ASCII characters to be transmitted. All goes well when I transfer files to the Mac for storage or editing.

When I download back to the Model 100, the Escape character (ASCII 27) is transmitted properly but I lose the character that follows. Everything else works fine.

The problem seems to be in TELCOM, BASIC and TEXT. Do you know a way around this?

Lance Gilbert  
Laguna Hills, California

► The problem is that the 100 receives the Escape character and thinks you are issuing a command. The character following Escape is interpreted as part of the command, so isn't included in the received file.

The best I can offer right now is to suggest that you insert a space immediately after each Escape character in your file. When you load the file into your 100, the space will be thrown away and not a character.

You might also check with the companies that make Model 100 communications software to see if their programs have more convenient solutions to the problem. Traveling Software (11050 Fifth Ave. NE, Seattle, WA 98125), Software by Sigea (19 Pelham Road, Weston, MA 02193) and Micro Demon (P.O. Box 50162, Columbia, SC 29250) offer such programs.

You might also check with Portable Computer Support Group. I believe they're working on a version of Disk Plus that will allow the 100 to use the Mac as a slave disk-system.

### Making the CoCo Connection

How do I transfer data and documents between my Radio Shack Color Computer and my Model 100?

I use Scribes, Telewriter-64 and a modem with my CoCo. My 100 has all the fixin's, including a null modem, cables and Scribes.

Charles Redman Jr.  
Fairfax, Virginia

► You need one more piece of software for your Color Computer: a telecommunications program. Good programs are available from Spectrum Projects (P.O. Box 21272, Woodhaven, NY 11421) and Softlaw (132 Aero Camino, Goleta, CA 93117).

Once you have the software running, plug the Color Computer's RS-232 cable into the null modem, and plug that into the Model 100. Set the TELCOM parameters to match those on the Color Computer. A good starting sequence is 38N1E: 300 baud, eight-bit words, no parity checking, one stop bit and XON/XOFF protocol.

Now you should be able to communicate easily. Use function keys 2 and 3 to download and upload files.

### The File that Wouldn't Die

I recently made the mistake of adding a quotation mark to the name of a .DO file. BASIC can't KILL LP'S.DO — how do I get rid of it?

An associate in my office also has a Model 100. How can our machines communicate over telephone lines? What special software is required, and how do we get it?

Stuart Ray  
New York City

► To get rid of the file, type KILL "LP" + CHR\$(34) + "S.DO" from BASIC. CHR\$(34) is a BASIC statement that's equivalent to ASCII value 34 — a quotation mark.

You don't need special software to make your two computers communicate. If they're in the same room, connect them with a null modem and a serial cable — both available from Radio Shack. Plug one end of the null modem into one computer and use the RS-232 cable to connect them. Set the ANS/ORG switch on one of the computers to ANS, and on the other to ORG.

Enter TELCOM and use the STAT command to set matching communications parameters — 37E1E, for example. Then type away. The text you type on one computer will appear on the screen of the other. Use



## FULL-DUPLEX

UPLOAD and DOWNLOAD to transmit files.

If you're using phone lines, you'll need Radio Shack's direct-connect modem cables for each computer. The silver cable connects your computer to the telephone, and the beige cable goes from the computer to the wall jack.

Set the TELCOM parameters to M7E1E, then dial the phone. When a telephone connection has been established, both of you should press function key 4 (TERM) at the same time. Then you're in business.

If you have problems, double-check to make sure that the telephone cables are correctly connected, that the TELCOM parameters match and that the ANS/ORG switches are correctly positioned.

## Asleep at the Keyboard

I'm having trouble with the text formatter and word count program that appeared in the September issue. I typed it in, but can't get it to print anything more than a header on my Axonix ThinPrint 80. Can you help?

G.C. Hill  
Kansas City, Missouri

► After looking at the program, I think you might have mistyped the statement that transfers control to the header-printing routine, or left out the RETURN statement that transfers control back from that routine.

Because you can get the header to print, it seems that the program does work with your printer. I suggest that you carefully inspect your version of the program and trace what happens after the header is printed. It should return control to the main program and start reading your text file from RAM.

## Basically True

In your August column a reader submitted a fix for a bug in Radio Shack's Calculator program, which wipes out the standard function key definitions. A simpler solution is to delete lines 190 to 210:

```
190 For I= 1 to 8
200 KEY I, CHRS(I)
210 NEXT I
```

These lines are unnecessary. Your

readers should be warned that the program doesn't accept scientific notation as input.

More than 25 percent of the program is devoted to REM statements and extra spaces. They look pretty, but waste space. And when you try to reduce the program's size you'll find that all the GOTO and GOSUB statements are addressed to the REMs: a programming no-no.

Your readers should also be warned that Radio Shack's Spectaculator program isn't a normal spreadsheet. Formulas always apply to the whole row or column. I was unable to adapt any of my spreadsheet applications to this peculiar restriction.

Gary Clark  
Bethesda, Maryland

► Thanks for the information. A number of alternative spreadsheet programs are now available for the 100, including Multiplan and PCSG's Lucid. Most of them would solve your problem.

## Port and Re-Port

I use a Xerox Memorywriter 610 as a printer for my Model 100. The 610 has only a serial port. I have no problem printing text in TELCOM, but how do I get the 100 to send text through the serial port from BASIC?

I've used the command SAVE "COM:58E2E" but this only prints a list of the program as though text.

Len Sutherland  
Santa Maria, California

► You almost got it. Instead of using SAVE, which sends a copy of the program to the RS-232 port, you should use OPEN "COM:58E2E" FOR OUTPUT AS 1. Thereafter, PRINT #1 will send text to the printer.

Ordinarily, you would use PRINT to send text to the LCD or LPRINT to send it to a parallel printer. □

---

*Full-duplex is your column. It's dedicated to solving users' problems. Address your questions to Terry Kepner, P.O. Box 481, Peterborough, NH 03548. Please remember to include a return address with all Full-Duplex correspondence. — Ed.*

---

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 110 on the reader service card. If it was of interest, circle 111, and if it wasn't, circle 112.*

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# GHOSTS OF TYPOS PAST

**N**othing frustrates an editor like discovering errors of fact, typos and misplaced photo captions in a magazine once it's been printed. In the trade we have what's called a post-mortem where all those who worked on a particular issue meet to discuss its problems as soon as it's printed. It's the place where — two or three times a month due to the pace of our production cycle — we get to confront the awfulness of having performed imperfectly. It's humbling, to be sure.

But what about you? While it's frustrating to us who believe that our function is to provide readers with timely and accurate information, it has to be perplexing and bewildering to a subscriber who has paid dearly to get what he believes is accurate information.

This industry is particularly problematic because of BASIC code, machine language, scientific notation and industry jargon.

We have resolved to try harder to find all the problems before the magazine hits the press. In addition, we are, with this issue, introducing Post-Mortem Errata.

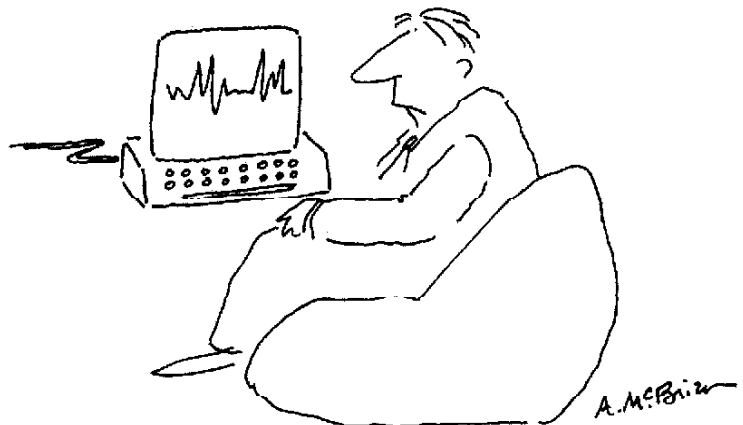
This final resting place of our little sins is the idea of New Hampshire-ite Paul Winslow, a faithful subscriber who said he'd rather get his issues late than find a host of errors. We hope to do both: put out timely and factual issues.

But in Post-Mortem Errata, we'll wash our dirty laundry. We hope this is a department that gets smaller and smaller and smaller....

**BEWARE THE IDES OF MARCH**

Ah, March. Like Julius Caesar, we've had better months.

An overhaul of Portable 100/200's graphic design yielded mixed results. We like our new look, but the new type specifications and graphic



**MAN AND MACHINE NOT TALKING 'TIL ONE OR THE OTHER APOLOGIZES.**

requirements led to new problems. Sometimes the solutions were inconsistent from article to article. We think in this issue we've worked some of the bugs out of the design. Let us know what you think.

Carl Oppedahl's otherwise fine review of Lucid was marred by an error of fact. In describing a competitor to the Model 100, Carl wrote, "Called WorkSlate and priced several thousand dollars above the 100...."

At the time Convergent Technologies introduced the Workslate (note the lower-case S) the 8K Model 100 sold for \$799. The Workslate was priced at \$895.

Our cover story reported that a Florida police department's use of the Model 100 helped it locate "soften" bikes — one of far too many typos that slipped past our harried proofreaders.

We reported in large type at the bottom of page 42 that a microamp is 100 times smaller than a milliamp. An alert reader phoned us with information that sent us scurrying for our metric-conversion charts. He was right: a microamp is 1,000 times smaller than a milliamp.

We variously reported on pages 52 and 53 that the Model 100's microprocessor is:

- A. the 85C85
- B. the 8085
- C. the 80C85.

Those of you who chose option C were correct.

Perhaps the most embarrassing error was in The Wire. We reported that microcomputer-industry newsweekly InfoWorld had plugged Portable 100/200 in a recent issue. In returning the favor, we spelled it "InforWorld."

There's got to be an easier way to make a living. — Ed.

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RS11





*Play-by-play, color, analysis and post-game debate on the Presidential inauguration extravaganza were all instantaneously, electronically, interactively yours — that is, if you were party to the Parti on The Source.*

# 100 Hurls Inaugural News To Hungry Source On-Liners

BY MIKE GREENLY

---

*"You need to know what kind of daytime it was. Misery. Evidently today saw the worst Washington traffic in years — stultifying cars and buses, crawling in affliction down one-lane corridors. As inaugural parade bleachers now narrow the streets of the city."*

*For subscribers to The Source, electronic journalist Mike Greenly's descriptions of Inauguration Day were immediate. Live from a phone booth on 1600 Pennsylvania Avenue, from the Senate press gallery and from the Capitol, his Model 100 made history as the vehicle for his organization TFNS (Trans-coastal Electronic News).*

*The Model 100 hurled interactive news coverage on-the-spot to hungry Participant (Parti) readers on The Source. As Greenly and associate Sherwin Levinson experienced the pageantry, so did subscribers.*

*Relive the Inaugural Day weekend through the intimate journalism of Greenly and Levinson. (Unless stated, the excerpts are by Greenly.)*

*Reexperience now the smell of the grease-paint . . . the roar of the crowd. — Ed.*

---

**A**t first, in my grumpiness, I notice only the tacky glitter of the stage set. (It probably looks splendid on TV.) The green leaf in the American eagle's mouth glows and flickers like some radioactive spinach. Everything is like that — overly bright, heavy-handed.

## EVENING TRANSFORMATION.

The soundman for national Canadian Broadcasting explains with irony that Fess Parker is narrating the tour of music through Inaugurations of History. I wouldn't have recognized Parker as the original Davey Crockett I used to love. On the far right of the stage, a woman is standing in an overcoat, her back to us, staring at the curtain. She doesn't move.

"Secret Service," says the soundman. "She's got the curtain beat tonight."

On my right a short fur-covered woman holds equipment for a larger man beside her. From station WDBB, Tuscaloosa, Alabama. Over my shoulder, hundreds upon hundreds of cameras are clicking, and reporters write on pads and notebooks, gloved hands around the ball-point pens.

The Reagan-Bush Party sits behind a plexiglass booth. They look regal and protected.

Fess Parker speaks and brings us into the 60's, John Kennedy's Inauguration. Dozens of "clean cut all American" young people, dressed in red, white and blue, come clap-

ping and snapping out onto the stage. They lip-synch peppy music.

"What am I doing here?" I wonder. It all seems so surface, empty.

But I watch these kids, inescapably. I muse on what it's like for them to be here — to be up there on stage, to be a video moment in Tuscaloosa or Toronto.

## PROUD TO BE AN AMERICAN.

And I let myself relax into knowing how much fun the people around me are having. I begin to feel about what I'm watching as a celebration. As calculated as it is, I begin to accept it. Its truth outweighs its falseness.

I am proud to be an American. I am proud of what I believe are our country's values, when we remember them. I am proud of our achievements. Of our freedom. Of our potential.

Understand, please, I don't have these thoughts every day.

And I feel, despite the Velveeta arrangements on stage, that as these young people sing this song, they too are feeling proud. It seems to me I'm in an audience where we're all proud to be Americans.

I find myself psychologically letting go and melting into this crowd, happy to be nestled into the bullpen with media brothers and sisters, clicking and writing and evaluating, too,

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## INAUGURAL

as,  
in the foggy evening  
with the low-hanging clouds  
and the Washington Monument  
glowing in the misty night  
with a light snow falling

and with helicopter brightbeams overhead  
— with all that, the fireworks begin now.

You can really feel them, almost bullet-like on your body, as sharp, sudden sounds puncture the night.

Someone behind me whispers about how the clouds reflect and refract the light from the sparkles. The clouds are pink. The clouds are gold. The clouds are fiery, sparkling stars.

All of us together.

And I feel in this moment, at last, that it's more than empty ceremony.

And when the fireworks stop at last, when all that's left is gentle, sprinkling snowflakes drifting sparsely across the floodlights — like lingering sparks from nature, right on schedule — then I feel I am celebrating, too.

Being an American. Being in Washington. Being here — on Network Nation — with you for the Inauguration.

And now the show is over, and I go off through hazy sulphur-smell to order an American hot dog.

A pleasant good night to you from Washington.

*While President and Mrs. Reagan basked in the spotlight that January weekend, and invited guests got caught up in the presidential heyday, The Source subscribers were having their own celebration.*

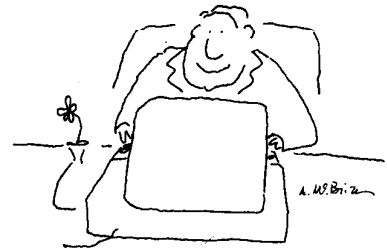
*Here is how the Inauguration went public. TENS organizers urged readers (as participants are called) to "bear kudos or cudgels, orate or observe" and electronic journalism took off.*

*The following is an excerpt from this public discussion where participants interacted with reporters Greenly and Levinson and each other. All readers were forewarned that comments made during the conference would be "100 percent quotable." — Ed.*

A New York marketing consultant deemed the Inaugural celebration as hype: "Amidst the glory and the celebration . . . the plexiglass booth," Peggy B. surmised the American public is not what we celebrate.

**PARTI BASH.** A California student with the handle of Cynic Al carried this thought with his conference contribution: "So far the hype surrounding the inauguration really does make it seem more like a coronation. I think there's only one job Reagan would like more than that of President, and that is to be 'King Ron'."

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5. Or, worst of all, you're afraid your friends will think you're (gasp!) a hacker.

If, however, you could use more good solid application programs ready to run in your Model 100 or Tandy 200 . . . or games . . . or programing utilities . . . or graphics . . . or text formatters . . . then this message is indeed for you.

Or if you like the idea of getting maximum benefit out of your little computer and the time you spend in its brilliant, if arcane company, then, this is for you. And if you secretly like the idea of your acquaintances thinking you're not only a computer guru but quite possibly a personal friend of Stephen Wozniak, then . . .

... the Editors of PORTABLE 100/200 Magazine are pleased to introduce THE PORTABLE PROGRAM REVIEW — a new monthly newsletter featuring the best of public domain programs from the day of introduction of the Model 100 through and including everything that will follow for the Tandy 200.

Each month we will fill to overflowing the pages of THE PORTABLE PROGRAM REVIEW with the cream of the crop of ready-to-run program listings contributed by the readers of PORTABLE 100/200 Magazine — programs the Technical Editors have themselves run, tested and found to be particularly useful, worthwhile and fun.

Every program will be well-written, fully-documented and accompanied by our own review notes and comments from users on their improvements and embellishments discovered on the way to true program elegance. We'll even give you a map to help you through some of the trickier places when we think it's appropriate.

SUPPORT for THE PORTABLE PROGRAM REVIEW. Every issue will be backed up by PORTABLE 100/200 Magazine's Technical

Staff — whether you ask your questions by mail, on the 100 SIG on CompuServe, or by telephone. PLUS every program listed in each issue also will be available on tape cassette for your convenience.

BENEFITS of THE PORTABLE PROGRAM REVIEW. It's your chance to take full advantage of your Model 100 or Tandy 200 and to get the full benefit of its power and versatility. You'll save money by creating your own software. You'll develop greater programing interest and skill by working with the efforts of others like yourself. You'll find new uses and applications for your portable computer. And you'll take more pride in — and get more pleasure out of — your computing hours.

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3. Enclose the card with your check or money order in the amount of \$19.96 for One Year (12 Issues) of THE PORTABLE PROGRAM REVIEW newsletter. Or you may use the blank space by Letter F to pay by MasterCard or Visa (only). Please be sure to include the card number and expiration date.



Appreciative of Greenly and Levinson's on-the-scene reporting, a Texas Presbyterian minister reflected on Jimmy Carter's inauguration: "I suppose the security is necessary. Yet it was only a few years ago, eight, that the Carter family walked down Pennsylvania Avenue. Those pictures still smolder. And I'm sure it was against the best advice of the security agents, and much to their horror. But boy, was that a powerful image from a president who knew he was of the people."

"Strange," contributed a publisher from Pennsylvania only known as DVO, "that out of 365 days four years there should be

only a few that we're forced to feel more patriotic than those others where it's simply business as usual.

"Here in my big chair, on top of my mountain, the whole inaugural affair seems of little importance. I know that there'll be a fun show on TV Sunday night. That's the Inaugural Gala.

"I also know that you are there to tell me what *really* happened.

"Washington, DC is a patriotic experience no matter when you go or who is president. But do we have any real indication that things will be as soft as they've been for the past

four years in the upcoming four?

"I guess that's not the point of the inauguration. It's not to prove over again that you've got the vote. It's to set the tone for the years ahead. . . . What is the tone?"

**BARRED FROM THE CAPITOL FLOOR.** Sherwin and I make it through security into the Capitol — up the elevator starting on the House side, walking across ceramic tile floors, then across faded marble and industrial gray carpet to the Senate side.

Along the way we pass an open door, a glimpse of navy blue pant leg, a vigilant guard at the door, and a hasty awareness of a TV set in the room. We are passing Dignitary X who is watching the event in private.

The guard gestures to us to keep moving.

