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VOL. 3 NO. 8

portable 100/200/600

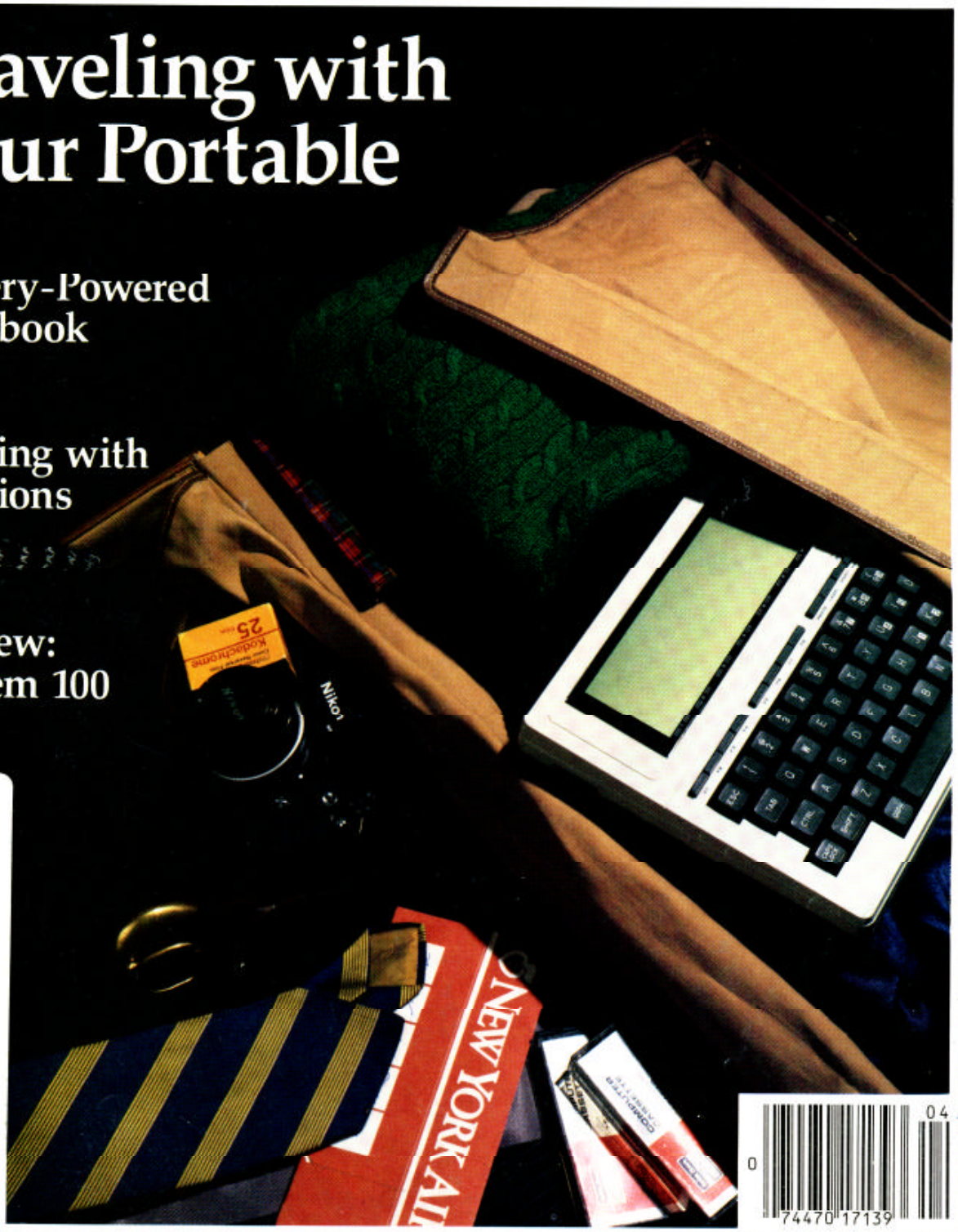
TANDY BRIEFCASE COMPUTING

Traveling with Your Portable

Battery-Powered Notebook

Dealing with Fractions

Review: System 100



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GOING PORTABLE?

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This printer is half the size and half the weight of your Model 100. Anywhere you happen to be, cruising at 30,000 feet or in a cab to an important business meeting, you can get a quick and quiet printout. A perfect companion for your Model 100/200/600.