Every step of the way we hold our credentials out before us, a pacifier for the guards we encounter. Before too long we realize that we've already experienced the major benefit of those squares of colored paper: they permitted us to come in out of the cold but not much more.

We wend our way through the corridors to find Max Barber, superintendent of the Senate Radio Television office and the man to whom I had applied for credentials.

"I'm sorry," he says. "We'll have to give you your \$100 back." Max made me feel better, however, when he said only 10 journalists were allowed inside the Capitol Hall.

So TENS was one of the hundreds and hundreds of news services not allowed onto the Capitol floor. "Only 900 guests in total," he said.

Having come all that way — it's a very long walk from the House side to the Senate side — we are now allowed to watch TV from the Senate office itself.

So, here we are. Not far away from the Chosen 900, the remains of the 140,000 who were originally to observe the ceremony outdoors. We are two stories higher than the people we are watching on TV — a matter of mere yards from them diagonally as the laser flies.

I click away on my Model 100. Sherwin is at my side on the Epson PX-8. May history take note:

ours  
are surely  
the — only — two  
lap portable computers in  
the entire United States  
Capitol building during the  
50th Inaugural Ceremony  
January 21st, 1985.

*continued on page 36*

## Model 100 Helps Newsroom Get Over VDTs

By Mary McHale Wood



Author/reporter Mary McHale Wood uses her 100 for a phone interview.

**T**imes were rough for the editorial staff at the Green Bay News-Chronicle. Illness and abdications had left us understaffed and overworked at the morning daily. So when we were told we'd be joining the world of electronic journalism, most of us were grim.

It was decided we'd all be outfitted with a Model 100. With trepidation we each signed a contract assuming responsibility for our respective machines.

**GOT THE VDTs.** We'd all been getting along with the video display terminals (VDT) in the newsroom. Although aged and unpredictable, we knew what to expect from the VDTs. We'd learned how to deal with their quirks.

But by each having our own 100, we'd be able to save a lot of time and hysteria. During the VDT era, there were only four terminals available. When the average day saw half-a-dozen reporters returning to the newsroom with last minute stories to write, the atmosphere was tense. We'd be able to say good-bye to word-processor queues.

News-Chronicle Editor Ronald Poppenhagen called the situation a bottleneck. During the day reporters had to share the VDTs with the classified department. At night, six or eight all needed a machine simultaneously.

**CENTER FIELD ACTION.** Sports-writer Dan Flannery had an advantage over the rest of us. He'd been using a 100 for close to six months to cover Green Bay Packers football games. He was our pioneer, and we looked to him for support and reassurance.

"It was a lot like being Neil Armstrong stepping on the moon," Flannery quipped about his being the first.

He wasn't at all apprehensive about using a new computer. "I've had a closet sort of interest in computers for a long time," he admitted. He was given his 100 the day before he had to use it to cover a football game between the Green Bay Packers and the Seattle Seahawks. He said the game ended at 10:29, Seattle time, and the story arrived in the sports department at

*continued on page 36*



News-Chronicle Editor Ron Poppenhagen sends news breaking story from his 100 to the typesetter.

# Introducing **SUPERA** and **TEX PRO...** More Revolutionary Software from Micro Demon

## **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.

## **TEX PRO - Give Your Model 100 a Real TEXT Editor**

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.

- \* You can turn on a 'type over mode' in which typed characters will replace the current text instead of being inserted.
- \* The F4 key will activate a powerful, multi-featured search and replace function.
- \* You can change the case of the character under the cursor by a control key.
- \* You can delete a word or line by pressing the appropriate control keys.
- \* The same 26-function key capability as PRO AID except that the keys can define longer strings (up to 28 characters)
- \* And More!

TEX PRO is an intelligent program that will turn itself off as soon as you exit the Model 100 TEXT mode, and thus will avoid conflicting with other machine language programs you may be using.

## **ASM - A Powerful 8085 Assembler**

Only 36K 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 relocatable 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.

## **TEL PRO - A Telcom Enhancement**

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.

## **PRO AID - Background Power**

PRO AID is a machine language program that adds many powerful features to your Model 100. You get 26 new, easy to define, super function keys that can be used in TEXT and TELCOM as well as BASIC. You also get automatic line numbers, instantaneous deletion of any range of BASIC lines, a special calculator mode with new BASIC commands, immediate access to MENU programs, a program status key, and much more. PRO AID uses less than 18K of your memory, and can be located anywhere there is room. PRO AID comes with complete documentation.

## **DASM - Far Beyond a Mere Disassembler**

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.

DASM also contains a remarkable split-screen effect that makes it possible to view the previous 8 lines of the disassembly.

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# YOU, TOO, CAN BE A TXTPRO

BY RONALD F. BALONIS

The 100's  
greatest  
deficiency  
may be  
its lack of  
output options.  
Here's a  
machine-  
language  
program  
to fill the gap.

Listings one and two which accompany this article exceed the length possible to run in this issue. COBUG.BA, the machine-language assembler program from the March, 85 issue of Portable 100/200; TXTPRO.BA, the simpler alternative contained in listing one, which is companion to the article; and listing two, which is the additional two-step approach which 8K system owners must use may be obtained in the following ways:

1. Through CompuServe PCS 154 Model 100 SIG as a direct download;
  2. As photocopy sheets from Portable 100/200;
  3. On a cassette at a cost of \$6.50.
- If using the mail, please enclose a self-addressed envelope.

Send orders to: COBUG, Portable 100/200, Box 250, Camden, ME 04843.

**W**ith its built-in text editor, the Model 100 is easier to use than pencil and paper. Elegant and simple, TEXT has fewer than a dozen functions — but they're all you really need.

Or almost all. TEXT lacks print-formatting capabilities that would allow it to duplicate the performance of word-processing programs written for larger micros. Its deficiencies are infamous and manifold: no page breaks, no justification, no centering, no headers, no footers, no page-numbering — the list goes on and on.

**SO WHAT ELSE IS NEW?** TXTPRO.CO is a 1,500-byte program that formats and prints Model 100 text files according to commands the user embeds in the file.

The program doesn't answer every complaint. It left-justifies only, leaving a ragged edge at the right margin. It assumes that the operator is using 8.5 by 11-inch paper with six lines per inch and 85 characters per line.

It doesn't draw pictures, and it doesn't prompt you with cute messages. Except for centering a line of text, it doesn't have any automatic functions.

What it does do is follow your orders. And all it requires in return is that you use its commands logically and that you know something about your text and your printer.

Table 1 lists TXTPRO's 18 formatting commands. They include all the margin commands found on a typewriter: page length, left margin, right margin, top margin, bottom margin and line spacing.

And there are a few word-processing commands: center a line, page numbering, new page, keyboard input, tab spaces, single sheets, printer control. CRLF suppress, header and footer.

The commands are placed in the

text file anywhere you need them, and take effect when the document is printed. The form of each command is: a plus sign (+), the two-letter command and a digit value (+XX##).

Incorrect format values halt printing, and the program displays a FORMAT ERROR message. It's up to you to figure out where you went wrong.

**TAKING THE EASY WAY OUT.** There are two ways to get a copy of TXTPRO. You can assemble it from the source or you can use the BASIC boot program that accompanies this article.

TXTPRO's 900-line assembly-language source program is available from Portable 100/200. It works with COBUG.BA, the assembler presented in last month's issue (Come on, Wanna Cut Some Machine Language Bytes on the Model 100?, p. 50).

The BASIC program presented in Listing 1 is a simpler alternative. For a 24K Model 100, just key it in as is.

Users of 8K systems must take a two-step approach, dividing the DATA statements and running the programs shown in Listing 2.

Either way, the result is a 1.5K program called TXTPRO.CO.

Upon running the program in Listing 1 (or the two programs in Listing 2), an OK message should result. The message \*\* ERROR IN DATA \*\* indicates that the program as typed failed an internal checksum operation that's tested in line 500.

The format of the listings was designed to minimize errors. Compare your listing against the one printed copy, correct the errors, then try again.

**RAMS IN SPACE.** TXTPRO.BA's only purpose is to create TXTPRO.CO (the .CO extension means it's a machine-language program). So once you've run it, you may KILL it.

Of course, if it's taken you long to

# EVERY DISK/VIDEO INTERFACE USER NEEDS THIS PROGRAM.

*DISK-BUDDY manages your disk files with one keystroke!*

The DISK-BUDDY menu is like the M100 command menu except it works on disk files instead of RAM files.

Just position the cursor over the file of your choice and press the function key. It takes one keystroke to:

- Display a disk directory of either drive
- Load a file or program from disk to RAM
- Run a program directly from disk

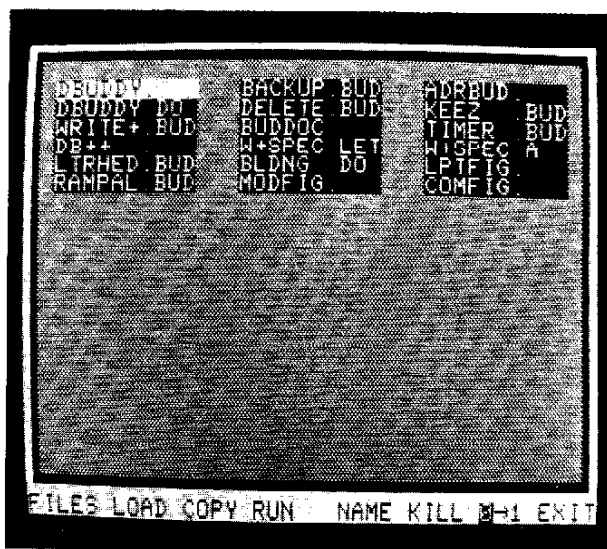
With two keystrokes:

- Delete a file from a disk (the second stroke is for safety)
- Send file of any length (up to the capacity of the disk) to serial port, printer, screen, cassette or another disk drive.

DISK-BUDDY unlocks the power of the M100 operating system. Commands for computer and peripherals, stored on disk, can be sent at the touch of a button.

One touch can ready your printer for word processing, another sets it for BASIC listings.

Change function key configurations instantly. Keep a set of key functions for word processing, telecommunications, editing, programming, etc.



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

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DISK-BUDDY works great with programs that use "spec" files and templates. Just keep your favorite models stored on disk. A key touch loads and saves it to RAM, another touch gets you into your application. Changing formats is just as simple: load the new template with a single keystroke.

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For TRS-80 Model 100, 24K RAM, DISK/VIDEO INTERFACE, WITH MONITOR, TV, OR LCD.



# TXTPRO

type it into your 100 and you're disinclined to repeat the effort, you might choose to save it on tape. It's not a bad idea.

It's also wise to back up any other files you value before running TXTPRO.BA, as a mistyped number POKed into the wrong location can have a disastrous affect on stored data.

Remember too that the Model 100 requires that you reserve data for machine-language programs or they won't run. To reserve memory for TXTPRO.CO, enter BASIC and type CLEAR 100, MAXRAM-1500.

If you've a mind to, you can write a short BASIC program with these two statements, adding a third that calls TXTPRO.BA and RUNs it. This eliminates the need to clear RAM space each time you run TXTPRO.

**THE ALGORITHM METHOD.** TXTPRO's algorithm is:

- Read the text file and fill the line buffer with characters from the file.
- At each character, check for the end of the file, the end of a line, a format command and the right margin limit.

- If at the end of the file, print the line buffer and make a bottom margin.

- If at the end of a line or at the right margin, just print the line.

- If it's a format command, change the format value or perform the indicated command.

The program loops on this sequence until it terminates with the end of the text file.

The first step in using TXTPRO.CO is to create a text file. If you're not familiar with it, read Section 8, pages 43 to 67 of the Model 100 Reference Manual — it's an excellent tutorial on the use of TEXT.

I recommend that you follow it through, example by example. You'll find that once you've mastered it, TEXT's small complement of commands is sufficient to create and edit virtually any text file that's short enough to fit into your 100's memory.

TXTPRO commands can be placed almost anywhere in the text file, as many times as you need them, as long as they're in +XX## format and followed by a non-numeric character.

Each line of text is printed only when the buffer is full or an end-of-text marker is found. To be on the safe side, follow each TXTPRO command with an ENTER.

**SOFTWARE ON TRIAL.** For the purposes of comparison, print your sample file without adding any format-control characters. This should give you a pretty good idea of the program's default values. SHIFT-BREAK stops the printing, as does ENTER.

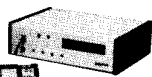
Next, alter the default format by adding commands of your own. Remember that TXTPRO can't do any of your thinking for you. You must make sure that the command values are logical for the page you're printing. Invalid format commands and typographical errors are likely to cause unpredictable results.

The approved method of becoming proficient with TXTPRO is trial-and-error. Formatting on a typewriter is done intuitively, by appearance. The transition to letter-and-number formatting isn't accomplished easily. But through successive trials, it's possible to get a good feel for the results of any format change. Intuition may be regained.

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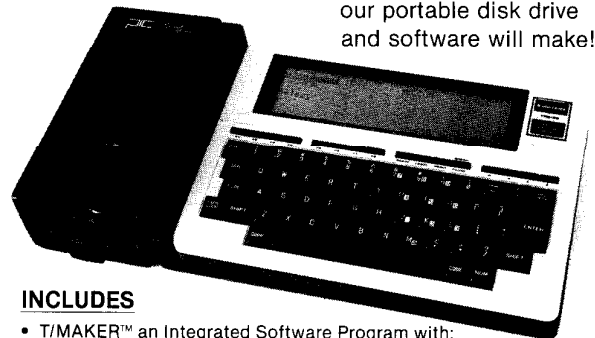
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**TXTPRO 17B: ADVANCED TOPICS.** TXTPRO lets you emulate the functions of a high-level word-processing program. The keyboard input command, for instance, lets you personalize letters, contracts and other documents. The printer control option lets you access boldface, underscore, alternative fonts and other printer functions.

The single sheet command allows you to use individual sheets of stationery, even envelopes. The centered text option lets you create custom letterhead, paragraph headings and chapter titles.

Your main limitation is your imagination.

Still, the program's not perfect. Its scope was confined to tasks that are realistic for a little computer. The 100 acts like a big computer, and it's easy to forget how limited it really is.

Compromises make for some idiosyncracies, which are listed below.

The tab spaces, keyboard input and center line functions are limited by the right margin value so they won't overrun the printer line buffer. They might require some experimentation.

If different top and bottom mar-

gins are used for different pages in the same document, a new page command should be used for each page, with the margin commands directly following it.

To use a plus sign in your text, type two (++) .

The header is printed after the top margin. And the footer is printed at the bottom margin. Be sure that there are enough lines for the footer between the bottom margin and the page length setting, or the printer will overrun the page.

The line-printing algorithm looks for the last space before the right margin limit. When a format command occurs at the end of a printed line, it's possible to lose two or three characters. The answer: put each format command on a separate line terminated with ENTER.

When using pitch and mode changes with the printer control command, you must count lines and spaces to set the margins correctly or the result may not be as expected.

**STRAIGHT AS AN ERROR'S PATH.** TXTPRO is a machine-language program, and so can be very unforgiving with operating errors. The \*\* FORMAT ER-

ROR \*\* is designed to prevent print buffer overflow, variable overflow and illogical format constructions. Each time TXTPRO detects a format command, the \*\* FORMAT ERROR \*\* routine tests it.

The routine first checks for a valid command. Then it reads the value, and tests it against its limits.

If the command and value are okay, TXTPRO tests to make sure that the top margin is equal to or greater than the bottom margin and that the right margin is equal to or greater than the left margin. Page length must be greater than or equal to the bottom margin. If the command fails any of these tests, an error message results.

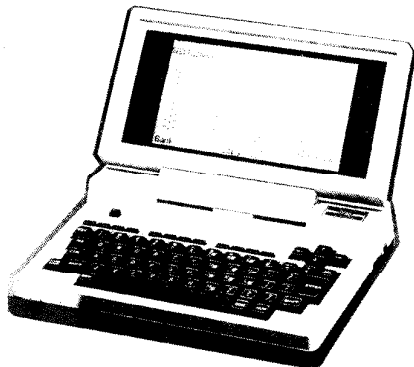
To determine the source of the error, check the text file at the error location. Read it from left to right, as this is what TXTPRO does.

**THINKING LIKE A MACHINE.** The Model 100 has an inefficient file structure for machine-language programs. The user must reserve memory for them even though they exist as stored programs in RAM. In effect, they take up twice as much room as their length.

(continued on page 53)

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RS24

# TURNING WHAT-IF INTO I-SEE

**PSCALC**

Purple Computing  
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Camarillo, CA 93010  
(805) 987-4788  
\$88

By **BOB RYDEEN**

**A** number of firms have begun to glimpse the potential of the empty read-only memory (ROM) socket found on the bottom of the Model 100, the NEC 8201 and the Olivetti M-10.

It's a logical step with benefits for manufacturers and users. Given the memory limitations of the Kyocera-designed lap tops, a dedicated ROM module could be a welcome addition.

But if the programs are as limited as Purple Computing's latest offering, they're too expensive at any price.

Purple has introduced PSCALC, a ROM-based spreadsheet program that runs on the NEC 8201. While PSCALC's manual is superb and its operation is both logical and powerful, the program suffers from the screen-size and memory limitations of the 8201.

**SQUEEZING THROUGH THE WINDOW.** Let me admit a certain degree of bias up front. I use electronic spreadsheets frequently, and find them among the most useful tools for managing a small business.

Firmware applications yield obvious benefits to lap-computer users. Chief among these benefits is conservation of random access memory (RAM). If a program exists in ROM, it needn't be loaded into RAM when it's run. All the RAM space is available for data and other programs.

ROM-based programs run more quickly than those that are loaded via keyboard, bar-code reader or cassette. For some programs, this would make little difference. But when you're recalculating all the values in a large spreadsheet, small differences in execution speed begin to add up.

Firmware needn't be loaded in from that bane of the lap-computer user's existence, the cassette drive. And because it's burned into a chip, it can't be erased or altered.

Electronic spreadsheets are by definition general-purpose tools. Though they require a significant amount of program code to be useful, they needn't be customized for a specific application. All the customization takes place at the user's level at template-building time.

As a result, spreadsheets are particularly good prospects for implementation in ROM. Purple Computing's decision to market a firmware spreadsheet for the 8201 seems a good one. If PSCALC lived up to its billing, it would go a long way toward making the 8201 a more useful computer.

Unfortunately, it doesn't. **FIRST THE GOOD NEWS.** This isn't to say that PSCALC is useless, or a bad program. On the contrary, it has many good points. But on the whole, it's not an excellent spreadsheet program — just a mediocre one that's executed brilliantly.

One of the program's strongest points is its documentation, which is effective and complete. Even the program's weaknesses are covered in an honest, thorough, straightforward manner.

Unlike PSCALC itself, which is the product of a Japanese firm, the manual is a Purple Computing creation. Purple's rewrite for the American market is excellent.

Every program has idiosyncracies, small inconsistencies that inhibit effective program use. PSCALC is no exception. But I was unable to find one that wasn't covered in the documentation. Even a fatal flaw, requiring a cold boot to correct, is explained in enough detail to guarantee its prevention.

The documentation even makes the installation of the PSCALC ROM module foolproof.

Another strong point is PSCALC's price. At \$88, it's less expensive than most cassette-based programs. The price is right.

The expected spreadsheet features are included, though the 8201's inherent limitations preclude many of the bells and whistles of a Symphony. The command structure is adequate. What it does, it does well.

Calculation options include addition, subtraction, multiplication, division and exponentiation. Functions range from absolute value to integer-rounding, from square root to sign identification. Average, minimum and maximum are included as keywords.

There are also some unexpected functions that increase the program's usefulness.

You can install PSCALC in either of the 8201's banks of memory — a handy feature if, like many, you divide the banks according to different applications.

A subprogram called MEMO lets you jot down text entries in your template. You could use MEMO to integrate text and spreadsheet data, just as if you were using a powerful desktop program like Symphony or Framework.

SCHDL lets you set as many as six alarms. When the alarm goes off the 8201 beeps or chimes, and a reminder message is displayed on the screen.

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## REVIEWS

**GIVE IT TO ME STRAIGHT, DOC.** The good news is pretty good. But I'm reluctant to grant PSCALC a thundering endorsement because the bad news is so bad.

When I use a spreadsheet, it's usually for a complicated project.

But complex problems aren't solved with just a few figures. Even a moderately useful template requires a good-sized spreadsheet. And this is PSCALC's greatest weakness — it can't handle large amounts of data.

Each PSCALC column has a user-defined width of five or 10 characters. You can't use narrower columns to save space or memory, and you can't use wider columns to display long text labels or other information.

With five-character columns, PSCALC is limited to 14 columns of data. And if you choose 10-character columns, you get just seven columns.

Even if you disregard the rigid column-width restriction, a limit of seven or 14 columns precludes serious number-crunching.

While a few of my templates fit within the limitations imposed by PSCALC (and for them the program isn't just adequate, but a pleasure to use), the program is too limited to be really useful.

In all honesty, the idea of a spreadsheet — no matter how powerful! — in a lap computer is ludicrous.

**BROKEN PROMISES, FRACTURED DREAMS.** Any program that calls itself a spreadsheet creates high expectations — higher, I'm afraid, than PSCALC delivers.

Some of the fault lies with the hardware. Spreadsheet programs stretch the capabilities of desk-top micros; it's not surprising that a lap computer chokes when asked to compete in terms of number crunching.

On a one-to-10 scale, PSCALC

rates a seven — with an explanation. If you can live within its size limitations, it's an excellent program. If you can't, you're better off spending your money elsewhere.

Purple Computing is an honest company with a number of worthwhile products. If PSCALC's limitations weren't so severe, president Larry Berg would have another hit on his hands.

In fairness, it should be noted that PSCALC isn't a Purple Computing product. It was developed by Tokai Create Ltd. in Tokyo; Purple is merely a U.S. distributor. However,

the excellent American user's manual is a Purple Computing effort.

Purple recognizes PSCALC's limitations, and offers a 30-day money-back guarantee. "The program is great for some applications and absolutely useless for others," Berg admits. "We recommend people try it."

If your spreadsheet needs are modest, PSCALC may be for you. But its faults render it unsuitable for most serious applications. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 180 on the reader service card. If it was of interest, circle 181, and if it wasn't, circle 182.*

## Votrax Teaches Your 100 to Talk

### PS Speech Synthesizer, Model SC-01

Votrax Inc.  
1394 Rankin  
Troy, MI 48043  
313-588-2050  
\$395

By **ALAN L. ZEICHICK**

**H**ave you ever cried out to your Model 100, "Talk to me! Why don't you ever talk to me?" If you have, then the latest product from the research and development labs at Votrax may be just the peripheral for you.

**WHAT IT TELLS US.** The Votrax PS (personal speech) system allows users to add voice-output capabilities to the Model 100. The flexible unit's applications are bounded more by the user's ambition, imagination and patience than by any inherent limitations.

The PS system creates sounds from three kinds of information: text, phonetic characters and non-speech data.

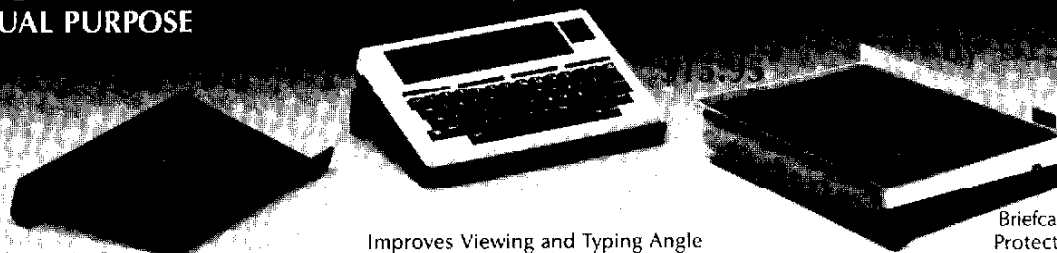
The text option creates speech based on regular words typed in through the keyboard. This is the easiest way to operate the unit, but yields the least pleasing results.

With phonetics, the PS system can duplicate any sound made by the human voice. This option allows users to program the unit to sound quite natural. However, it is time-consuming and complicated.

The PS system's non-speech features allow the unit to make music and sound effects, even to work as a programmable alarm clock.

Taken individually, any of these three capabilities would earn only a mediocre rating for a product. In concert, they provide flexibility and power that make the unit as useful as the operator wishes it to be.

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RS17

## REVIEWS

**TYING IT ALL TOGETHER.** The 12.25 by 5.2 by 3.1-inch, 2.6-pound PS system is encased in a sturdy sheet-metal frame. The back panel holds an eight-switch DIP panel that allows the unit to work with virtually any micro.

The PS system accepts data via either an RS-232 serial or a Centronics-compatible parallel port. Both interfaces are standard — a nice touch that increases the unit's flexibility.

The unit reviewed by Portable 100/200 interfaced without difficulty to the Model 100's serial port via a null-modem cable. The detailed pin-out diagrams given in Votrax's manual are informative, but less helpful than a suggestion to use a standard null-modem cable would be.

The unit's other controls and ports include an external speaker jack, a five-pin DIN plug that accepts power from a supplied AC adapter, a push-button on/off switch and a volume control. A front-panel light indicates when the power is on.

There are two ways to send text to the PS system from the Model 100 or Tandy 200. You can use TELCOM for just fooling around, or you can send data via the RS-232 port from BASIC. TELCOM is easier, but if you want to use the synthesizer's power to supplement your programs you'll have to use BASIC.

**WE HAVE WAYS TO MAKE YOU TALK.** As mentioned above, the Votrax PS system can handle two types of speech: plain text or phonetic symbols. For most purposes, it's easier to use text. Sending "Hello friends" to the unit from TELCOM or in a BASIC PRINT statement yields unnatural — but generally intelligible — results.

Altering the spelling of certain words slightly seems to help. The system pronounces computer as "compyou-ter," for instance, with the second syllable lengthened unnatu-

rally. Spelling the word "computer" looks funny on the screen but sounds better; the "eu" combination creates a shorter "you" sound.

Even with spelling adjustments, the speech is awkward. When precision is required, it's better to use Votrax's phonetic alphabet, which comprises 43 characters.

Phonetic and regular text can be mixed in the same string sent to the synthesizer, as long as each phonetic word is prefaced by a tilde character (~). Unfortunately, the tilde isn't accessible from the Model 100 keyboard, and so the user must add the BASIC statement CHR\$(26) to each string, or instruct the Votrax system to use another character for starting phonetics.

Either way, this makes phonetic pronunciation inconvenient for Model 100 users. Still, the excellent results attainable may make the inconvenience seem unimportant.

**FEATURES WORTH TALKING ABOUT.** The PS system is loaded with additional features that make it more useful than other speech synthesizers. Under keyboard or BASIC control the operator can instruct it to change speech rate, amplitude fade rate, inflection and noise filters. When the unit is producing music, the operator can control tempo, note frequency, note duration and glide.

It's possible to instruct the PS system to serve as an automatic clock, with or without alarms. Once informed of the time through special codes, it can speak the time every 15 minutes, or upon receiving an ESC sequence from the keyboard. Users can also set as many as eight alarms, each with its own verbal reminder. Imagine your co-workers' faces when your computer says, "Five o'clock. Time to go home."

Perhaps the most powerful feature

of the PS system is its Exception Dictionary. Within the unit is a Zilog Z80 microprocessor that controls three kilobytes of user memory. This memory can store commonly mispronounced words with modified spellings that enhance intelligibility.

The example Votrax uses is the name McDaniel, which the unit doesn't pronounce correctly at all. The user can instruct the synthesizer to scan the text to be spoken and, upon finding McDaniel, substitute the words "Mic Dahnyul". The substitution yields accurate pronunciation.

**CARRY ME AWAY.** The Votrax PS system is a versatile device, but it's not geared for portability. There's no battery-power option; the included AC adapter is a large box, reminiscent of the old TRS-80 Model I power supplies. For any single-site use, though, the PS system is fine.

The documentation is weak. The unit comes with three documents: a 55-page System Operator's Manual, a pocket-sized Phonetic Speech Dictionary and a quick-reference card. The manual is helpful as a technical reference, but assume that users know precisely what they want to do with the PS system.

There are commands for changing rates, amplitudes, inflections, voice, envelopes, filters, noises, modes and tempos — but few examples or descriptions of what these commands do.

The documentation's weaknesses aside, the Votrax Personal Speech system is ideal for non-portable applications requiring speech synthesis. Potential uses include recreation, education, manufacturing and work with the handicapped. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 190 on the reader service card. If it was of interest, circle 191, and if it wasn't, circle 192.*

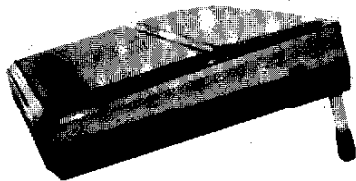
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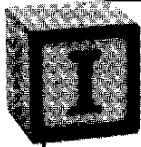
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*An unlikely, sometimes stormy East-West marriage between Kyocera and Radio Shack produced a tiny, brilliant, talkative offspring that may sit in your lap but changed forever the concept and definition of portable computing.*

BY WILLIAM T. WALTERS



I became Radio Shack's pocket computer product manager early one Saturday morning after the hasty departure of my predecessor. It wasn't exactly my first choice of product lines, but I was the new guy on the block. I couldn't be choosy.

There was one bright spot. Jon Shirley, vice president for computer merchandising (and now president of Microsoft) called me into his office that afternoon to tell me the good news. Not only was I in charge of pocket computers, but I was to be involved in the evaluation of a proposed computer from a Japanese firm called Kyocera.

Jon handed me a couple of folders. One was fat with Telexes; the other held 12 pages of product specifications and rough design notes. I'll never forget the devilish grin on his face.

"Here," he said. "Look through these and tell me Monday morning if we should buy it."

It was Saturday afternoon. I had less than 36 hours to form an opinion on the proposal and to move into my new office. I decided that priority three — sleep — would have to be assigned to standby status.

I was about to learn that this was the Radio Shack way.

**EAST MEETS WEST.** Jon wasn't really asking my opinion. He'd already made up his mind to buy the Kyocera unit if we could negotiate the right price.

It was a unique technological opportunity: a battery-powered, notebook-sized computer with built-in

*Who knows what stories lurk within the Model 100 and the Tandy 200?*

*Bill Walters does. Walters was in the right place at the right time to be a contributing force in the 100's development when he became Tandy's product manager for pocket computers in February 1982. Later, he was instrumental in sketching out the performance characteristics of a product that eventually became the 200.*

*Here, Walters describes the birth of the 100. A follow-up article will give the 200's story. — Ed.*

software, a modem and a huge liquid crystal display (LCD). No one else had anything even close. The unit seemed too good to be true.

It almost was. We haggled over the price for months before striking a deal that both Tandy and Kyocera could accept.

The project had two main components: hardware and software.

The hardware was the easy part. The Model 100 released to the public is 97 percent identical to the specifications initially proposed by Kyocera.

There were a few small changes. I said the modem had to have auto-dial capabilities — \$2 in extra parts, tops. Jon said the serial port had to have a standard DB-25 connector, not a round DIN plug. The Radio Shack team was agreeable.

The software was trickier. The design called for built-in software, or firmware, packaged in 32 kilobytes (K) of read-only memory (ROM) chips. That scared the devil out of us. Our track record with ROMs wasn't exactly error-free.

**BY THE STRINGS OF A POUCH.** Bernie Appel, then executive vice president for merchandising and now president of Radio Shack, had advice as well. The new machine would have to have some sort of carrying case — something simple, like a calculator slip case.

Once again, the other project members concurred.

These changes were Telexed to Kyocera in Japan. After much grumbling about the problems of squeezing in dialer parts along with a DB-25 connector, they said they could do it all.

Then it was our turn to grumble. The auto-dialer would cost \$1.30; the DB-25 connector, about \$3; the pouch, \$2.

We negotiated a lower price on the serial connector after two weeks of haggling and at least 15 Telex exchanges. At one point we offered to buy them in the U.S. and ship them to Japan at our cost.

We reached agreement quickly on the dialer. We were ecstatic over its low cost, as it would be extremely valuable to users.

But Bernie Appel drew the line on the pouch. Kyocera had known we wanted one before they agreed to the selling price. As far as he was concerned, they owed Radio Shack the product complete with pouch.

Again we haggled. This time it went on for two months with neither side budging.

In May 1982, Bernie traveled to the orient with Tandy chairman John Roach as part of an annual product search. During the trip they met with Kyocera. Although minutes of the meeting were highly edited before distribution, the pages still radiated the heat of battle.

In the end, the pouch was flung onto the table. "Look," Bernie told them, "no pouch, no Model 100. I guess we'll just cancel the order and look around CES (the Consumer Electronics Show) to see what else is available."

That speeded up the negotiations. Kyocera quickly relented. It was a good thing, too, because Bernie was serious. He would have killed the project if they hadn't included the pouch.

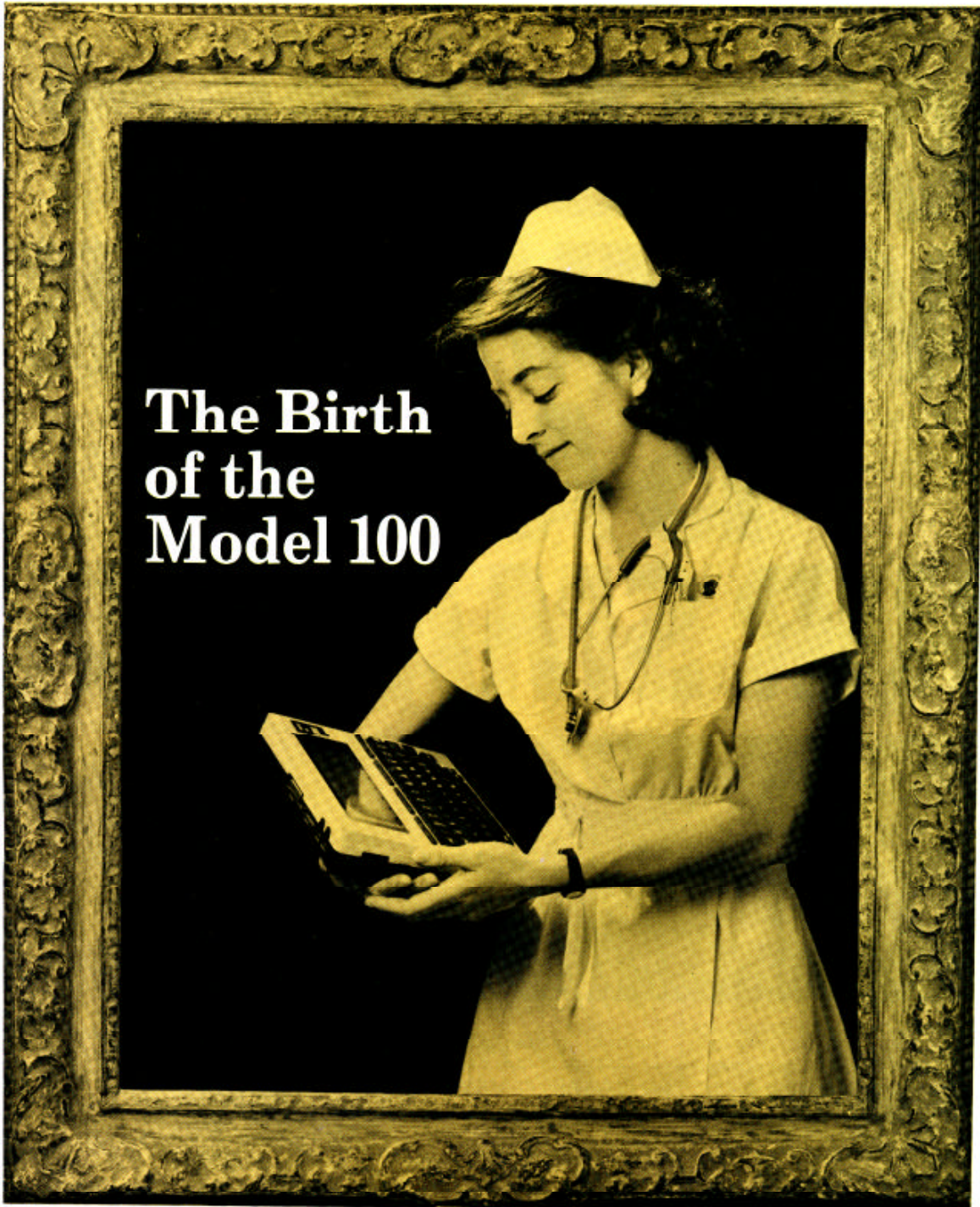
**SEATTLE SOFTWARE.** Back home, things were jumping. The computer merchandising department was buzzing with a complete product-line reorganization.

With all the interest in the new Model 16, the Model 4 and the conversion of the Model II into the Model 12, I was pretty much left alone with the new little computer.

The software plan was simple. The specifications read: BASIC, text editor, scheduler, calendar, alarm, communications. The programs were to be provided by Microsoft according to Radio Shack's specifications.

In my naivete, I believed it. I made my first pilgrimage to Microsoft's Seattle headquarters in April. Radio Shack applications software director (now director of business products and computer mer-





## The Birth of the Model 100

chandising) Van Chandler and I went to the Pacific northwest.

I was in awe. I was about to enter the software brain-trust of the micro-computer world. Our mission was to see exactly what Microsoft had in mind.