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- Excellent User's Manual

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underlined Emphasized!
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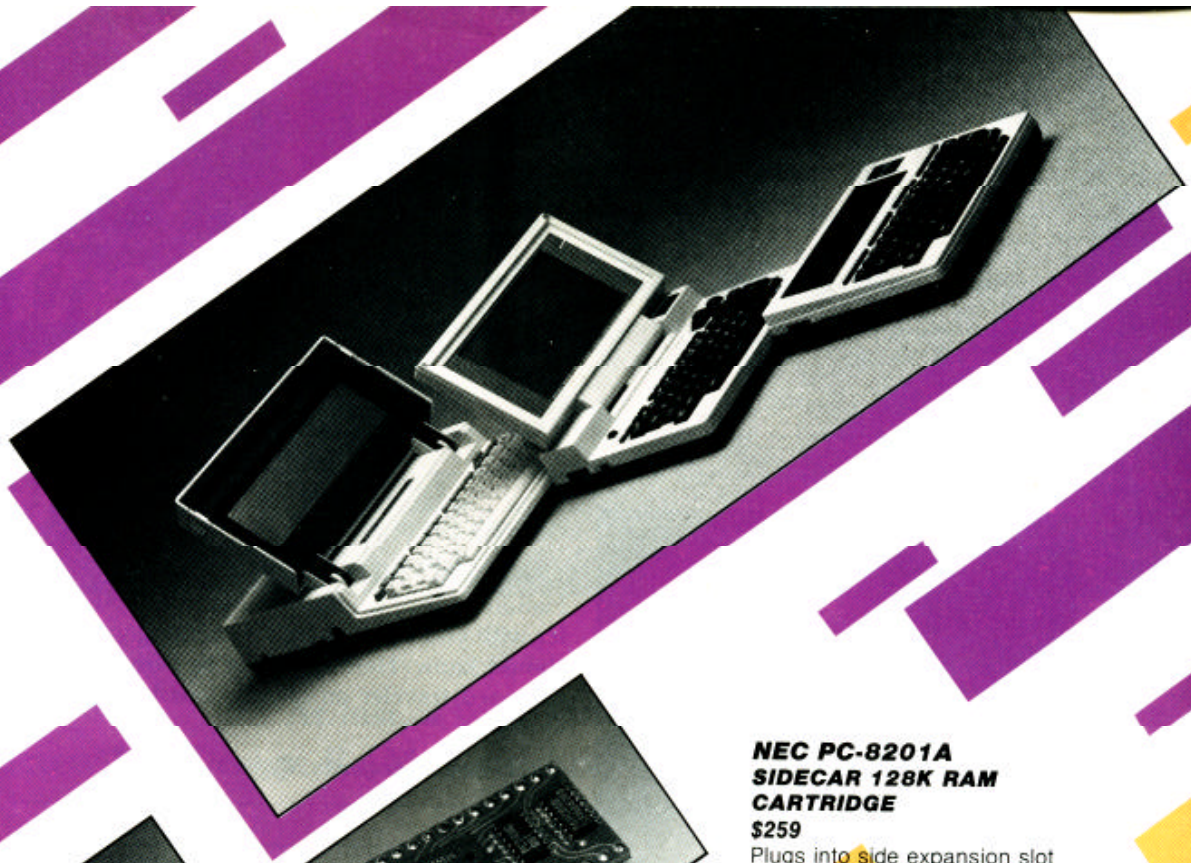
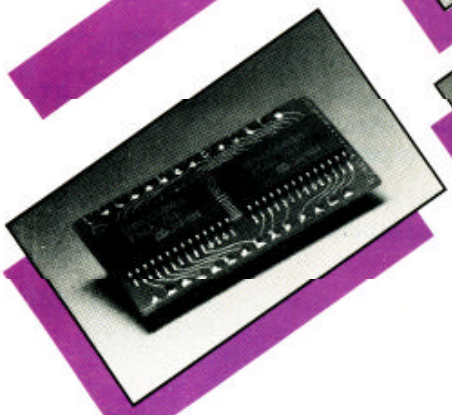
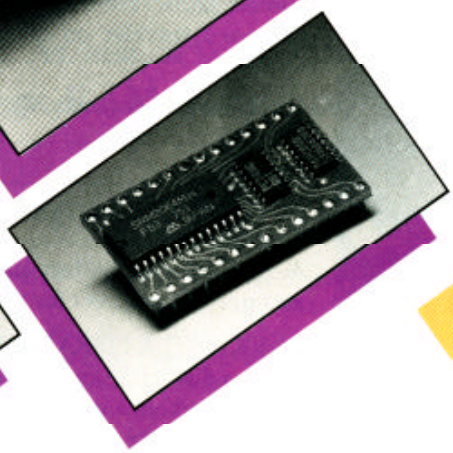
$99







NEC PC-8201A
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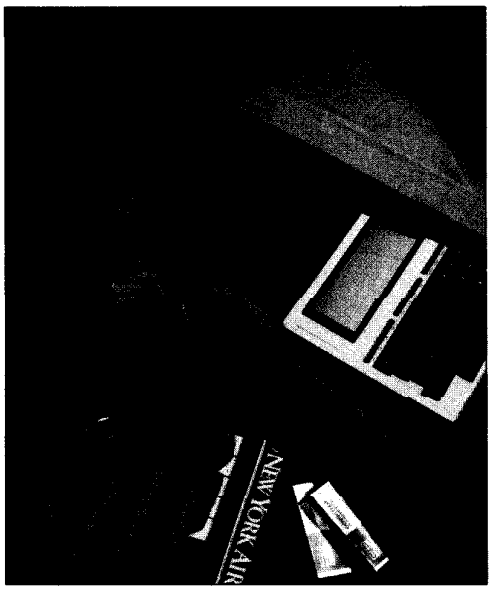
RAM EXPANSIONS!

FOOLISH TO PAY MORE — DANGEROUS TO PAY LESS

Circle 46 on Reader Service Card

portable 100/200/600

APRIL 1986 VOLUME THREE, NUMBER EIGHT



ON THE COVER

TRAVELING WITH YOUR PORTABLE 30
Planning a trip? Going to take your computer with you? Well, there's something you should know. Here are some tips from a seasoned traveler on taking your laptop abroad.

Cover Photo by Benjamin Magro

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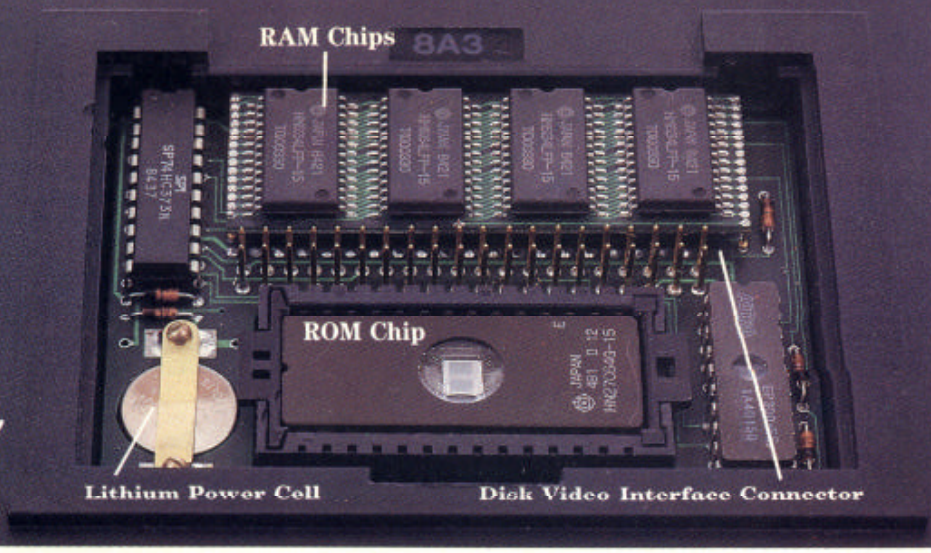
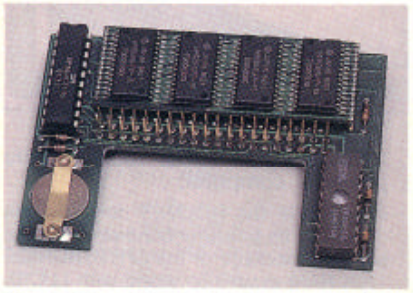
State of The Art RAM Technology