**GENIUS GENESIS.** The meeting lasted from 2 p.m. until after midnight. I felt a little awkward — Van and I were the only people wearing suits. We were also easily the oldest partici-

pants. Bill Gates, renowned for his genius, rocked back and forth in his seat. Occasionally he reset his glasses and brushed back his hair.

Kazuhiko Nishi (Kay for short), vice president of Microsoft, Japan, was there too. He was short, full of energy and buzzing constantly with ideas. I learned months later that the entire project, both hardware and software, was a direct result of his efforts.

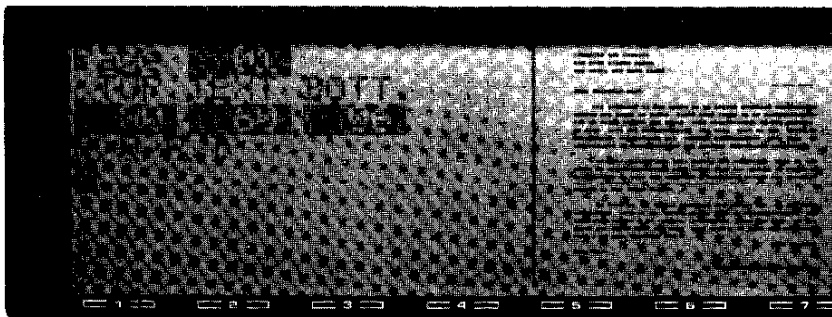
But that's another story.

Van and I couldn't believe our eyes. Bill and Kay laid out a plan for a portable UNIX-like computer with lots of interesting capabilities: multi-sorted lists, the ability to extract information from any file at the menu level, true scheduling/calendar interaction, even an alarm.

No thought had been given to BASIC, the text editor or communications software.

(continued on page 50)

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# WELCOME TO THE PORTABLE SIG

Imagine a forum where you could meet with more than 5,000 Model 100 users to exchange gossip, operating tips, public-domain software, product reviews and applications ideas for your portable computer.

Sound too good to be true? It's not. You've just imagined the Model 100 Special Interest Group (SIG).

With their built-in modems and telecommunications software, the Model 100 and Tandy 200 are built to communicate. The hardware/software combination lets users on the Model 100 SIG access software, reviews, documentation and — most importantly — other users who might have developed solutions to common problems.

The only charge for accessing the SIG is CompuServe's connect-time. Rates vary according to time of day and the particular packet-switched carrier that services your area of the country (see figure one).

In the months ahead, this column will help you utilize the Model 100 SIG and introduce you to some of the other features and services available through CompuServe.

Although officially named the Model 100 SIG, Portable 100/200 magazine is the sponsor, and the SIG will include Tandy 200 news.

**ONE SMALL STEP FOR A USER...** SIG access requires that you have the right hardware to connect your Model 100 or Tandy 200 to a telephone line,

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figure one

and that you have a CompuServe ID number.

The easiest way to make the phone-line connection is via the Radio Shack direct-connect modem cable (part no. 26-1410). It's available at Radio Shack stores and computer centers for \$19.95.

If you don't have modular telephone jacks where you live, you'll need an acoustic coupler (part no. 26-3805, \$39.95) to connect the computer to your telephone handset.

Both devices include a free hour of CompuServe connect time and instructions for becoming a CompuServe subscriber. After the first hour, you'll be charged CompuServe's hourly rates.

Once you've logged onto CompuServe, you'll see the main menu.

At this point, you can select any of hundreds of pages, each the repository of a different CompuServe service. Menus provide a step-by-step means of finding the precise service that interests you. It's also possible to bypass the menus and skip directly to any particular page.

The page for the Portable 100/200

SIG is PCS-154. PCS means the SIG is part of CompuServe's personal computing section; 154 is a place-holding number assigned by CompuServe.

To access the SIG directly from CompuServe's opening menu, issue the command GO PCS-154 at the command prompt (!). This takes you to the SIG's opening menu (figure two).

**...ONE GIANT LEAP FOR TELECOMPUTING.** Once you've entered the SIG you can utilize its three main functions: public-domain software, conferencing and message exchange.

A good first step is to put your printer on ECHO mode with a press of function key 5, and issue the CompuServe command MI (member information). This will provide you with a printout of most of the information needed to utilize the SIG effectively.

Future columns will be devoted to the SIG's contributed software library, conferencing and how to join the message exchange, plus tips about other valuable services available through CompuServe.

In the meantime, good luck on the SIG. If you need help, call on system operator (sysop) Dave Thomas. His CompuServe ID number is 76703.446. Or contact Portable 100/200 directly at ID 76703.372. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 170 on the reader service card. If it was of interest, circle 171, and if it wasn't, circle 172.*

```

CompuServe          Page PCS-154          figure two
Welcome to Model 100 SIG, v. 3B(25)

Your name:         Alan & JD @ P .5      76703,372
Last on:           20-Feb-85 09:08:43
You are user number 303026

There are 0 members in conference

Forum contains messages 6790A to 68464
The latest message you have read is 68409
    
```



	1	2	3	4
	January	February	March	
Labor	2134.7	1679.67	1258.84	
Materials	5946.87	4782.25	2371.48	
Total	8081.57	6461.92	3630.32	
SALES	23789.56	27652.68	36456.82	
Net Prof	15707.99	21190.76	32826.5	

Meeting with J.R. 3:00 19th Fl.

# A NEW STAR IS BORN

## Out of Radio Shack's Famed Model 100 Evolves the Advanced Technology Tandy 200

Our new Tandy 200 portable computer does what no other computer could.

It takes our amazing Model 100 one step further.



And like the Model 100, the new Tandy 200 proudly carries our Advanced Technology symbol, your assurance that the Tandy 200 includes state-of-the-art features and performance at an unmatched price.

### The Next Generation of Portable Computing

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### Improved Word Processing Software

An improved version of the Model 100's easy-to-use word processing program makes the

Tandy 200 especially useful for journalists, students and anyone who needs to write letter-perfect memos, reports and correspondence in a hurry. Edit, delete and move blocks of text with the touch of a function key. It's that easy. The portable Tandy 200 computer gives you the convenience of a personal word processor for use anytime, anywhere.

Four other "instant-on" programs let you use the Tandy 200 as your personal appointment calendar, address and phone directory, and telephone auto-dialer (the Tandy 200 generates tone dialing pulses, so you can use it with long-distance services). A much more powerful built-in program for communications makes it easy to access other computers by phone. You can program in BASIC, too.

### A Bigger Screen and a Larger Memory

The Tandy 200's new flip-up liquid crystal display has 240 x 128 resolution for big, clear graphics and easy-to-read characters. The 16-line by 40-character display makes the Tandy 200 particularly well suited to word processing and spreadsheet duties and with simple BASIC commands you can add dot-addressable graphics to your text.

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# THEY WANT TO SEE OURS

**T**he response to this column has been terrific. Each month we learn about more and more of you.

In fact, to get a better handle on the Model 100 user groups across the country, we enlisted Radio Shack's help. Boy, wasn't it a surprise to learn that we knew more about your presence than they did. They've even asked to see our list.

It's wonderful to be on the receiving end of so many of your newsletters. They make for fun reading. We'll be sharing selections from some of them in this issue.

## From the Windy City

**N**EC users in the Chicago suburbs looking for computer ties can join the Northern Illinois NEC User Group (NINECUG) in Glen Ellyn. These enthusiasts meet the third Monday evening of each month at member Joe Beda's home.

Writes newsletter editor John Thill, "We use a structured approach when we meet with individual members giving presentations on topics of interest." Their latest talk covered dBase II.

Member John Lin has discovered a remote bulletin board system (RBBS) in Rhinelander, Wisconsin devoted exclusively to NEC people. The data line is 715-362-3444. Accepting 300 or 1200 baud modems and operating evenings, the board offers discounted NEC software and hardware.

According to Fred Facht of NINECUG, this RBBS includes the usual on-line CP/M board features: a message subsystem, four drives of downloadable public domain software, and an array of utilities and games. A board well worth a long distance phone call, says Facht.

## Sailaway

**F**or those Model 100/Tandy 200, NEC or Olivetti users in the San Francisco Bay area, there's a thriving user group of about 75 members. With many members of the "I'd rather be sailing" mentality, chairman/treasurer Rachel Holmen reports sailboats are where a great number of members use their machines.

"The group has everything from beginners to programming experts," says Holmen. "We've had demonstrations of disk drives, software and book reviews." An evening of telecommunications was even dedicated to calling local bulletin boards.

Holmen says they'd love to meet members of other 100 user groups if visiting the Bay Area. They've got their eyes out for any programmers passing through town who specialize in converting 100 programs to the NEC and vice-versa.

Also the publisher of a newsletter, Truly Portable, Holmen sent us her first issue. (She's made sample copies available for \$2.50.) A rather impressive 10-page directory of portable computers, accessories and software was featured. "We know our machines aren't toys," she writes.

Interested readers are invited to contact Holmen on CompuServe (ID 75066.107) or by writing Box 1169, Berkeley, CA 94701.

## Newsletter News

**S**ysop Rick Hansen of Abacus On-line, introduced here last month, offers a trick for user group newsletter editors. Members of this California group are urged to send news blurbs as ASCII files in E-mail. The editor can then download the messages to his or her computer.

A healthy sign proving how sophisticated Model 100/200 and NEC owners have become is the addition of classified ads in many newsletters. After monitoring those received from groups in California, New York and Illinois... there's a lot of trading going on. Portable computerists are upgrading their systems, updating their software and anxious to use the latest products.

Another growing newsletter feature is the inclusion of program and software libraries. One group has gone a step further by making programs available on disk. For \$4, any library volume can be yours.

And to keep track of members and their interests, a number of editors have included user surveys in their recent issues. From an editor who has already tabulated the results from his group, the majority of his peers use the 100/200 and NEC for word processing, pleasure and business, in tandem with desk-top computers. They are not programmers, but love to fiddle with their machines and make them work. □

*Editor's Note: We want to keep readers informed about Model 100 user groups. If you know of a group in your area, let us know about it. If you've some info about your user group that you'd like others to know about, let us share it with readers. Send user-group correspondence to Nancy Laite, Portable 100/200 Magazine, Highland Mill, Camden, ME 04843. Or call us at 207-236-4365.*

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 160 on the reader service card. If it was of interest, circle 161, and if it wasn't, circle 162.*



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RS58



**COLD WEATHER, COLD POLITICS.** Interspersed throughout the weekend conference, attendees continued to ask, "How cold is it?" So Greenly phoned the weather bureau.

"At the moment, the temperature is minus 1 degree, with a wind chill factor that feels like minus 23. Tonight's low will feel like minus 50 below." Tomorrow will be more of the same, "not the best day for a parade," reported Greenly.

"Aren't you guys being sucked into the illu-

sion, just a little?" questioned Dr. Memory, a former DJ and California recording studio owner. "When the windchill factor hits fifty below in DC tonight, pull the limo over and ask one of the city's homeless how rich he or she feels."

"Sherwin, the ones I feel most sorry for are the workmen who had to work in the bitter cold, putting up all those seats and stages, only to have the darn thing cancelled," sympathy from reader Cynic Al.

*continued from page 18*

12:35, Central Daylight Time, six minutes later. The Packers lost, but the News-Chronicle won!

After many successful transmissions, only once did Flannery have trouble sending a story via the telephone from his machine in Florida.

He was in Tampa covering another Packers game, writing as the game progressed. He got on the phone to send his story, but it came out garbled by the time the sports editor got it. Flannery said he should have changed phones because he heard static on the line. He said it was not the fault of the 100, but it sure was frustrating.

**PRECEDENT SET.** Poppenhagen said the success of using a Model 100 for sports led to looking into the possibility of "putting a Radio Shack into the hands of every reporter." There was no comparison between the 100s with their versatility and capacity of functions, and the limited VDT's, known as "dumb terminals".

Plus, the investment of less than \$10,000 in 10 Model 100s was relatively small. According to Poppenhagen: "The cost of the Model 100 was much lower than any of the traditional kinds of VDT systems . . . . If there was a power outage, such as the one recently that lasted three-and-a-half hours, reporters could continue to write on their 100s using battery power."

So it was decided. We would each be issued a Model 100. But what about the day-to-day deadline scramble. Who had time to fool around with a new computer?

**COMPUTERPHOBIA.** Poppenhagen started using a 100 two months before the rest of us so he could answer our questions and work out the coding bugs. Being a computer lover, he wasn't the least bit hesitant about getting to know the 100.

He speculated on our reluctance. "There's a certain fear of anything new," he explained. "Certain people are intimidated by the word computer. Also, under deadline pressure, reporters are wont to use the familiar VDTs, even though they're less efficient."

Poppenhagen had worked with a sophisticated computer system at another newspaper before coming to The News-Chronicle. He'd also just purchased a home computer. He was sold on computers and delighted with the 100.

**GOOD WITH THE BAD.** There haven't been any unpleasant surprises yet. But we're wondering how well they'll hold up under constant use.

So far we've seen no evidence of wear. As Poppenhagen observed, "Electronic

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things don't wear out like mechanical things do." We're hoping he's right.

A reporter who goes to a meeting with his or her 100 is able to write some of the story during the lull. That's a lot more efficient than writing a massive story all at one time.

It also creates a bit of a stir. According to reporter Chris Sampson who has taken his computer to meetings, "You end up explaining how it works to everybody there," he said.

His only complaint with the 100 is its small screen. "With only eight lines visible at a time, as compared to twice as many on the VDTs, it's hard to keep your train of thought going," he remarked.

Entertainment reporter Ellen Zettel said she was distracted when first making the transition from the terminals. "I thought it wasn't keeping up with me" because the words typed didn't appear immediately on the screen. "Now I know it's... it's incredibly easy and convenient" to use, she concluded.

There's only one of us who've fought the change-over to the Model 100s. Veteran newspaperman Pat O'Donahue said he doesn't trust anything electronic: "Machines I get along with, but nothing electronic. With a typewriter, I'm the power source."

His distaste for the 100, he admitted, is pure romanticism. "I think a lot of the newspaper business romance is lost." With the introduction of computers, "it's switched to the Barbara Cartlands of the world," he said ruefully.

**CLAUSTROPHOBIA.** The small screen puts off another reporter. Reporter Jonathan Drayna said, "Sometimes I feel like I just want to grab the cursor and pick it up and stick it where I want it to go."

He misses the satisfaction of physically dealing with his mistakes, too. "I wish it were something I could crumble up and throw in the wastebasket," he said. "It's not gratifying — you can't release your hostility."

"Besides, I feel a little claustrophobic working on the small screen of the 100. But the advantages far outweigh the drawbacks," he summed up.

"They're not perfect," admitted Poppenhagen. "The small screen and complex codes are a couple of disadvantages, but the ability to turn out perfect copy in any location is good for a reporter's ego. Everybody who touches them, loves them!"

"Dr. M., you bring up something that needs to be considered," responded Sherwin Levinson. "Not just briefly and not just when it's cold outside. It'll take the kind of national agreement we had on the space program to really solve the problem of street people, homeless and mentally incompetent people who have been put on the street without adequate care or preparation. I wish I had an answer, but people have been talking about it for a long time and there's no sign that we're any nearer to a solution.

"Meanwhile, this weekend it's almost a necessity to have a vehicle on call if we're to get to these events. As long as we have it, I'll be damned if I won't enjoy it. I guess, though, that I still have enough ingrained need for guilt that I won't sleep quite as well tonight as I would have if I hadn't read your note."

"My resentment," retorted Dr. Memory, "is towards the Reagan mentality. 'Life is better for us, so screw the less fortunate.'"

*continued on page 40*

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RS14

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# Write ROM<sup>®</sup>

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**PCSG says "Send it back in 30 days for a full refund if you don't agree."**

WRITE ROM is the definitive word processing extension for the Model 100. Less than two months after the Model 100 was announced Portable Computer Support Group introduced the very first text formatter for the Model 100. That program, called Write + was licensed to Tandy and is now in Radio Shack Computer Centers as Scripsit-100. Write + had many powerful features and most reviewers still say it is the best of the cassette based text formatters.

But now eighteen months later PCSG has introduced WRITE ROM. Those who experience it have said "WRITE ROM literally doubles the text processing power of the Model 100."

WRITE ROM is what you would have expected PCSG, the software leader for the Model 100, to develop in the 18 months since Write + was brought to the market.

First of all WRITE ROM as it's name implies is on a snap in ROM. You

simply take a quarter and open the little compartment on the back of your Model 100 and press in the ROM cartridge. It is as easy as an Atari game cartridge and can be snapped in and out instantly so that you can use other ROM programs whenever you wish.

WRITE ROM appears on the main menu just like one of your built in programs. It lets you do every formatting function you would expect like setting margins, centering, right justifying and having headers and footers. But it does them under function key control, with the clear and easy to learn and use techniques for which PCSG has become famous.

In keeping with PCSG's long standing reputation for superlatively simple yet comprehensive documentation, the manual is a model of lucidity.

WRITE ROM remembers your favorite format settings so that you can print a document without any set up, but you can change any formatting or printing parameters instantly with a function key.

WRITE ROM's 'pixel mapping' feature shows you an instant picture on the screen of how your printout will look on paper. Incidentally, PCSG introduced this feature on the Olivetti M-10 version of Write + over a year ago.

In all there are 44 separate features and functions that you can do with WRITE ROM, and some of these features are truly breakthroughs for the Model 100.

First, WRITE ROM lets you do search and replace, with function key ease of course. Any word or phrase in a document can be searched for and replaced with any other phrase where the search words appear.

Second, WRITE ROM lets you send any text (formatted or not) to any other computer over the phone with just a function key. What's more, it dials and handles sign on protocol automatically.

Third, WRITE ROM has a wonderful feature called 'Library' that gives your Model 100 power that you never thought it could have. Library lets you



record favorite phrases, words, or commonly used expressions (sometimes called boilerplate). Any place you wish any library text to appear in your document you just type in a code. WRITE ROM automatically inserts the text just like a Xerox Memory Writer.

The library phrase is inserted as your document is being printed rather than as it is being typed, so this feature conserves memory in documents where a long phrase is used repetitively, since each occurrence of a library phrase in your document is indicated by a single code character.

This Library feature is so powerful these two pages could be devoted just to telling you about things it can do. For example, you can have names and addresses that you designate in one text file with a customer or supplier number. Or you can have inventory items with stock numbers.

In your document you simply type in the customer or stock number and that entry from the other file is automatically inserted in the document. Picture what you can do with that kind of capability.

Because WRITE ROM is written in machine code, it is blindingly fast. No one can claim faster operation.

Because it is on a ROM it uses virtually none of your precious RAM for its operation, and it does not interfere with other machine code programs in your RAM. It works with any printer, serial or parallel. At the touch of a function key you can find the size of a RAM file in bytes and in words (ideal for journalists and other writers who need to know how many words are in a piece). You can make a duplicate copy of a document file under a new name. You also can rename or delete (kill) any RAM file with function key ease.

This description only scratches the surface of this amazingly powerful piece of software. You can automatically insert the date or the time anywhere in your document; WRITE ROM senses when you are nearing the bottom of a page, and at your command will start a new paragraph on the next page.

Write+ was the Model 100 pioneer in the use of 'dot commands' to allow control of such things as margins, centering, line spacing and other appearance related changes in the middle of a document. WRITE ROM goes a step further by making all the dot commands Wordstar compatible. This means that if you wish you can quite easily prepare a Wordstar compatible document. Then you can use features of WRITE ROM (such as pixel mapping) that Wordstar lacks, before uploading to your desktop.

A Mail Merge feature allows you to send the same document to every name on your mailing list, personalized for each recipient.

WRITE ROM enables you to do underlining, boldface and correspondence mode as well as any other font feature that your printer supports in a way that is so unique many users say "It is worth the price of the program just to have this one feature."

Here's how it works: When you want to underline you don't have to remember some complicated printer code. You just type Graph-U, and to end underline you just type Graph-U again. For boldface it's Graph-B and to end boldface it's Graph-B again. It's easy to remember and easy to do. WRITE ROM lets you record the codes from your printer's manual one time only and then just use these easy to remember signals any time you want to do a printer font feature.

WRITE ROM does so many things that other text formatters cannot do.

For example you can not only double space but triple, quadruple or any other.

WRITE ROM allows you to use your TAB key in a document so that you can indent the first line for a paragraph easily or space rapidly over many tab stops.

WRITE ROM has another nice feature. It allows you to undent. This means that you can have paragraphs that have a first line that projects to the left of the remainder of the paragraph.

WRITE ROM allows you to not only center a word or phrase on a line but you can center copy vertically on a page as well.

There are many other examples of excellent programming evident in WRITE ROM. The line feed problem of the Model 100 is dealt with by the simple use of a function key. Files are selected by moving the wide bar cursor over the WRITE ROM menu.

PCSG makes the claim that WRITE ROM is the easiest, fastest and most feature rich text formatter for the Model 100, as well as being the only one on a Snap-in ROM. You can do more with WRITE ROM than anyone thought possible for the Model 100. We at PCSG are happy to offer WRITE ROM because it expands the Model 100 to a dimension of text processing you cannot equal on even larger computers.

If you are already a PCSG customer you know the impressive quality of PCSG craftsmanship. We brashly state that WRITE ROM is the best you can buy. But don't take our word for it. It is sold on a thirty day trial. If you aren't as excited as we are, return it within 30 days for a full refund. Priced at \$149.95, on Snap-in ROM. Mastercard, Visa or COD.

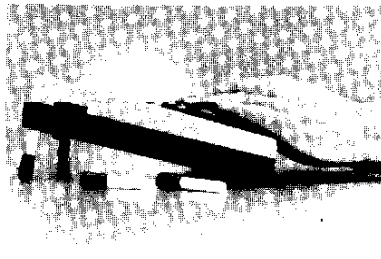
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RS23

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RS47

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## INAUGURAL (from page 37)

"You are correct that solving the problems of poverty will require a national consensus and commitment comparable to that which launched Americans into space. . .

"The right stuff for the Eighties? It might be compassion, but we'll never know with Reagan in the White House. . . Poverty's problems aren't the fault of this administration. Sympathy and succor are the ethical responsibility of each of us. Effort expended in empty celebration of a mythical 'city on a hill' (with slums extending below as far as the eye can see) is effort tragically wasted," mused the doctor.

And from a high school student named Kenny came this ponderous opinion directed to DVU: "I didn't want to get into politics but one of my feelings is that our country would do better if we believe in our President.

"Most of the pro-Reagan people I've spoken to are very pro-Reagan. I know the same applies to the non-Reagans, but there were a majority of Pro-Reagans who voted to keep him in office. As long as we have faith in our government we'll invest in business and produce more income. I feel the hoopla Reagan makes is very important to restoring the national pride and faith necessary in our country.

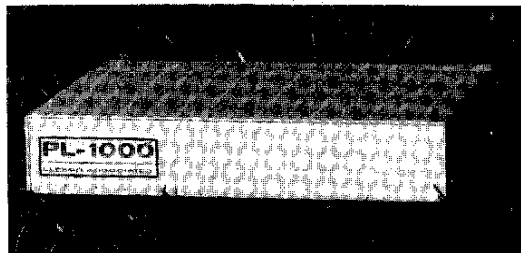
"I'm sorry if Mondale doesn't agree with my sense of values more than Reagan, but Mondale's not an exciting man. He doesn't capture the public's imagination. That we need now. Later we can elect a man like him to sort this country out but now we need to believe what Reagan promises. Once we're on the road to recovery we can elect a more realistic president," voiced the student.

**LEVINSON ON THE CEREMONY.**  
I'm sitting in the Senate radio/TV press gallery. Only 1,000 people remain, cut from the original 140,000 invited. All are crammed into the rotunda. There's barely breathing room. Our tickets are essentially worthless. Except that they got us into the Capitol. Only ten press people and four cameras were allowed into the rotunda, so I guess I don't feel too bad about it.

You be the editor! Please help the editors of Portable 100/200 by rating this article according to its overall value to you as a Model 100 user. If you found the article very valuable, circle number 150 on the reader service card. If it was moderately valuable, circle number 151, and if it wasn't valuable to you circle 152. Thanks. — Ed.

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RS19

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# INAUGURAL

So here I am, probably in a much less comfortable seat than you have, sitting in a small studio watching the Inauguration on TV, just as you could. Perhaps 1,000 feet away the actual ceremony is taking place, and it might as well be an equal number of miles.

Dr. Memory's comment on Participant has been preying on me, bringing out old doubts and questions. A tremendous amount of time, money and human effort has gone into this ceremony. I'm sure that the cost of this event, even though it comes to millions, would not have made a significant dent in the problems of the poor. What would it add up to? A dollar or two each? One meal?

But the effort that went into this — that could have made a difference. The nearly 8,000 students who practiced and practiced, sold tons of candy, just so they could be here — the question is how could that kind of effort be channeled into solving some of the problems that are with us?

The oath of office has just been taken. You can feel the boom of the big guns as they do the 21 gun salute — shaking the building. It's odd hearing it on the TV then *feeling* the deep boom a noticeable split second later.

**LEVINSON ATTENDS THE BALL.** There are a total of nine official inaugural balls. This is one of them, in the historic Pension Building, now the National Building Museum. This is the hall to which honorees from only two states, Vermont and Tennessee, have been invited because also invited here are the "biggest givers".

I really have no idea what to expect inside. The long line of limos dropping off guests, press and workers, the uniformed doorman, are in keeping with my vague mental image. The tight security meant turning on our recorders so the guards could see the tape reels moving, careful scrutiny of handbags and inevitable metal detectors aren't in keeping with the image but, again, expected.

But entering the building itself I'm immediately disappointed. I'm not exactly sure why, but I expected a large crowd of glittery, smiling, elegant people and a setting that reeks of opulence — maybe like the lobbies of the very best hotels. The Pension building was said to be one of the most beautiful settings for a ball in all of Washington.

It looks more like a train station. And it's cold! I'm not feeling it much — wearing an extra T-shirt and leg warmers under my tux. But I feel sorry for the ladies in sheer, low-cut gowns.

Six-foot high reproductions of the Inaugural Ball invitation, banners bearing the official seal of the 50th American Presidential Inaugural, the official seal again on either side of the central platform, set within the flowers, eight-foot-high flower arrangements bearing flags with the seal, tables where the guests can get their souvenir plastic bags

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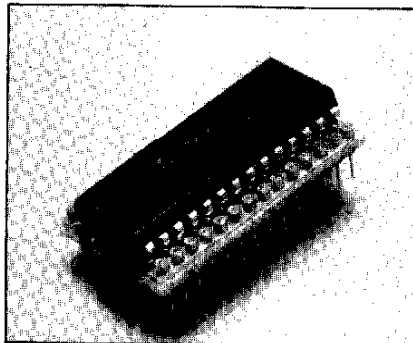
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## INAUGURAL

containing three informative booklets about the event and official packages of M&Ms and jelly beans — all bearing the ubiquitous seal, plastic drink glasses with the seal — these are the props for this coveted event.

At either end of the room is a stage. There are two dance bands: Lester Lanin and his orchestra and Warren Covington and his orchestra with the Pied Pipers.

I'm surprised the Secret Service doesn't have to dress formally. After all, even the press and the staff are required to. Mike suggests it might be that formal dress would interfere with their effectiveness. I imagine there are some in formal dress among guests and try to figure out who they are.

There are two levels of balconies above the main floor. The first balcony, affording the best view, is lined with boxes of eight seats each with champagne and glasses (plastic glasses) provided for each box. These cost \$2,500 each per person. An invitation to one of the balls merely conveys the right to purchase a ticket.

I'm also surprised there's no food being served — no chips or pretzels at the bars, no hors d'ouvres. Okay, so it isn't a Bar Mitzvah, but it's cold in here despite the growing crowd and hot lights. I'm among the many guests who would kill for something warm.

## Portable Adapts to AP-Style Environment with GRPH Key

By Jesse G. Hillman

**W**hen you 'beat' a Model 100 in my office, that means you take the lap-sized computer, give it to a street reporter and tell him: "This is what you type your copy on from now on."

As computer systems manager for the Commercial Dispatch, a daily newspaper in Columbus, Mississippi, I can tell you the acid test for any electronic equipment is simple: give it to a newspaper reporter or production typist for a few weeks — the bugs will show up pronto.

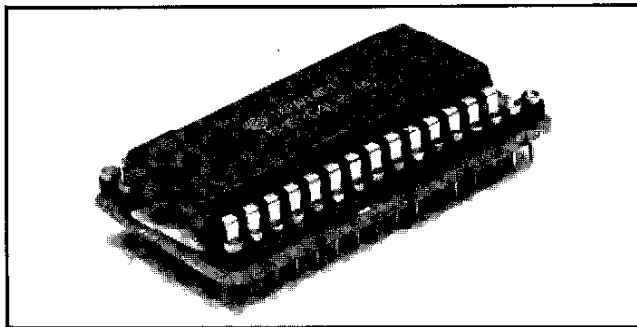
Any reader who has been around a newspaper office can tell you it is a climate of controlled mayhem aimed at one goal: producing finished copy and pages by strict deadlines. Time is money. And you don't take electronic junk and put it in an environment like that.

**PROBING FOR A PORTABLE.** A few years ago the only portable data terminals available for the newspaper industry that were worth taking to the field cost in excess of \$5,000. Sitting in a corner of my office right now is a machine that works from a digital cassette deck, has only a 2K buffer in which to compose copy before dumping to cassette, has only rudimentary cursor-controls, and costs \$5,295 new. Recently, the prices of some terminals for the newspaper market have dropped to \$3,000. But that's still high enough to make managers think twice before buying one.

When the Model 100 was first displayed at the local Radio Shack computer center, I was skeptical. But I was hopeful there'd be possible applications for the newspaper. I'd completed, albeit unsuccessfully, a lengthy foray through local and regional

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RS13

computer dealers' businesses trying to find an off-the-shelf computer with off-the-shelf text-processing software that'd be compatible with the tough environment a newspaper offers computerized equipment.

I was very specific in my demands on the software during my search. I can tell you the Cadillac word processors I looked at for Osborne, Kaypro and the IBM PC just couldn't cut it. People I talked to were downright skeptical about both my requirements of their machines and my belief that there was an answer to my five-year old question: "Why can't I have a simple remote terminal that won't cost like the dickens?"

**SEARCH ENDS WITH 100.** I examined the Model 100's manual. The first

thing I noticed was that Radio Shack doesn't call its text processor a word processor. One of the major stumbling blocks to using the other systems I had looked at was the fact that the feature-packed software used the first 32-ASCII characters for various text control functions.

When you transmit a file to the PDP 11/34 that forms the heart of the production system for my newspaper, that file has to be preceded by certain ASCII control codes that make the text look like a news story being transmitted by Associated Press. There are also specific end-of-the-paragraph codes and file ending codes that have to be used. Otherwise, a text file flies right by the system without being recognized.

Disheartened when I saw the Model 100 uses the control keys I wanted for

There's no coffee either. Many resort to munching on their precious souvenir M&Ms and jelly beans.

It's 9:15 p.m. and the place is more crowded — I guess three- to four-thousand people.

A band with crisp white uniforms and red hats files onto the balcony behind the central platform. They're bearing long heraldic trumpets with banners hanging from them. They handle their instruments with the stiff precision of a drill team.

Banks of flood lights come on and I hear others echoing outloud my speculation about whether these are for the benefit of the TV camera, which have their own lights, or to make it easier for the Secret Service to scan the audience. (Earlier one of the agents had explained to me they weren't particularly worried about the size of the crowd. They consider this a "filtered environment" — everyone has been required to undergo a security check before being allowed to enter.)

**HAIL TO THE CHIEF.** No doubt the Presidential party is about to enter.

Yes, here comes the White House press corps, setting up just inside the velvet-roped barrier that separates the platform area from the rest of the floor. Next, a fresh contingent of Secret Service agents. Their faces are as stiff and hard as if chiseled from granite and

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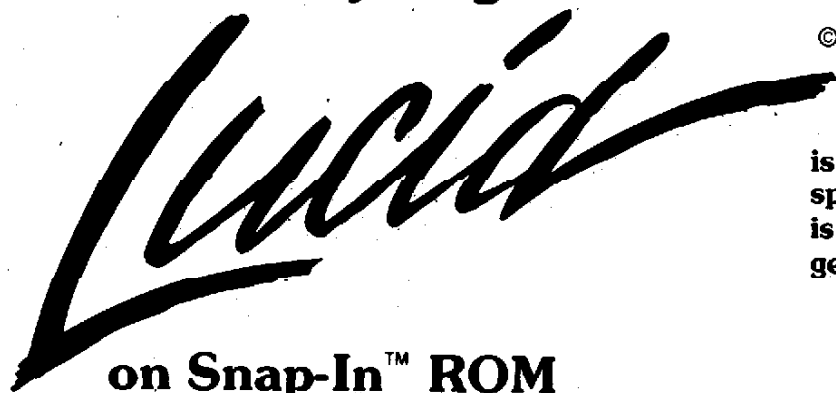
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LUCID<sup>®</sup> is amazing in so many ways. First of all, it is memory conserving. It will let you build a large spreadsheet—255 row by 126 column capacity. Where other spreadsheets actually consume 4 to 5 bytes for an unused cell, LUCID<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

Thirdly, LUCID<sup>®</sup> 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<sup>®</sup> also allows you to set column widths individually, and of course LUCID<sup>®</sup> has insert row and insert columns, as well as other standard features. LUCID<sup>®</sup> even lets your formulas refer to cells in other spreadsheet files. Further, LUCID<sup>®</sup> 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<sup>®</sup> supports all BASIC math functions as well as Log, sine, cosine, tangent, exponentiation and other sophisticated math functions.

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

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 calculation 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 inquiries 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 questionnaires, 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 over-used 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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# INAUGURAL

their stares sweep the hall from side to side like radar.

I become very, *very* self-conscious about pulling my camera and recorder from the pockets of my tux. I'm careful not to make any sudden moves.

The band director signals and the trumpets are raised in perfect unison. "Hail to the Chief" blasts out, vibrating in my bones, making me almost unconsciously stand at attention.

President and Mrs. Reagan jauntily stride

in with the President's daughter Maureen and her husband. They're smiling, obviously enjoying this ultimate celebration of their victory, at ease among those representing the inner circle of their staunchest supporters.

They both look good, a sharp contrast

text manipulation, I turned the page. But alas, the 100 can general every code from OOH to FFH, using combinations of CONTROL, CODE and GRPH with the rest of the keyboard. I asked the computer center manager if I could tinker with one for a while and found he was more than willing to let me play to my heart's content. Three hours later, I had a test file transmitted from Radio Shack to the newspaper's system.

My other worry was durability: could the 100 stand up to the daily demands of news gathering? My initial test transmission was in late summer. The next month I gained approval to buy the newspaper's first Model 100 and try it, on an experimental basis, at our news bureau in a town about 30 miles from the home office.

**CUB REPORTER.** The reporter — like most reporters I have known — could have cared less about the gizmo I handed her. "So I'm going to be the guinea pig," she grunted when I told her. "Hmmm. . . ." Like most reporters during these days of electronic newsrooms, she, too had lost copy through power failures and static electricity discharges. Understandably, she didn't feel comfortable with any of the equipment.

Her Model 100 is now the oldest of five assigned to Commercial Dispatch reporters. Each reporter is equipped with the same package: one 24K Model 100, acoustic cups for the modem, CCR-81 cassette recorder and a briefcase to carry the lot in. The entire Model 100 system we use for our reporters weighs less than a third of what the older portable terminals do. It's a lot less bulky and less expensive. Each outfit costs about \$750.

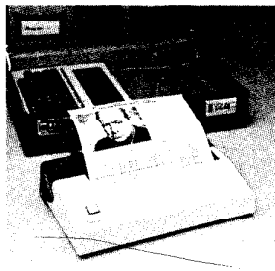
The sports editor can now write his column at home after hours in the quiet of his living room. Our bureau reporters can write and transmit copy from anywhere. We are still proving the flexibility of the machines, starting slowly from a half-hearted experiment to the point where the managing editor is asking when her staff will get more machines.

**GRPH THE KEY.** As an outgrowth of our use of the 100, I have prepared a three-page adaptation of the manual for our reporters' use, with appropriate adjustments to make the copy fit our production system. After entering TEXT, for example, the reporter uses the GRPH key and appropriate alpha keys to generate the

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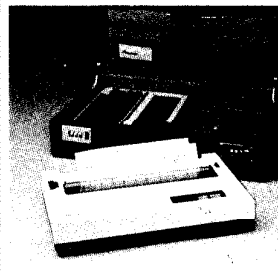
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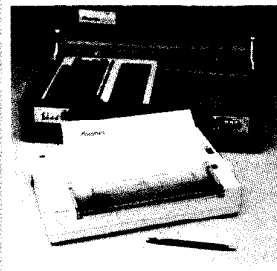
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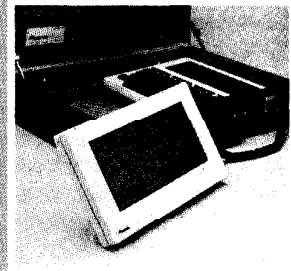
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## INAUGURAL

from when I saw them at the Republican convention where they both looked much more tired and worn, older. He appears to be wearing no makeup. The bright lights are very revealing, especially at my distance of about 15 feet. I laugh out loud when someone

nearby loudly remarks how lifelike the President looks.

The President beams about the just-released economic news and the reaction of the stock market — which he attributes to the inauguration. "You ain't seen nothing yet,"

he boasts. And with special thanks to his group who have contributed more than most to this second victory, the party turns and walks out waving and smiling, soaking up the applause. Actual time in the room: less than five minutes.

necessary header. This enables the 11/34 to recognize the file, name it and place it in the appropriate directory.