At last, a 96K Model 100!
"The new PG Design RAM should be in every Model 100 built!"

Miniaturized Technology

Our miniaturized RAM chips are state of the art. They are the most advanced memory chips found anywhere in the world. Their tiny size allows us to keep a low profile in the expansion port of the Model 100. We use a technique called *vapor phase soldering* to ensure that each and every tiny connection is clean — perfect.



The RAM module is precision constructed.

Like The Original

Each 32K RAM bank has its own command of the software that comes in your Model 100. BASIC, TEXT, TELCOM, ADDRSS, SCHEDL are all there in each bank and you can use them as you would in the original bank. Each bank can be accessed from any of the other banks. We even have an optional data transfer program which allows data to be transferred from one bank to any other bank. It's flawless!

Simple Installation

"Adding this 64K RAM module to your Model 100 is as easy as putting in new batteries." Once you've removed the expansion cover on the back of your Model 100, just snap the **PG Design** RAM module in. You can't get it wrong! The pins line up perfectly with the expansion holes in the Model 100 compartment. Snap the cover back on and turn your Model 100 over. Turn it on and enter BASIC. Type in the one line program we supply you and presto—you've got a Model 100 with 96K of RAM. You do not need a 32K Model 100 to utilize the **PG Design** 64K RAM module.

No Need To Remove It

The beauty of this RAM module is that we've enabled you to have a Model 100 with 96K of RAM and we've given you access to the other Model 100 options within the expansion compartment. The DVI connection can be made easily with our rugged connectors. Gone are the flat flimsy pins. And best of all, the ROM slot is clear to insert any ROM modules, (like Tandy's Multiplan on ROM). We designed this RAM module so it wouldn't ever have to be removed from your Model 100. But, if you should remove it, we've installed a lithium power cell that will keep all the data on the module intact for six months outside the Model 100. Six months! The actual life span of the lithium power cell while in the Model 100 is nearly six years!

Guarantee

We stand behind all the products we manufacture at **PG Design.** If you are not completely satisfied with your purchase, call us! If we cannot solve your problem, return the product to us and we will refund your money. We are positive that you will be completely satisfied with all our products.

Order Today

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Now you can access LUCID, DISK +, WRITE ROM, RAM + and others instantly.

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The ROM bank props up the Model 100 at the same angle and height as those little legs you've seen. The ROM BANK itself is only about 1½" deep and it runs the width of your Model 100. It only weighs one pound. It not only installs instantly, but it pops free in a second if you need everything to lie flat in a briefcase.

Change from ROM to ROM with the touch of a thumb switch.

You can go from LUCID to WRITE to DISK + to any other ROMS just by turning the thumb switch at the side of the ROM bank. The 6 ROM BANK is a sturdy well built construction that looks like it is a part of your Model 100.

What is also fantastic is that the ROM bank has a powerful NICAD battery and recharger built right in. This power source supplies up to 30 hours of life to your Model 100 with just 6 hours of recharge. What's nice is that it recharges right from your Model 100's power adapter. This is a quick charge system and if you need power in a hurry, you can get 6 hours of life for your Model 100 by just charging for an hour and half.

Suddenly, the Model 100 is a very powerful computer.

If you have the HOLMES portable disk drive with its powerful bundled database software package or the CRYPTRONICS 128K RAM expansion along with LUCID, WRITE ROM and DISK + in the 6 ROM bank with its rapid rechargable NICAD power source, you have the ultimate portable system. It's all available only from PCSG.

As usual we don't want you to take our word for it. The 6 ROM BANK is sold on a 30 day trial. If you are not satisfied simply return within thirty days for a full refund. MC, VISA, AM. EX. or C.O.D.

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Circle 32 on Reader Service Card

portable
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ROM WITH A VIEW

Legitimacy? Who Needs It?

The brouhaha will likely have died away by the time you read this, but at presstime all the computer press could talk about was IBM's failure to introduce its high-end laptop in late January as predicted.

The computer, reportedly code-named Clamshell and perhaps to be dubbed Convertible in its realization, has been the subject of industry speculation, rumors and second-guessing for almost two years. In my former gig as technical editor of *Portable Computer* magazine I averaged two calls a week from industry insiders who said they'd seen the machine ... or met someone who'd seen the machine ... or knew somebody whose sister said she worked with a fellow whose brother-in-law had once met the parents of a guy who had seen the machine.

The craziness has only intensified since then. The latest wave of rumors has been in response to the Internal Revenue Service's announced intention to purchase 15,000 to 17,000 high-end (IBM-compatible, disk-equipped, 512K RAM) laptops for use by agents.

When the bidding started a year ago IBM was shut out; the IRS specified that it would only purchase a computer that was actually on the market — not plans or prototypes for a computer that would be built merely to satisfy the bid's requirements.

But the IRS changed the rules within a few months, stating that it would evaluate prototypes and plans for laptops that would become available through retail channels on or before the day the bid was awarded.