The reporter then composes his story, again using the GRPH key to generate the proper paragraph ending for the first paragraph only. This three-key sequence is then saved via Select and Copy functions so that throughout the rest of the session the Paste key can be utilized to provide the same one-key paragraph endings offered by our larger system.

Ending the file is a two-keystroke sequence, again utilizing the GRPH key. As a precautionary measure, since the system seems to have a sensitivity to static, all reporters are trained to store and retrieve their files from cassette.

As a matter of fact, GRPH, which gives the Model 100 user access to over 70 spe-

cial graphics characters, is the key to its successful use by the newspaper. The special characters it generates are translated by the newspaper system as the hexadecimal characters the production system needs to recognize the file. Without those special graphics characters offered by the 100, there would be four less terminals for our reporters to use.

**ON THE SCENE.** Training the reporters to use the 100 has been boiled down from the two-day grind with the first one, to a three-hour briefing and practice session. This may be reduced even more.

Transmitting a file to our system is straight out of the Model 100 manual. Since most of our reporters are accustomed to using various types of remote equipment anyway, one practice transmission is all they need before going to the field with their new terminals.

It is worth noting the reporters using the 100's are generally the antithesis of the computer professional — their idea of personal computing doesn't get past playing games. Yet they use a general purpose machine for a specific application and have yet to get bogged down in computerese they neither want nor need to know.

From where I sit, successful use of the 100s has freed terminals on the larger system for copy editors and put reporters where they need to be: on the streets gathering news instead of hanging around the newsroom waiting for a vacant terminal. □

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## INAUGURAL

By Monday afternoon, long after the Washington guests had only a memory left of the Inaugural weekend, Parti readers continued their volly. Back and forth their discussion went, a political ball.

More than 80 joiners continued to share opinions and enjoy the immediate feedback this uncensored medium offered.

And just to insure more conferences, they closed their Inaugural Day discussion with a question. How much influence buying went on to make the 50th American Presidential Inauguration the festivity it was? Did its ostentation reflect the power behind the throne?

The reader known as Peggy reported she'd been investigating this connection for the past year. "These festivities are a celebration of power in the most frightening sense of the word," she said during the conference. "I'm certainly hoping that more will be revealed. . . if it happens, I promise you'll hear it here first!"

Computerized journalism and electronic conferencing have arrived. Reporting style that requires writing on the fly, both would be impossible without lightweight, battery-operated computers like the Model 100. □

## Knowing How Many Words Important for Freelancers

By J. Omholt-Jensen

If you're like me, a dependent on the Model 100 for generating weekly articles by the truckload, you know what I'm talking about. Figuring the word count of each piece is a beast. And no one wants to have to do a manual count to come up with a total.

So two programers helped me with a byte count, but it didn't give me the exact number of words I was cranking out. To the rescue came my programing brother and his boss. Between them the nine-lined program WCOUNT.BA was created. Although slow, it works beautifully.

**DOWN FOR THE COUNT.** After testing the program in the field, I improved it by adding a series of beeps. The program requires 30 seconds to determine 290 words, one minute to tabulate 570 words, and so on. Before the beeps were added, I often forgot it was counting words, and would interfere by trying to do something else. Now the beeps instantly tell me when the job is done. □

I can include the word total on my feeds to papers or wire services. The total helps the translators who often have to manually count words sent in. I simply add the count to the bottom of each page of translation. This saves my association both time and money.

```

20 W=0:P=0:F=0
30 INPUT "ENTER THE FILE NAME
   HERE ==>";F$
40 OPEN F$ FOR INPUT AS 1
100 X=ASC(INPUT$(1,#1)):IF EOF(1)
   THEN F=1:X=0
110 IF (X2) THEN P=1:GOTO 100
120 IF (P=1) THEN W=W+1:P=0
130 IF (F=0) THEN GOTO 100
140 CLOSE 1
150 PRINT F$: "CONTAINS ":"W:"
   WORDS."
160 BEEP
170 PRINT
180 BEEP
190 PRINT
200 BEEP
    
```

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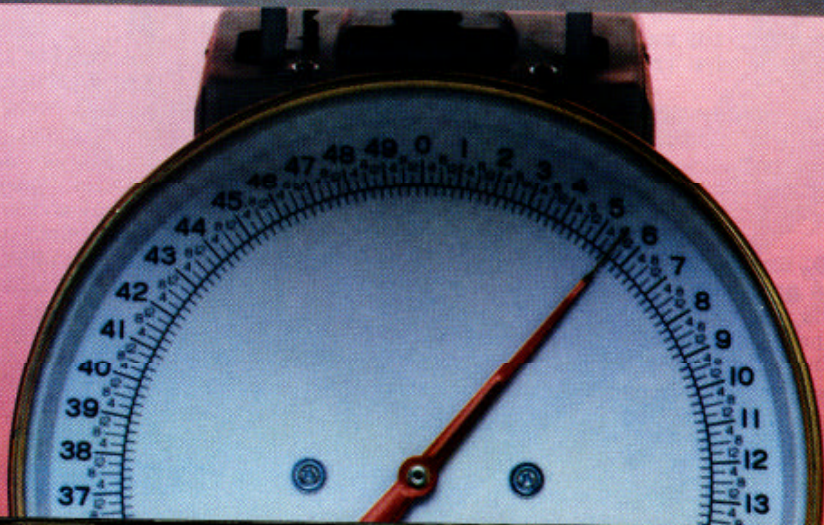
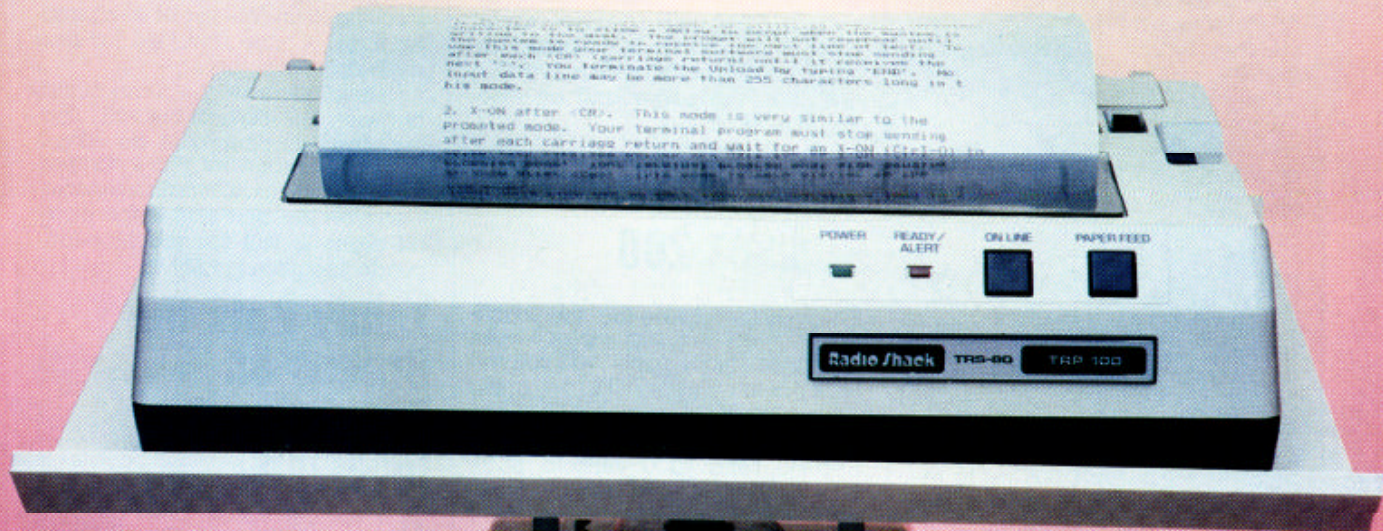
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# VENDORS GREET 200 WITH MIXED REACTIONS

**D**isappointed. That's the word Chattanooga Software Associates manager Ray Hoskins uses when asked about the Tandy 200.

"I expected the 200 to be more of a jump in memory and screen size," he says, "more like the NEC Starlet. The 200 isn't significantly better than the Model 100 for most tasks, and the price is too high."

Bert Sperling, president of Portland, Oregon-based Dataaccount Inc., says he's disappointed too. "I haven't seen the product yet, so I can't speak authoritatively," he says, "but it looks to me like the Starlet and the Geneva are the hot products in that market."

Sperling says his firm probably won't develop programs for the 200. "We don't see much of a software aftermarket for lap computers," he says. "We'll be concentrating on MS-DOS programs from here on out."

"I'm puzzled by the 200's memory limitations," says Larry Berg, president of Purple Computing in Camarillo, California. "But I think they may have made a good choice with the screen size. After working with the (Epson) Geneva, I think 40 columns may be the largest readable size for an LCD."

Like Sperling, Berg has yet to receive a 200 to use in his software development efforts. "One of the dealers in town has promised to call me the day he gets one in," he says. "I'm eager to try it."

Berg's company is already supporting NEC's Starlet with memory add-on products. Like most vendors, he compares the Model 100 to the Starlet and the Geneva. Each retails for about \$1,000.

For the record, NEC says the differences outweigh the products' similarities. "There's no comparison," says Chris Good, the NEC product development manager in charge of

the 8201 and the Starlet. "The Tandy 200 is just a superficially upgraded Model 100. The larger LCD is a plus, but its operating-system revisions limit its compatibility with the 100's software base. The similar price point is misleading — the two products just aren't in the same league."

The 4.75-pound Starlet has 64 kilobytes (K) of random-access memory (RAM), 96K of read-only memory (ROM), a 16 by 80 LCD, a 300-baud modem, and ports for adding a microfloppy disk drive, a bar-code reader and a cassette data recorder. The unit operates under CP/M and includes ROM-based implementations of WordStar, BASIC, a data-base manager and an electronic spreadsheet.

## TSI to Support 200

**T**raveling Software Inc., the Seattle publisher of a catalog of Model 100 applications, says it will convert many of its more popular programs for the Tandy 200.

According to TSI president Mark Eppley, Tandy 200 versions of T-Backup, T-Base, Idea and the Traveling Writer are already available. "We ported them over as soon as we had a development unit," Eppley says. "The 16-line screen makes a big difference."

Although the 200 versions are more powerful than the Model 100 implementations previously offered, TSI plans no price differential between the two product lines.

Production versions of Idea (a pre-release version was reviewed in last month's Portable 100/200) have found applications in publishing TSI

reports. Among the journalists now evaluating the program as a writing aid are the Chicago Tribune's Henry Kisor, the Washington Post's Michael Schrage and Evelyn Richards, technology-beat columnist for the San Jose (California) Mercury-News.

The latest project at TSI's development labs is code-named T-View 80. Eppley reports that the program provides an 80-column format for the Model 100's TEXT and TELCOM programs. Sixty-character lines are displayed on the screen in a TSI-developed typeface, with horizontal scrolling to enable use of 80-character lines — the standard for most desk-top computers.

"It helps increase the compatibility between the 100 and the 200," Eppley says, "and provides an 80-column display format that's compatible with dial-up information services."

Maybe the best part is the price. TSI plans to sell the machine-language program for \$39.95.

## Tandy Puts the Brakes on European Invasion

**A** mid-December press advisory from Tandy's corporate offices relayed the welcome news that the Fort Worth company would form a jointly owned distribution company with Applied Computer Techniques of Great Britain. The new company, TA ComputerWorld, would operate a retail chain with 70 outlets throughout England and continental Europe.

By the first week in February, Tandy and ACT had scaled down their plans. The companies' new

(continued on page 64)



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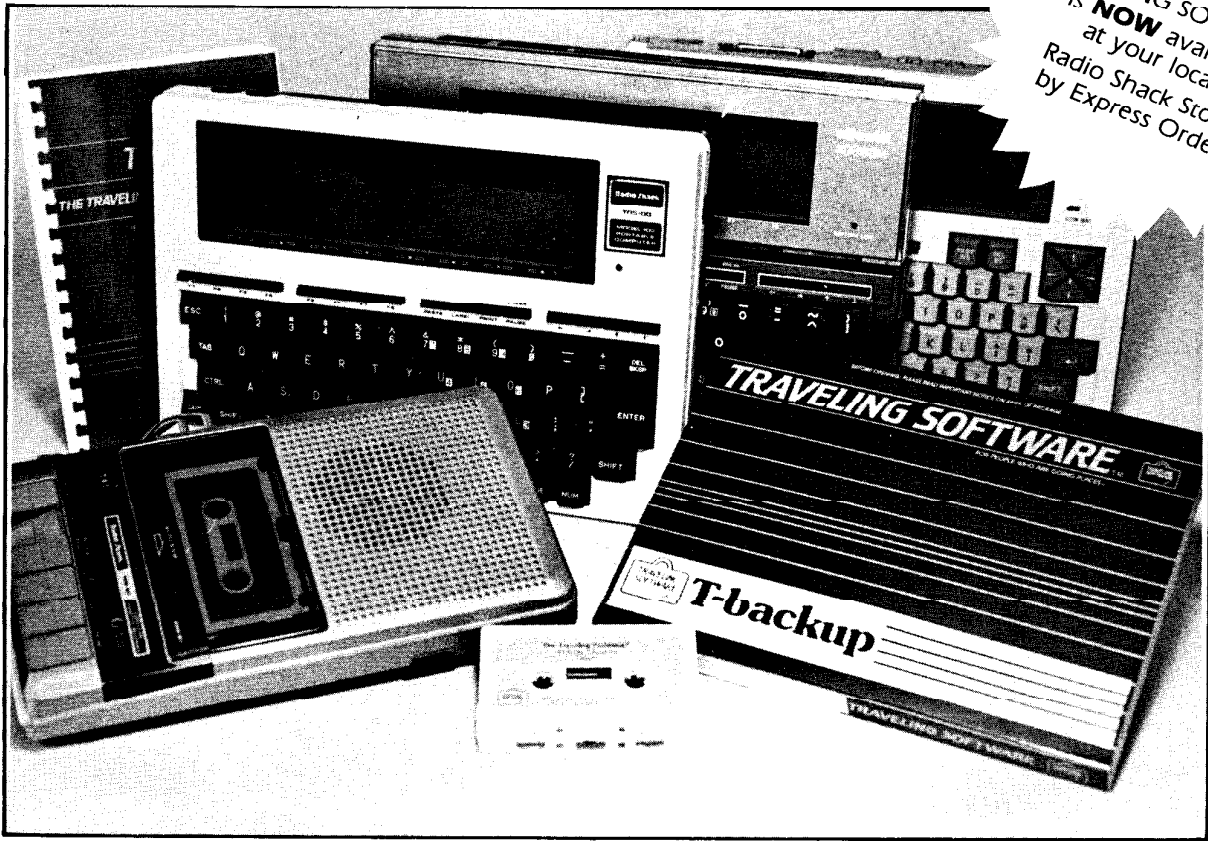
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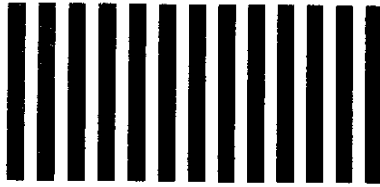
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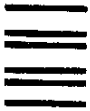
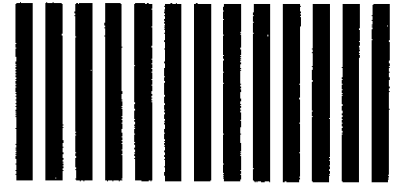
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## TXTPRO (from page 23)

One way to save RAM is to reduce all memory requirements except for a few bytes at the execution address. Typing `SAVEM "TXTPRO", 61460, 61470, 61470` reduces memory overhead, but doesn't allow you to use another machine-language program in the reserved memory.

or your Model 100's acting strangely, do a cold restart and reload the program.

Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 135 on the reader service card. If it was of interest, circle 136, and if it wasn't, circle 137.

table one  
TXTPRO 2.0 Format Command Table

Function	Format	----- Value ----- Command Default Low High
Page Length (lines)	+PL##	66 1 180
Left Margin (spaces)	+LM##	12 0 130
Right Margin (spaces)	+RM##	72 1 132
Top Margin (lines)	+TM##	6 1 179
Bottom Margin (lines)	+BM##	60 2 PL
Line Spacing (lines)	+LS##	1 1 180
Page Numbering	+PG##	0(off) 0 254
Number of copy	+NO##	1 1 254
Tab spaces (spaces)	+TB##	0 0 LM
Printer control	+PR##	0 0 255

Center a line **+CL** Centers the text  
 New page **+NE** Start a new page  
 Keyboard input **+KB** Type in text  
 Change paper **+SS** Enter-Paper ok

To suppress a CRLF (line): Place a + (plus sign) before the end of text marker.

To print a (+) plus sign: Use two in series.

To make a Header: Place it at the top of the file; define its start and end with: **+HD**

To make a Footer: Place after the Header, if any, and at the top of file; define its start and end with: **+FT**

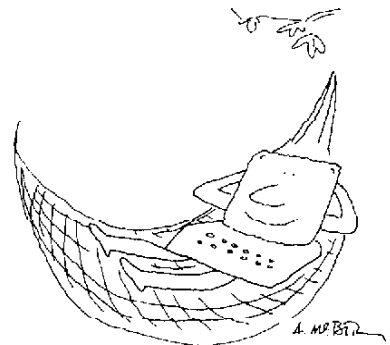
To center a line of text in a Header or Footer: Place an @ in first position of the line.

To make a page number: Place **+##** in either a Header or Footer; not both.

It's possible to change TXTPRO's built-in default values. Just POKE the new value into the appropriate location: for page length, 61542; left margin, 61547; right margin, 61442; top margin, 61557; bottom margin, 61562; line spacing, 61567.

You can make the changes permanent by re-storing the program.

As with all Model 100 programs, it's best to buy yourself a little insurance against present and future bugs. Back up the files you care about. If TXTPRO doesn't work right,



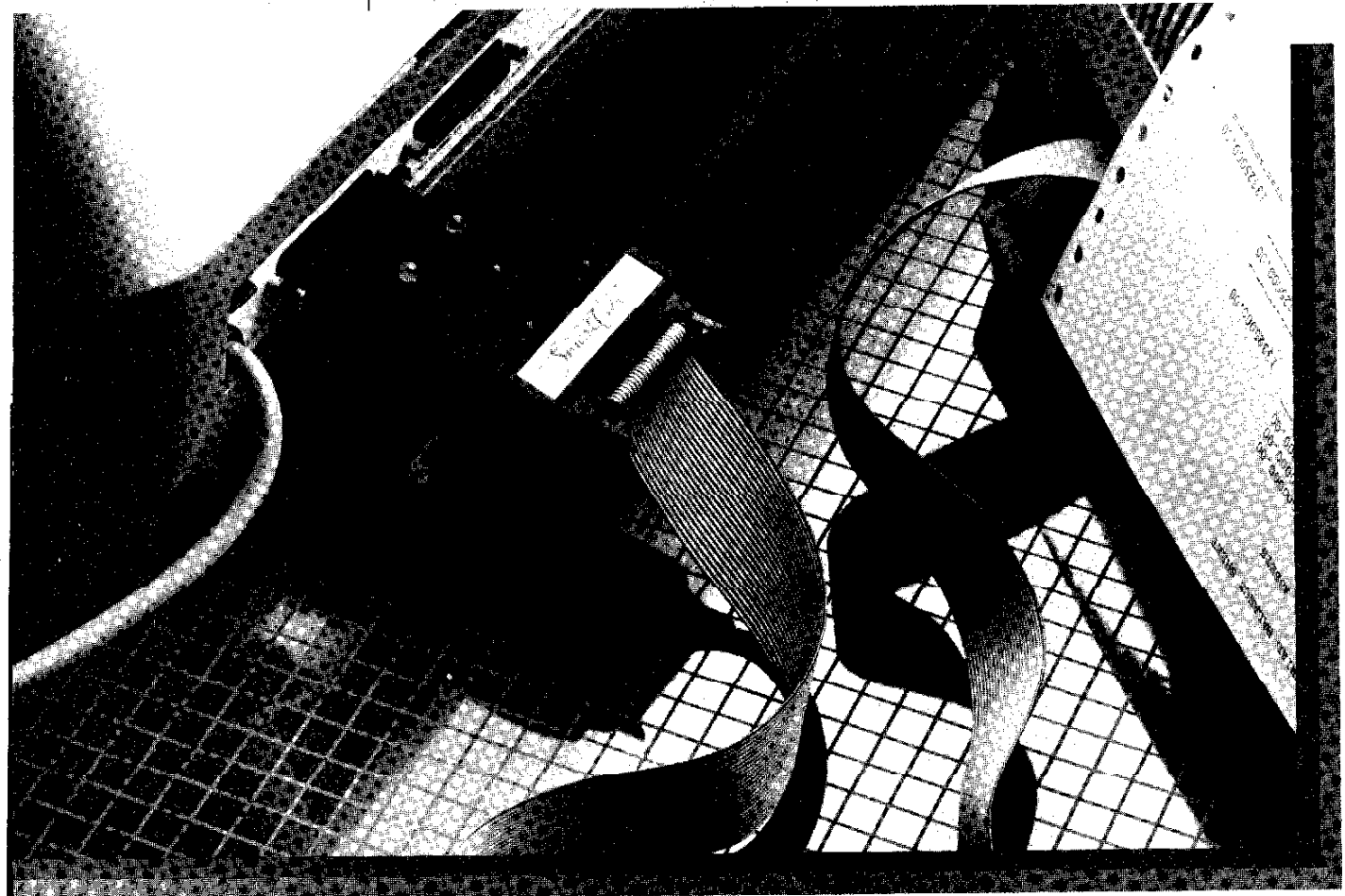
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# PARDON THE INTERRUPTION

Model 100 BASIC's ON event GOSUB command provides power and flexibility.

By David D. Busch

**W**ere interrupting our presentation of program generators to offer a programming tool this month, and provide an introduction to the Model 100 and Tandy 200's powerful BASIC interrupt capabilities.

Many of the previous Radio Shack computers have used the Zilog Z80 microprocessor. The TRS-80 Model 100 and 200 use a related chip, the 80C85. This is a complementary metal-oxide semiconductor (CMOS) version of the veteran 8085 microprocessor, a member of the 8008, 8080, Z80 family that is so popular among Radio Shack and CPM-based computers. The CMOS attributes allow the chip to be operated at much lower power levels; hence the viability of the battery-operated Model 100 and 200.

While the 80C85 shares many of the same instructions as the Z80, it has much better interrupt features. The microprocessor can be instructed to poll various registers continually. When the right sort of action is found, the chip interrupts whatever else is going on and performs an alternate activity prescribed by the programmer.

All other commands and statements in BASIC are carried out only when the program encounters them. That is, 100 PRINT "Hello" is interpreted by BASIC only if program control goes to line 100 — either

because it is the next line number or the program was directed to jump to line 100 because of a GOSUB or GOTO command.

**ETERNAL VIGILANCE.** Interrupt routines are different. They allow the programmer to turn a particular feature on or off at some point in the program. When enabled, the computer constantly checks for a given event and when it happens, sends control to a line number the programmer specified earlier with an ON (event) GOSUB (line number) statement. Interrupts

of this sort are commonly known as event trapping routines. The most common type, found in virtually all BASICs, is the ON ERROR GOSUB (line number) routine.

By placing the ON ERROR GOSUB statement at the beginning of your program, you turn the error trapping feature on. Thereafter whenever the Model 100 or 200 encounters an error, program control is directed to the line number you specify. Without error trapping, the Model 100 simply stops the program

## listing one

```
100 CLS
110 PRINT "What time would you like to be alerted:?"
120 PRINT "Use HH:MM:SS format"
130 INPUT FTS
140 AS=LEFT$(FTS,2)
150 BS=MID$(FTS,4,2)
160 CS=RIGHT$(FTS,2)
170 IF VAL(AS)>23 OR VAL(BS)>59 OR VAL(CS)>59 THEN PRINT "WRONG FORM
    AT!"
    :GOTO 110
180 IF MID$(FTS,3,1) <> ":" AND MID$(FTS,6,1) <> ":" THEN PRINT "WRONG
    FORMAT!"
    :GOTO 110
190 TIMES ON
200 ON TIMES=FTS GOSUB 230
210 GOTO 1000
220 ' *** TIME IS UP ***
230 CLS
240 PRINT "TIME IS UP!"
    :BEEP
250 STOP
1000 ' *** YOUR PROGRAM STARTS HERE ***
```

# INTERRUPTS

and displays a cryptic two-character error code.

The Model 100 and 200 have a variety of ON (event) GOSUB (line number) routines available. Most of these can be started or initialized early in the program, but switched on and off as you direct. For example, ON KEY GOSUB interrupts whatever you are doing whenever one of the defined function keys is pressed. You can define one or all eight function keys for this routine. The others are ignored.

ON MDM and ON COM interrupt your program whenever a character is received from the built-in modem or arrives over the RS-232 port.

ON TIMES GOSUB lets you be a clock-watcher, with your program interrupting you when a desired time is reached. This is a handy way of providing for a timer in any BASIC program.

**PUTTING INTERRUPTS TO WORK.** Listing one illustrates the use of interrupts. Line 190 turns the event trapping on, while line 200 tells the computer where to send program control when the event finally occurs.

listing two

```

10 *****
20 * * * * *
30 * ERROR HANDLER *
40 * * * * *
50 *****
60 -----
70 * * * * *
80 * * * * *
90 ERR: ERROR CODE
100 ERL: LINE ERROR IS IN
110
120 -----
130 * * * INITIALIZE * * *
140 ON ERROR GOTO 170
150 GOTO 360
160 * * * * *
170 E=ERR
180 IF E>22 AND E<51 THEN E=21:GOTO 220
190 IF E>58 THEN E=21:GOTO 220
200 IF E=57 THEN E=21:GOTO 220
210 IF E>30 AND E<30 THEN E=E-29
220 IF ERL=65535 THEN PRINT "ERROR MADE IN DIRECT MODE":GOTO 230
230 PRINT "ERROR IN LINE";ERL:ON E GOSUB 250,260,270,280,290,300,
310,320,330,340,350,360,370,380,390,400,410,420,430,440,450,460,4
70,480,490,500,510,520,530,540
240 RESUME
    
```

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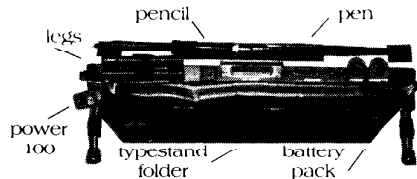
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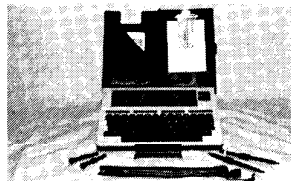


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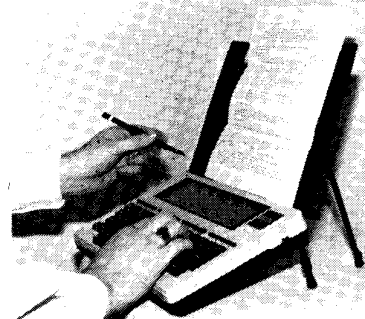


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# INTERRUPTS

```

250 PRINT"NEXT without FOR":STOP
260 PRINT"Syntax Error":STOP
270 PRINT"RETURN without matching GOSUB":STOP
280 PRINT"Not enough DATA available.":STOP
290 PRINT"Illegal function call.":STOP
300 PRINT"overflow error.":STOP
310 PRINT"Out of Memory.":STOP
320 PRINT"Undefined line number.":STOP
330 PRINT"Subscript out of range.":STOP
340 PRINT"Re-dimensioned array.":RESUME NEXT
350 PRINT"Division by Zero":RESUME NEXT
360 PRINT"Illegal direct":STOP
370 PRINT"Mixed string and numeric variable types.":STOP
380 PRINT"Out of string space. CLEAR more.":STOP
390 PRINT"String too long":RESUME
400 PRINT"string formula too complex. Rewrite.":STOP
410 PRINT"Can't Continue.":STOP
420 PRINT"Input/output error.":STOP
430 PRINT"ON ERROR without RESUME.":RESUME
440 PRINT"RESUME encountered without ERROR.":RESUME
450 PRINT"Undefined Error.":RESUME
460 PRINT"Missing Operand":STOP
470 PRINT"File number unavailable.":RESUME NEXT
480 PRINT"That file not OPEN":STOP
490 PRINT"File not found":FILES:STOP
500 PRINT"That file already open":RESUME NEXT
510 PRINT"Input past end of the file":RESUME NEXT
520 PRINT "Bad file name":RESUME
530 PRINT"Statement without line number in file":STOP
540 PRINT"That file has not been OPENed.":STOP
550 ' *** YOUR PROGRAM STARTS HERE ***

```

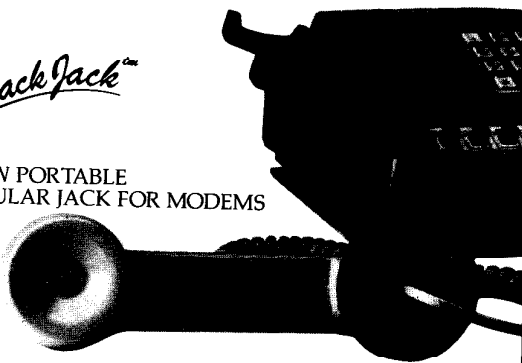
Error Handler (listing two) provides you with a tool for your own program generators or BASIC programs. You may put this routine within programs you are debugging as a speedy way of determining what errors have taken place. There is no need to look up the cryptic two-character error codes the MEWS provides.

You may also build in error-trapping routines to help naive users. Once an error has been found, and control sent to the proper subroutine, you may correct the problem and then RESUME the program at an appropriate place. The Model 100 allows sending control back to the same place the error took place (RESUME) or at the following line (RESUME NEXT). In many cases, RESUME is not appropriate, because the error is a fatal one. Some suggested results are included. You may change them to suit your own programs. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 115 on the reader service card. If it was of interest, circle 116, and if it wasn't, circle 117.*

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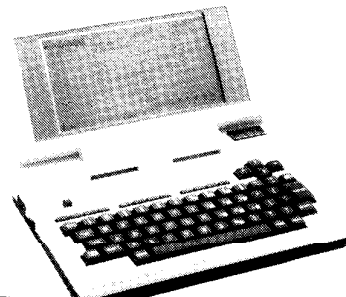
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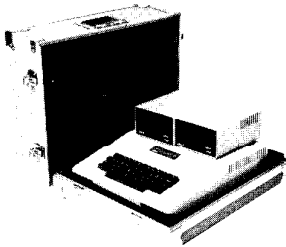
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## BIRTH (from page 29)

We ended that first meeting with more questions than when we began. Microsoft asked us to draft the communications specifications since they had little knowledge of that area. We had to respond in two weeks.

**TWO-WEEK TASK.** Meanwhile, Microsoft would draft specifications for the text editor, prepare a list of BASIC keywords and functions, and supply us with memory requirements for each. We all knew the memory space in ROM was limited. Something would have to be cut.

Our thorough specifications required 16 function keys — eight unshifted and eight shifted. They provided automatic status parameter changes, multiple log-on procedures, selectable file buffering and editing and so on.

After two weeks of work we were satisfied. We sent the specs to Microsoft.

The end of May found Kay in Fort Worth with a list of BASIC functions and a description of the proposed command structure, complete with general-purpose input/output protocols. We were intrigued, and set to work making sense of the specifications.

**PRETTY BASIC.** BASIC would have a full-screen editor that used the eight-line, 40-column LCD as a window on a full-size page. Microsoft proposed that we include all the standard extensions of its version 4.8x BASIC, plus a binary-coded decimal (BCD) math package.

I had agreed to the BCD package earlier. It guaranteed greater mathematical accuracy at the expense of processing speed.

Jon had impressed upon me the potential importance of the Model 100 to business people. I was determined to make it truly useful for that target audience.

We were told that the text editor would use the same code as the BASIC editor — it just wouldn't require line numbers. We accepted this information tentatively, saying we wanted more definite information as soon as possible. Kay agreed.

The original deadline for the first pass on software came and went. We had decided on specifications, but Kyocera was becoming anxious that schedules would continue to slip.

**DON'T SPEAK THE LANGUAGE.** It became apparent that it was extremely difficult for Microsoft to answer questions about the Model 100's software.

This wasn't Microsoft's fault. The programmers were from Japan, where they worked for Kay's Microsoft division. (Their names appear in the final ROM as RICKY, HAYASHI and SUZUKI.) They worked long hours, often putting in 12-hour days. Part of our difficulty was that they spoke very little English and our translator, Kay, was back in Japan.

After several heated Tolox exchanges between Tandy, Japan and Microsoft, we opted for a quieter medium for discussing the development — electronic mail. First thing each morning, I called Seattle and logged onto the mail system. The programming team was fluent in written English, and we could easily discuss the issues without fear of misunderstanding.

**STILL NOT THERE.** In mid-July I received the first working software. It arrived on a set of ROMs on a plug-in auxiliary board that trailed behind the 100 and required its own five-volt power supply.

As expected, BASIC was wonderful. But scrolling was horribly ugly and slow.

The text editor was awful. You had to command AUTO and it appended line numbers to each line. There was no automatic word-wrap. It was like a dumb typewriter.

I wasn't pleased.

Neither was Jon. "Go up there and see what you can get done," he said. "But remember the schedule!"

Two days later I sat across from Bill Gates and explained the problems. The programming team from Japan was also there, and showed its results. Bill, who hadn't yet seen the text editor, agreed with my assessment. It wasn't very nice, he admitted, but he felt it was usable. I didn't. More discussions.

Then inspiration struck, and Bill ran across the room to the blackboard.

He began sketching his concept of a modeless editor, one that used simple metaphors like cut, copy and paste — like a scaled-down Xerox Star. He estimated that it would require 2K of additional memory; more functions would have to go.

The big problem was that it would require a restructuring of the internal filing system, new coding and

## BIRTH

testing, and removal of some other code. The bottom line: it couldn't be completed before September 15, nine days after my approval deadline on the current schedule.

The change was important, well worth the wait, but I'd have to convince Jon and Kyocera.

**BACK TO PORT WORTH.** Jon wanted the complete story. He asked me to get Bill Gates to come down and explain the advantages and disadvantages.

Bill arrived the first week in August and we had a powwow. Computer merchandising director Ed Juge was there, along with Mike Grubbs, the software project manager for research and development. Gates laid out the system's full scope.

After six hours we were in agreement. The layout of the function keys, cursor keys and command keys would have to be changed to accommodate the new design concept. I was assigned the unpleasant task of explaining all the changes — complete with the adjusted schedule — to Kyocera. We predicted a minor explosion, and weren't surprised when it came.

The September 15 deadline passed without word — or prototype — from Microsoft. Mike and I went to Seattle for another meeting.

**DEADLINE DESPAIR.** Kyocera had sent one of its project managers to Seattle to watchdog the company's interest until I released the software. He chain-smoked and groaned as we added delay after delay to handle small problems.

After all the software details were agreed upon, the programming team said the only way they could make it all fit was to remove BASIC's PRINT USING function and possibly shift back to the smaller, binary version of the math package. I refused to allow this. More groans — but in the end, they did it.

We developed new schedules. The new ROMs would be ready for testing the first week in November. I would approve software for release November 30.

Kyocera decided to ignore the possibility of a last-minute change and mask the ROM as soon as Microsoft released it to Radio Shack for testing. In this way, the first production samples could still be shipped on December 7.

Any bugs would have to be corrected during a second masking, at Kyocera's expense.

**SEATTLE FINALE.** Time was short. As the deadline approached I decided to make one last trip to Seattle. I left work one Saturday afternoon and flew into Seattle. I checked into a hotel at 6 p.m. and slept until 10 p.m.

I got to Microsoft at about midnight. The programmers were still there. We talked for a while about the last-minute changes, then I set out to review the final ROM.

To make my 1 a.m. Monday return flight, I had to leave by midnight Sunday. It took about five hours to program 10 sets of EPROMs, and so everything had to be set in stone by 7 p.m. Sunday.

Everything was in order until I discovered a bug in the math pack at 10 o'clock Sunday morning. If you divided one by three you got .333333 — that was okay. But if you divided one by two you got .53333333333, which was definitely wrong.

That was the last fix. Luckily, most of Microsoft's programmers were working. The BASIC expert quickly diagnosed and corrected the bug. I decided to do a little more testing before going back to the hotel to sleep.

Up again at 8 p.m., I returned to Microsoft by 10 to find Bill Gates and Kay lounging in Bill's office. Kay showed us prototypes of a disk/video interface they'd gotten running, and we agreed that it might become a workable product for the 100.

**NEXT TIME.** We spent the better part of the next two hours discussing what the next series of products should be: a flip-up screen, 16 lines by 80 columns, smaller thickness, more memory, advanced software — all of the things we'd had to sacrifice on the 100.

The Tandy 200 incorporates some of these ideas. But that's another story.

There's no way to name everyone who contributed to the development of the Model 100. Don't get the idea that it was a result of three or four people in meetings. Many, many people from all over the U.S. — and from across the Pacific — contributed. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 125 on the reader service card. If it was of interest, circle 126, and if it wasn't, circle 127.*

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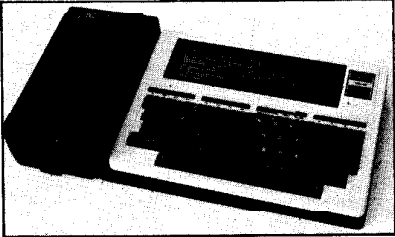


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**P**ersonal Integrated Computers (PIC) of Irvine, California has introduced a portable microfloppy disk drive that provides 360 kilobytes (K) of storage for the Model 100.