The computer industry press has reported as fact that IBM has submitted prototypes for evaluation. (IBM refuses to comment.) No fewer than three publications reported as late as January 20 that IBM's introduction date was set for January 21 and that the IRS bid's winner would be announced before February 1. (Both IBM and the IRS refused to comment.)

The deadlines have come and gone. The Clamshell/Convertible has failed to surface and the IRS is still holding the stockholders of most laptop computer makers in thrall. There is only suspense — for the first time in years, there are no rumors and no excuses.

DOES THE WORLD REALLY NEED ANOTHER LAPTOP?

Many laptop vendors claim to welcome the prospect of competing with Big Blue. "We'll automatically lose a share of the market," they say, "but IBM's blessing will legitimize laptop technology and the market as a whole will finally take off."

Data General officials, asked to explain the retail failure of the DG One and a 36 percent drop in quarterly earnings, say it's IBM's fault for not introducing a laptop and legitimizing the market. All vendors agree that the retail laptop market has failed to materialize. No high-end laptop maker has achieved satisfactory sales —not Data General, not Morrow, not Zenith, not Kaypro, not Hewlett-Packard, not Grid, not Gavilan, not Toshiba, not Sharp.

We'd like to suggest that the failure of these vendors' products isn't IBM's fault. They failed because they're too bulky to be portable, too power-hungry, too difficult to use, too fragile, too expensive. The vendors built them because it was technologically just barely possible — not because anyone needed the capabilities and functions they provided.

In the entire laptop market there is one successful line of products: the Model 100 and Tandy 200. Only these laptops are based on what users really need.

Tandy isn't moaning about poor sales and waiting for IBM to do its marketing groundwork. Tandy is dominating the laptop market by introducing low-cost, reliable computers that do the things people need computers to do while traveling.

Legitimacy? Why bother?

J.D. Hildebrand
Editor

Seeking Proportional Type

I need your help. I'm looking for a way to connect the Model 100 to any printer or typewriter that produces formatted (straight margin) proportional type.

There are dozens of printers with suitable features, and almost as many text formatting programs for the 100 advertised in your magazine. I would buy any workable combination.

Ed Beyn
Annapolis, MD

Many printers, including dot-matrix, impact and ink-jet models, support proportional type. Proportional type, like what you're reading in the magazine, allows varying room for each letter, depending on its size: so the letter "i" uses less space than a "w," for example.

Unlike normal type, where simply sticking full spaces into one line can create a force-justified right margin, proportional type requires the addition of fractions of a space. And, to make matters more complex, different brands of printers use different control codes for inserting these fractional spaces.

In other words, different "print driver" software would be needed for justified proportional printing on an Epson FX-80, Tandy DWP-410 and C.Itoh 8510 Prowriter.

We don't know of any commercial software for the Model 100 or Tandy 200 that supports justified proportional type. If any of you do, or feel ambitious enough to write one, please be in touch.

— Ed.

PORTABLE DISK DRIVE TIP

I wanted to pass along a tip for using the Model 100 with the Tandy portable disk drive. As you've no doubt heard by now, the FLOPPY.CO program won't always work if you're also using another machine-language program, such as Lucid. When you are, you have to go into BASIC and clear space in memory. It's not a big deal, but rather tedious and mildly irritating if you're in a hurry.

Well, there is another way around it. After you've loaded IPL.BA and FLOPPY .CO into RAM, simply enter BASIC and key in the following one-line program:

```
10 CLEAR 256,59400:RUNM"FLOPPY
   .CO"
```

Then save it to a file, perhaps as FLOPPY.BA.

This gives you a nifty little program that will always boot up the Tandy disk drive.

Grant Mangold
Linn Grove, IA

SHORT WAVES

The article, "Hello Rangoon" (*Portable 100, November 1985*) is excellent for use with my ham radio station except for one minor problem. The program is set up for three code speeds: 10, 15 and 20 words per minute. These speeds are too slow — I'd prefer speeds of 20, 25 and 30 wpm. I can't figure out how to change the speeds. Which line of the program sets the speed and how does it do it?

James Parsons
San Angelo, TX

According to the program's author, Louis C. Graue, the speed is set by the variable SP in line 50. Setting SP to 0 gives the maximum speed and increasing the value lowers the speed. So there isn't any way, without significant changes to the overall program, to make the speeds faster. The program was written to be optimal at about 18 wpm since the majority of ham operators seem to be comfortable with that speed for machine generated code.

Mr. Graue suggests one way to increase the speed is to reduce the number in the FOR loop in line 800. However, this will upset the balance between the transmission speed while the characters are typed and when the characters are not typed.

— Ed.

I'm a seagoing radio electronics officer in the U.S. Merchant Marine and was interested in article "Hello Rangoon" (*Portable 100, November 1985*).

Is there a modification to this program that will allow me to connect my Model 100 to the output of my receivers so I can read Morse and RTTY signals? A program such as this would be very helpful. I would be welcome any software and hardware suggestions for making this possible.

Robert Lion
Belmont, CA

According to Mr. Graue, Swindell Judy, Inc., Suite 349-4316, Dressler Road N.W., Canton, OH 44718 sells a very good RTTY program for the Model 100 and the instructions include plans for constructing a demodulator.

Reading CW off the air with a simple BASIC program and a simple demodulator isn't very practical. This will work only if the code is machine generated and the reception conditions are ideal.

— Ed.

HEARD OF ONE OF THESE?

I would like to find a source for a Model 100-compatible program in ROM that emulates the DEC VT100 using with ED2 editor. Address responses to: Abbtronics, 113 Marble Street, Somerset, MA 02726.

Art Bainten
Somerset, MA

This is a frequently asked question — and we don't have a good answer. Can anyone give us a pointer?

— Ed.

ROM BANK FEEDBACK

I've read Woody Liswood's review of Portable Computer Support Group (PCSG) Six ROM Bank (*Portable 100, December 1985*) and my experience has been a little different.

First of all, the lug that connects the nicad battery pack to the charging socket on the ROM Bank broke soon after I installed it. It was a very difficult part to replace and I had to solder it back on.

Second, the short power cable from the ROM Bank to the 100 doesn't have

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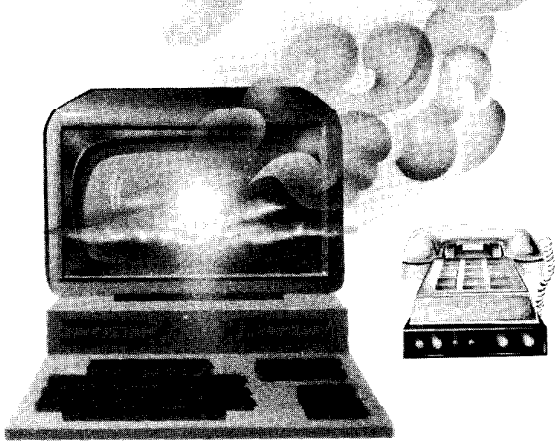

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INFORMATION SERVICES

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Circle 24 on Reader Service Card

It's the Holmes Engineering/PCSG "chipmunk"

PORTABLE Disk Drive for the Model 100/200

NOW AVAILABLE ON M-200

$499
Includes a library of six powerful programs

Uses the main menu concept. You see the disk directory instantly, arranged on your M-100 screen like your main menu. Just move the widebar cursor and transfer files with a function key. You can run a file directly from the diskette with the ENTER key. Uses 3½" microfloppy diskettes that have a rigid plastic casing and a metal core. They're tough and nonflexible. You can carry several in a shirt pocket without damage. There's 358K on a diskette. Ten of these in your briefcase and you've got 3½ megabytes.

Drive weighs only three lbs. and it works directly from the 110 outlet and recharges at the same time. It recharges in six hours with thousands of pages transferred between charges. It's compact, with dimensions of 2¼" x 5½" x 7.5"; and fits easily into your briefcase along with your Model 100 or 200.

Machine code programs, BASIC programs, *Lucid* files and documents all are saved and retrieved with no protocol–instantly, ready to run.

In a special association, Holmes Engineering and PCSG have worked together combining the hardware knowledge of Holmes and the software expertise of PCSG. The result is a product that can only be regarded as excellent.

You see the disk directory instantly; works just like the main menu

Here is what is really exciting. The portable disk drive has Random Access. Included as part of the operating system in the drive (ROM) is a very powerful disk BASIC.

This means that you can have BASIC programs that will access the diskette and read and write records directly on the diskette.

Just imagine yourself with this kind of capability.

Database – The portable disk drive stores your mailing list, inventory items, part #s and descriptions or any other data that you need to recall.

358K on a diskette

Invoice (purchase order) – At the touch of a button you can print out your sequentially numbered, professionally done invoices. This is truly professional invoicing capability.

Purchase orders are just as easy.

Sort – This excellent utility allows you rapid sorting of any records you have compiled. You can write the newly sorted list back in the same file on the diskette or to a new file.

Telecom interface – If you are a user that likes to access other computers or databases (for example CompuServe) by telephone then this powerful facility alone is worth the price of the disk drive. You can automatically download and upload information onto the diskette.

Calendar – Everyone who has seen this program has said, "This is the first calendar/diary/scheduler on any computer anywhere that I can use. It is so functional."

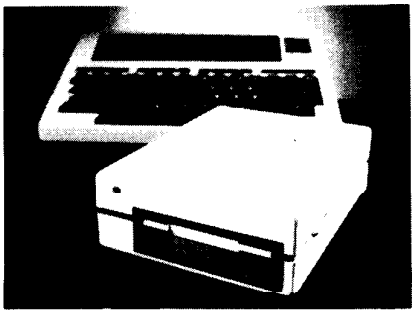
The calendar program is usable for two reasons, first it is designed correctly, and second you have the memory (358K) on the diskette to log and access a tremendous amount of notes over a long period of time.

Personal Finance Manager – This wonderful program truly lets you keep track of your finances.

All your records are kept on the diskette. Bank accounts (checking and savings) and charge accounts such as MasterCard and Visa.

We at PCSG believe we have the ultimate Model 100 system, the Portable Disk Drive plus the *Lucid* spreadsheet on snap-in ROM, *Write ROM* word processing and the new 64K RAM expansion now available from PCSG.

We want you to find out for yourself at no risk. If you aren't totally satisfied within 30 days, simply return the disk drive for a full refund. Priced at $499.95, including the software library. MasterCard, Visa, COD.



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a right-angle connector, like Radio Shack's adapter. This causes the cable to strain where it bends to make the connection. The cable can break under such stress. I've strengthened mine with RTV silicon rubber, but it's still a nuisance when I pack the 100 in a case with the connector and cable sticking out.

You must also be very careful when you switch from one bank to another. Sometimes the computer will hang up and you could lose memory — even in some add-on RAM banks.

I'd like a system in which all six ROMs, or however many are plugged in, would appear on the menu instead of just one at a time. You would select then the program with the widebar cursor.

I still love my Six ROM Bank. I just wish PCSG had paid a little more attention to detail.

I. Switzer
Toronto, Canada

THAT DAMN ASCII 0

We are frequently asked the question, "How can I embed an ASCII 0 into a TEXT file? My Epson (or Epson-compatible) printer requires this code to cancel certain functions, such as Esc-Hyphen ASCII-0 to stop underlining."

Well, we've said it once and we'll say it again: Regardless of printer make, ASCII 0 can't be embedded in a Model 100 TEXT file.

However, and some of our readers have pointed this out us, there are two ways to address this problem. The Epson printer series, realizing that many computers may have trouble generating ASCII values 0 through 31 without disrupting software limitations, accept ASCII values 128 through 159 in their place. So, try using Esc-Hyphen ASCII-128 for stop underline and Esc-Hyphen ASCII-129 to start underline.