The battery-powered PICDisc (\$799) plugs into the Model 100 via the expansion bus on the back of the computer. The drive's rechargeable lead-acid battery provides 2.5 hours of disk-access time, which PIC estimates is equivalent to 20 hours under typical operating loads.

The 4.5-pound unit docks with the 100, forming a conveniently portable package. According to PIC, it's easily detached when disk-independent operation is desired.

The PICDisc includes a 32K bank of RAM, increasing the Model 100's potential capacity to 64K. Also included are CP/M 2.2, the T/Maker integrated-software package and a communications program.

The CP/M operating system provides Model 100 users with complete file transfer capabilities and a degree of program compatibility with eight-bit transportable and desk-top micros, including models from Kay pro, Televideo and Morrow.

The T/Maker package includes a full complement of business tools: a word processor, an electronic spreadsheet, a relational data base manager and a spelling checker.

According to PIC, the bundled communications program provides

auto dial capabilities and convenient data transfer with CP/M-based host computers. The program also provides format conversion between CP/M files and those stored under the Model 100's internal operating system.

Contact Personal Integrated Computers, 18013 D SkyPark Circle, Irvine, CA 92714, (714) 261-0503. Circle No. 80 on RS Card

## Choosing the Wine Is the Hard Part

**C**ustom Software, the Wellington, Kansas publisher of CBUG, has developed a menu utility for the Model 100.

Function keys 5, 6 and 7 change the date, day and time. And function key 8, which is marked Alm, activates an alarm that sounds at a user-defined time no matter what application is running.

Men-u-tility displays the length of any unsaved BASIC program when the cursor bar is over BASIC, and the length of the text in the PASTE buffer when the cursor bar is positioned over TEXT.

The program also sends the menu to the cathode-ray tube (CRT) monitor when used in conjunction with the Radio Shack DVI, eliminating the operator's need to look back and forth between the computer screen and the monitor.

Written in machine language, Men-u-tility occupies 1.8K of RAM.

Feb 04, 1985 Mon 05:00:04				28006	2
BASIC	TEXT	TELCOM	ADDRSS		
SCHEDL	--	--	--		
--	--	--	--		
--	--	--	--		
--	--	--	--		
--	--	--	--		
--	--	--	--		
Name Kill Prnt Ivni Date Day Time Alm					

Custom's Men-u-tility (\$24.95) provides function-key definitions and commands at the Model 100 menu, allowing users to perform common utility operations without entering BASIC.

Function key 1, marked Name, allows the operator to rename files, including the 100's built-in ROM programs. Function key 2 allows deletion without resort to BASIC's KILL command.

Function key 3 formats and prints files from the menu, and function key 4 makes files invisible.

Contact Custom Software, 1308 Western, Wellington, KS 67152, (316) 326-6197.

Circle No. 81 on RS Card

## Pour it In, Spoon it Out

**A** low-cost printer buffer is available from Digital Devices Corp. of Atlanta.

The company's \$119.95 printer buffer accepts 16K to 64K of data at high speeds then transmits it to any parallel printer a line at a time, freeing up the computer for other operations.



According to Digital Devices, the unit works with any computer/parallel printer connection, though a Radio Shack printer cable adapter is necessary for use with the 100.

The \$119.95 printer buffer accepts 16K to 64K of data at high speeds then transmits it to any parallel printer a line at a time, freeing up the computer for other operations.

Contact Digital Devices, 430 Tenth St., No. N205, Atlanta, GA 30318, (800) 554-4898, or (404) 872-4430. Circle No. 82 on RS Card

## Structured Software Bows Five

Structured Software Services of Battle Ground, Washington has introduced five low-cost programs for the Model 100.

Morse Code Tutor (\$17) helps Model 100 users learn to receive and send Morse Code at rates as high as 30 words per minute. The program includes self-test and random-word transmission options that allow operators to review their progress. The program runs on 100s with at least 16K of RAM.

MON100 is a 10K program-development tool that allows users to create machine-language programs using a Zilog Z80-style vocabulary of assembly-language operation codes. The program includes an assembler, plus 23 commands that include debugging aids and program-flow monitors. The \$27 program, which requires 16K of RAM, includes a 62-page technical man-

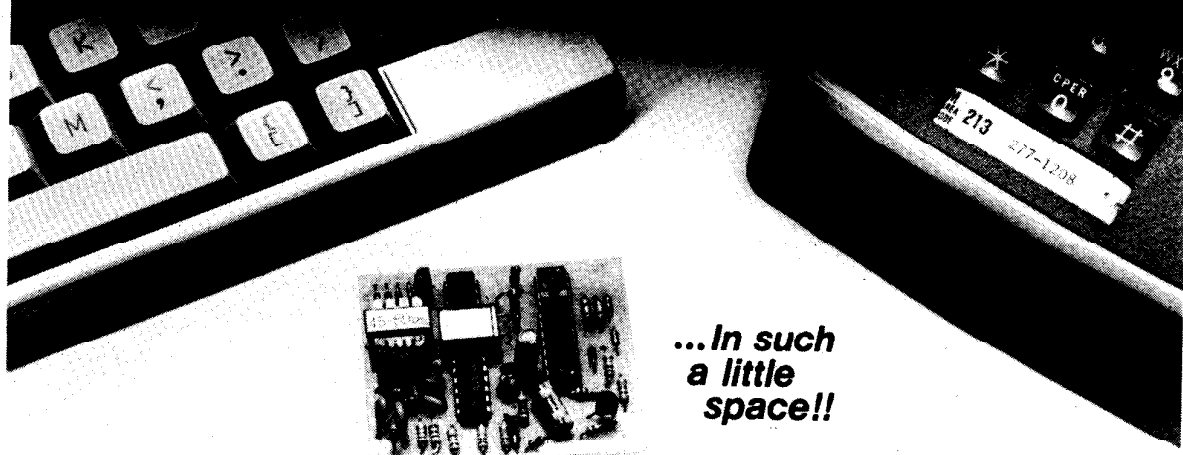
ual and a micro-reference manual that lists operation codes and mnemonics.

Dot-by-dot printouts of Model 100 text and graphics are provided by a \$17 graphics screen-dump program. The 600-byte program consists of BASIC subroutines that can be added to commercial or user-developed programs via a GOSUB statement. The routines support Epson, Prowriter, C. Itoh and Star printers.

Count-Write (\$17) is a machine-language program that provides statistics for writers. The program analyzes text files, providing information about total length, number of sentences, number of paragraphs, average word length and other aspects of the file. According to Structured Software, the program is alert to 30 common abbreviations that are counted as words without falsely signaling the end of a sentence.

Data security is the goal of LOK100, which provides password protection for Model 100 users. Once the program has been run, a password is required for access to the menu each time the computer is

# so much modem ...



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## NEW PRODUCTS

turned on. The lock is immune to both Break and Reset. A "cold start" allows access to the menu — but deletes all programs and data from the computer. The program retails for \$17.

Contact Structured Software Services, 9233 NE 269th St., Battle Ground, WA 98604.  
Circle No. 83 on RS Card

## Travelguide Sets Entrepreneurs on The Road to Riches

**A** guide for would-be software publishers is available from Associated Technology Corp. of Estill Springs, Tennessee.

How to Sell Your Portable Computer Software is a \$22 guide that tells the budding entrepreneur "how to obtain national directory listings, how to price a new software product, how to locate and qualify a new advertiser, how to write a users'

manual and how to operate a successful mail-order fulfillment service. Designing the software is up to you.

Contact Associated Technology, Route 22 Box 448, Estill Springs, TN 37330, (615) 967-9159.  
Circle No. 84 on RS Card

## Another Analog On the Fire

**E**lexor Associates of Morris Plains, New Jersey has introduced the PL-1000, a portable analog/digital converter and process controller.

The \$549 unit, which plugs into the Model 100's RS-232 serial port, has 16 channels for 12-bit analog-to-digital conversion, two 12-bit digital-to-analog channels and 32 bits of digital input/output.

According to Elexor, the unit accepts rechargeable batteries and two optional input/output boards. Options include event counters and timers, thermocoupler input, relays, opto-isolators and other devices.

An internal processor regulates data flow while controlling 8K of RAM and 8K of ROM. Complementary metal-oxide semiconductor (CMOS) circuitry reduces power drain while increasing reliability.

Contact Elexor Associates, P.O. Box 246, Morris Plains, NJ 07950, (201) 299-1615.  
Circle No. 85 on RS Card

## Spectrum Cellular Bridges the Gap



**T**he Model 100's built-in modem lets sales professionals, service technicians, hobbyists and reporters

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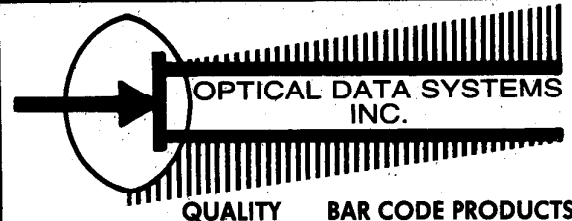
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## NEW PRODUCTS

communicate digital data to other computers quickly and easily. The only requirement is a telephone line to establish a physical connection.

If Spectrum Cellular Corp. of Dallas succeeds, the telephone line won't be necessary.

Spectrum manufactures the Bridge, a \$395 device that connects serial port-equipped portable computers — including the Model 100 — to cellular telephones like those found in automobiles.

The Bridge allows computer users to send data to other users via radio at 300 bits per second (bps). The unit allows real estate agents to access mortgage rates from a sales site, stockbrokers to gain market information while stopped in traffic and news reporters to file stories while on the way back to the office.

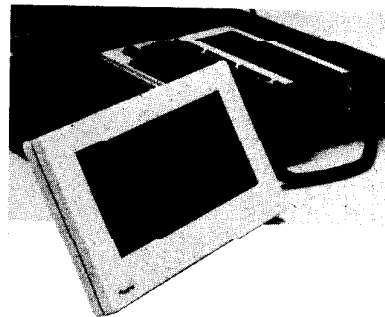
Models available include telephone-list maintenance, an RJ-11 modular telephone jack, a power supply for the Model 100 (via the battery) and an elapsed-time display.

The 7.5 by 4 by 3-inch unit, which

mounts on the car dashboard, includes filters that correct for radio interference such as fading, echoing and cell-site handoff.

Contact Spectrum Cellular, 2710 Stemmons Freeway, 800 No. Tower, Dallas, TX 75207, (214) 630-9825. Circle No. 86 on RS Card

## Axonix Promotes Clarity



Axonix Corp., the Salt Lake City maker of portable printers, has introduced a large, flat-panel dis-

play option for the Model 100.

The company's ThinView 25 is a 25-line, 80-column liquid-crystal display (LCD) that plugs into the Model 100 via the expansion bus at the bottom of the computer. The \$749 device includes an internal, rechargeable battery that provides 16 hours of operation.

The ThinView 25 is dot-addressable in a 640 by 200-dot matrix. According to Axonix, built-in timer circuitry turns the unit off automatically after 10 minutes if the display isn't updated or changed, conserving battery power.

The two-pound, 11.75 by 6.5 by 1.25-inch display comes with firmware that allows its use with existing Model 100 programs, including the built-in BASIC, TEXT and TELCOM functions.

Contact Axonix, 417 Wakara Way, Salt Lake City, UT 84108, (800) 821-7093, or (801) 582-9271 in UT. Circle No. 87

Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 120 on the reader service card. If it was of interest, circle 121, and if it wasn't, circle 122.

## SURVEY-100

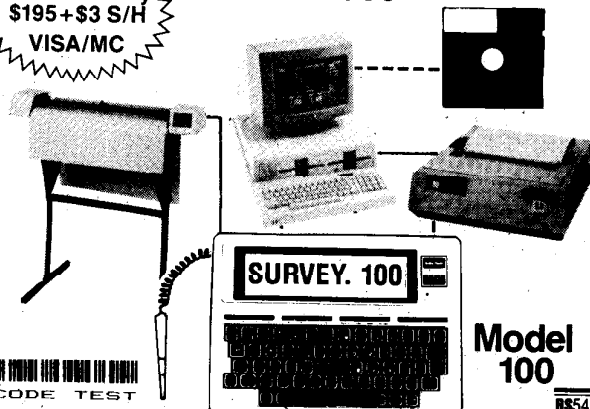
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## MINI-VAC

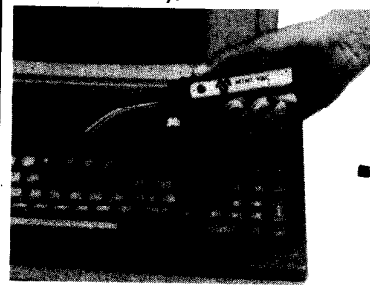
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strategy calls for a 38-store chain — consisting of 18 former Tandy Computer Centers and 20 ACT ComputerWorld franchises — in the UK only.

## **PCSG Learns by Listening**

**A**pple Computer found itself on the front pages of all the business sections last year when it announced its transformation from a "technology-driven" company to a mature, "marketing-driven" firm. Apple claimed it would stop being enchanted with technology for its own sake, and start letting users' needs dictate the specifications of future products.

The results? Not bad: record sales, the Apple IIc, Macintosh.

Portable Computer Support Group president Sam Redman says his company is following in Apple's footsteps. And what has he learned by listening? "Model 100 users are more sophisticated now than they were a year or two ago," he says. "Our products need to be more sophisticated too."

To that end, PCSG has entered into marketing agreements with the makers of a number of Model 100 hardware enhancements and peripherals. Last month Portable 100/200 reported that PCSG would market the Chipmunk, a portable disk drive developed by Holmes Engineering of Salt Lake City.

This month we learn that PCSG will be the sole distributor of a 64K memory-expansion board and an eight-slot, attachable ROM bank, both manufactured by Cryptronics Inc. of Fountain Valley, California.

PCSG is also expanding its library of ROM-based applications programs, which currently includes an electronic spreadsheet and the operating system for the Chipmunk.

"Our cassette-based programs are 18 months old," Redman says. "They've reached maturity. It's time to introduce a new generation of products — and they're sure not going to be on cassette. Cassette is dead!"

Redman believes his company's add-ons and programs may help extend the life of the Model 100, which after more than two years has reached the age at which many

high-technology products are retired, replaced by more advanced models.

"But we'll be supporting the 200," he hastens to add. "We like it because it doesn't have a disk drive — our drive works just fine with it." The Cryptronics ROM-bank, which will allow users to plug in as many as eight 32K firmware cartridges at once, will also work with the 200.

"Anybody who thinks the 100 is dead just doesn't see what's going on," Redman says. "We've got seven full-time programmers working on applications we can't even talk about yet."

## **SIG Members Get Price Slash Scoop**

**P**articipants in a weekly conference on Portable 100/200's CompuServe Special Interest Group (SIG) reported that further Model 100 price cuts may be forthcoming.

SIG members from Boston, New York and San Francisco reported that metropolitan newspapers in their areas were carrying full-page advertisements offering the 24K Model 100 for \$499. Radio Shack's current suggested retail price is \$599. Although the reduced price is advertised as a limited-time promotion, such reductions have historically signaled permanent price changes.

Tandy representatives at the company's Fort Worth press relations office were unaware of the promotion.

## **E-Mail Boost to Come From Postal Service?**

**I**nternational Resource Development, a Norwalk, Connecticut market research firm, reports that the U.S. Postal Service may inadvertently promote the electronic-mail industry by requiring a surcharge for daily mail delivery to rural areas.

"There is growing conservative sentiment for desubsidizing rural mail delivery," IRD reports, a move

that could slice as much as \$100 billion from the federal budget over the next 10 years.

IRD president Kenneth G. Dosomworth suggests that a likely scenario would include scaled-back delivery to rural homes, possibly on a weekly basis. "Suppliers of electronic mail may quite possibly end up with a major portion of the traffic related to bills, invoices, etc.," he predicts, "as well as with some of the consumer-to-consumer letters."

Should the E-mail boom materialize, there will be great demand for a low-cost, easy-to-operate computer with convenient telecommunication capabilities. Sound familiar?

## **Commodities News, Travel Tips Direct From The Source**

**S**ource Telecomputing Corp. of McLean, Virginia has added a number of services to its nationwide information network.

Among the new data bases is a commodities service from Commodity World News in Chicago. Under terms of an agreement between The Source and CWN, the Chicago company will provide hourly updates of domestic and overseas commodities prices, selected international news and commentary.

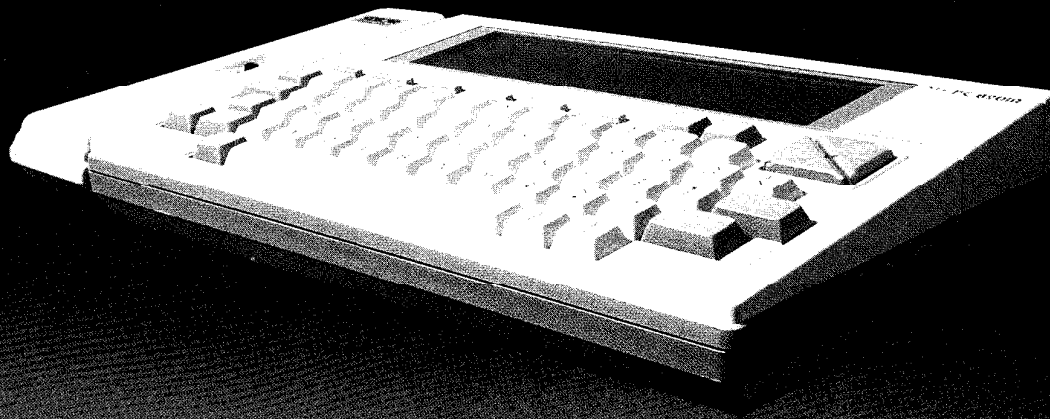
CWN is the latest addition to The Source's complement of business services, which also includes Investor Services, Bizdate, Unistox, Donoghue Moneyletter, Media General and Management Contents.

Also added to The Source is A-Z, a travel data base that provides information about 14,000 domestic and 8,000 international hotels.

Information, which is updated monthly, includes each hotel's address, telex number, toll-free telephone number and rates. Information about restaurants, conference centers, sports facilities and leisure services is also provided.

The data is provided by A-Z Worldwide, a subsidiary of U.K.-based St. James Press. □

*Please help us rate this article's value to you as a Model 100 user. If you found it useful, circle number 140 on the reader service card. If it was of interest, circle 141, and if it wasn't, circle 142.*



# 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 completely 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 \$199 (Part #SC32). User installable 32K banks are \$100 for bank 2 (Part #SCB2), and \$110 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 checks take 3 weeks to clear. Call for purchase order information.

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