Also, to make life easier, most of the newer Epson printers, including the entire FX series, accept the character instead of ASCII codes in these instances. So, try Esc-Hyphen 0 — that's actually Esc Hyphen ASCII-48. The Epson printer allows you to use the plain old character 0 or 1, instead of the control code.

— Ed.

BUTTON FAUX PAS

In your article "Tandy Takes the High Road," introducing the Tandy 600, it is stated that the 200's power button turns the machine off when the lid is closed. This is not the case with my machine or any others I've examined. I tested this with the wonderful BIGBEN.BA program (*Portable 100, December 1985*). If the switch did turn off the computer, that program would redraw the clock face as I opened the lid, but it didn't.

Cy Callaghan
West Chester, PA

Both the author and his source at Tandy have been duly informed of the miscue. We apologize to all 200 owners who've spent the last four months trying make their power button work properly. You can stop now.

— Ed.

CALLING ALL USER GROUPS

Portable 100/200/600 is compiling a comprehensive list of user groups for inclusion in a upcoming issue. We need your help. Please send us your group's name, address, telephone number and name of contact. If you maintain a bulletin board, include that information as well.

Even if you correspond with us regularly, write to us again to insure being listed. Send all information to: User Group Editor, c/o Portable 100/200/600, P.O. Box 250, Highland Mill, Camden, ME 04843. Thanks.

— Ed.

TALK OF THE TOWN

At the present time, I'm trying to hardwire my Model 100 to either my IBM PCjr or my IBM PC-XT so I may transfer files between machines. To date, I've not been successful.

One approach which I've tried involved connecting the serial port of the PCjr. to the serial port of the Model 100 via an IQ Technologies Smart Cable. This cable is supposed to sort out the handshaking signals between the two computers and then establish the correct path for the signals to follow. This works fine when my PCjr is connected to my Hayes modem, however, my 100 won't go into terminal mode when connected to the PCjr or the XT via the Smart Cable (or dumb cable for that matter).

I've tried a null modem as well with the transmit data and receive data lines reversed. This didn't work either.

In all cases, I'm using Crosstalk XVI, version 3.5 in the local mode on the IBM equipment and Telcom on the Model 100.

Any suggestions on getting these connections to work?

Gerard F. Tripptree
Little Ferry, NJ

On your IBM, make sure that you're using the correct serial port, and that the terminal status (we suggest 9,600 bits per second, eight data bits, one stop bit, no parity, or 88N1E) is the same on both computers. You'll also have to use half-duplex on both computers to see what you're sending.

Does your PC have more than one serial port? If so, check that Crosstalk is using the right one.

The Smart Cable should do the trick for you — that's what we use at Portable 100. To configure it correctly, try connecting your two IBM computers together. Once they're communicating, use the same settings with the Model 100.

— Ed.

IF YOU'RE WONDERING

Due to a corporate reorganization within Data Transfer Inc., the rights to modify, develop and market BASIC PAK, RAMPAK, GRAPH PAK, LOAN MANGER and INVESTMENT MANAGER as well as the responsibility for refunds have been sold. Address any further correspondence to: Danny H Mills, RD#2 New Road, Marlton, NJ 08053.

— Ed.

AN ADDENDUM

Thanks for announcing our portable light in the New Products section of the January (1986) issue. I'd like to bring up a point that your announcement failed to mention: Although the light can be used as backup light when regular lights go out, our portable light is ideal for commuters, reporters and salespeople _ people who work on the go. Airplane and bus reading lights are generally hard to adjust or just don't work. Our lights help avoid that problem.

The difference between our portable light and a flashlight or a book light is that it has a detachable base/suction cup, spring clip and six inch flexible neck. These features allow you to use it quickly and easily, hands free.

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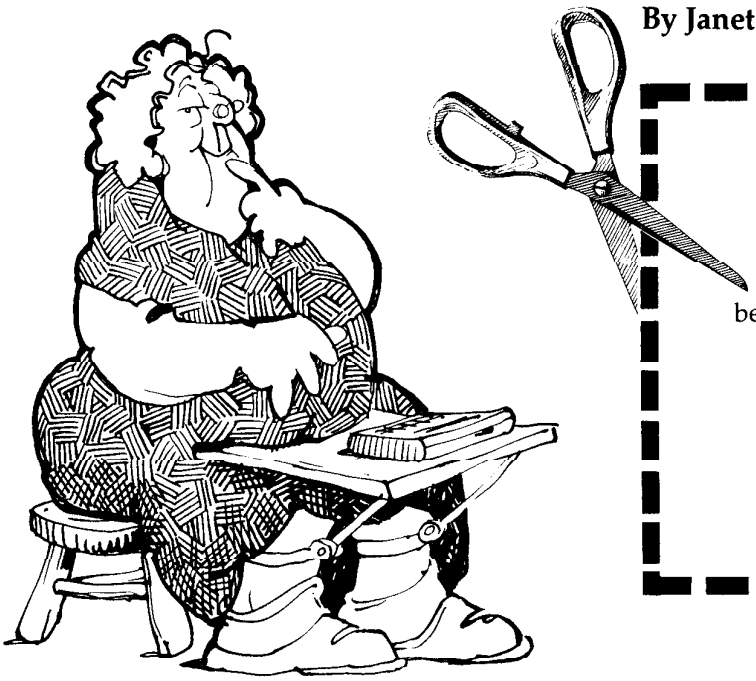
James Rozos
President
Amro Computer Systems

The Portable Light is available for $5.85 plus $1.35 for shipping and handling. Contact Amro Computer Services, P.O. Box 1131 Dept. B, Tualatin, OR 97062, (503) 692-5926.

— Ed.

APRIL SPECIALS

By Janet Goldenberg (Illustrations by Douglas Coffin)



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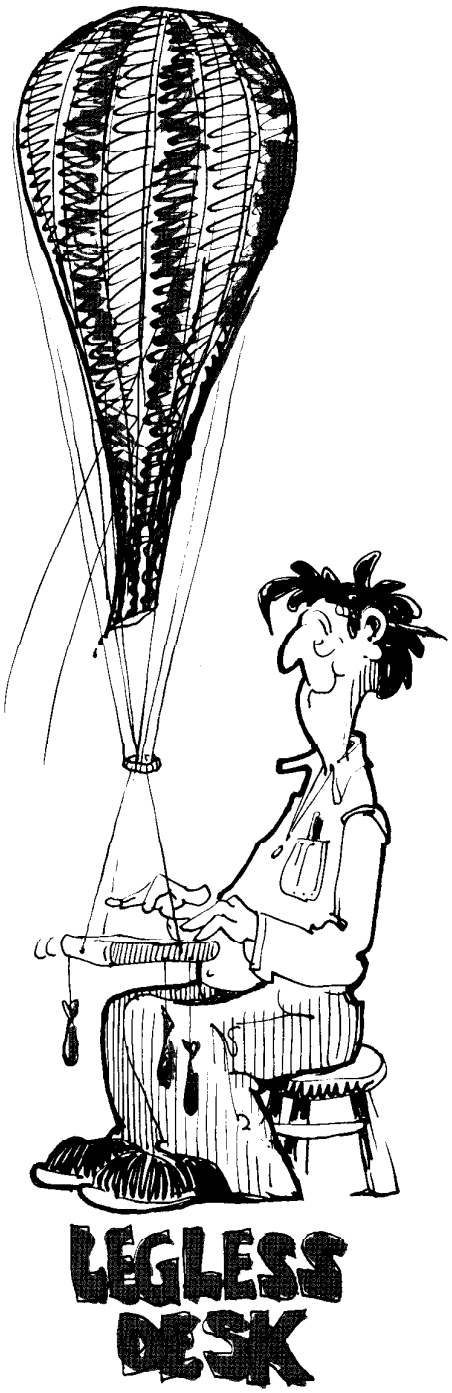
Have you lost your lap? This plastic tray with no-skid surface fits snuggly below your belly and attaches to your legs for support. Improves viewing angle. Dump that diet! Just $24.95. *Circle NO. 508.*

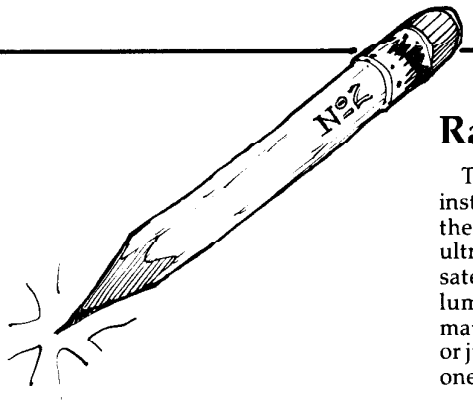
Brow Lamp

Work in the dark with your Model portable. Lightweight headband supports built-in twin high-intensity lamps — a must for astronomers, film critics, miners, etc. Yours for $29.95 or best offer. *Circle No. 507*



Shackster

Snap your Model 100 into this articulated frame and it becomes a 4 legged "pet" that wanders all over your house imitating cute baby animals. Simply stroke it and it calculates your income tax! A perfect gift For your accountant. A mere $79.95. *Circle No. 513*



Rambo Tote

Turn your Model 100 or 200 into an instant command post anywhere in the world! High-impact case contains ultra-rugged solar generator, modem satellite uplink, night-vision LCD illuminator. Built-in ROM computes materiel requirements. Specify desert or jungle camouflage. Be the talk of any one-man army. $CALL. *Circle No. 509*

Legless Desk

When filled with helium (or hot air from your desktop PC), this brightly colored balloon suspends your Model 100 at lap level, prevents legs from falling asleep. Nylon guy lines tether the computer to your knees. Enlighten yourself for only $59.95. *Circle No. 510*

Explanation Cards

Next time you're busy computing on the plane, or in a public area, avoid silly questions like "Is that a typewriter?" by keeping a stack of these business-size cards on hand. Each card tells what you are doing and explains that you have a highly contagious, incurable disease and cannot speak nor hear. Custom orders welcome. 50 cards. $5.95. *Circle No. 514*

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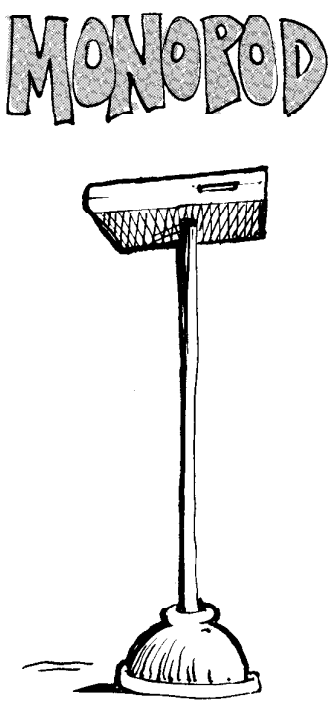
Circle 63 on Reader Service Card



Monopod Stand

A neat solution for campers, substitute teachers, anyone on the go. Lightweight telescoping pole has adjustable music-stand mount at top and large suction-cup foot that doubles as a bathroom plunger. Just pull off the plunger to reveal a pointed stake you can drive into the ground for added versatility. Best of all it's only $39.95. *Circle No. 512*

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LEAP YEAR ALARM Beeps every Feb. 29th	$29.95	**$3.95**

Book Disguise

Clever sheath foils thieves by disguising your Model 100 as Vol. 1 of Russell & Whitehead's *Principia Mathematica*. Stows vertically — saves space. At least $29.95. *Circle No. 515*

Universal Peripheral Cable

Fed up with carrying separate cables for your printer, modem and cassette — then untangling them when you need one? This all-in-one connector is the answer. Plugs at one end attach to your laptop's phone, printer or cassette ports; plugs at other end to the corresponding peripheral device(s). A $59 value on sale for $79.95. *Circle No. 503*

Color Monitor Adapter

Energy-efficient plastic screen adheres directly to the Model 100/200's LCD, transforming it into a vibrant 8-color monitor. Includes eight crayons and bottle of Windex. Super value at $89.95. *Circle No. 502*

Solar ROM Kit

Burn in your own custom ROM chips at home with this ingenious kit. Simply trace any chip plot onto the dampened photosensitive paper, leave in a sunny window for a few days and watch it shrink to size. Yours for only $49.95. *Circle No. 501*

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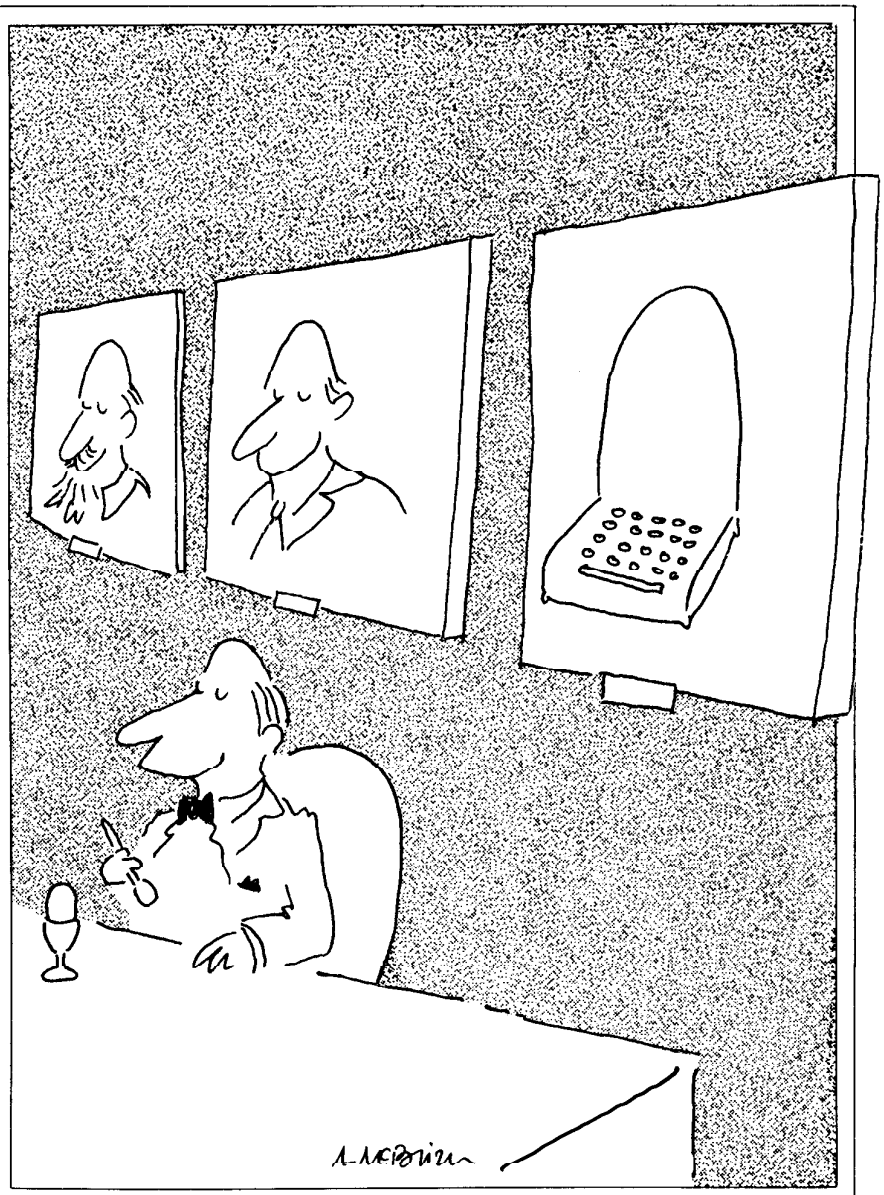
Don't settle for 32K! Low-cost memory expansion unit includes motherboard and 1,250 8K RAM chips you install yourself. A bargin at $119.95. *Circle No. 500*

By Any Standard

A common language is a must for communications. Whether the language uses English words or XMODEM block headers, all parties involved need a complete understanding — at least of the parts of the language they're using at that time.

But there's more to communication than common language. Both parties have to have complementary ways of expressing that language. In China, government officials often resort to hand-written notes during meetings. Although the language and its printed characters are the same, the pronunciations differ wildly.

That's also true with computers: Just because two machines use the same alphabetic characters, and understand the BASIC FOR-NEXT loop, you can't guarantee that they can successfully communicate with each other.



FOR THE ASCII-ING

In much the same way that a slanted line with three slashes might arbitrarily mean *house* in Chinese, so various manufacturers, user groups and neutral agencies have defined arbitrary communication standards for computers. These standards vary in complexity, from the interpretation of "seven data bits, one stop bit, even parity" to the answer and originate frequencies used by a 300 bits per second (bps) Bell 103 modem.

Perhaps the most universal standard in the microcomputer world is ASCII: the American Standard Code for Information Interchange. ASCII is like the written alphabet that we learned in grade school. The 24th letter of the English alphabet, pronounced *ex*, is written as two diagonal lines slanting in opposite directions and crossing in the middle. In the ASCII alphabet, it is a series of seven binary digits: 1011000. It's also "spelled" CHR$(88).

Note that we said *seven* binary digits. The interpretations of binary codes 0000000 through 1111111 — CHR$(0) through CHR$(127) — are standardized throughout the microcomputer world: On a Model 100, IBM PC monitor or Epson FX-80 printer, CHR$(88) appears as an upper-case *X* and CHR$(120) is a lower-case *x*.

But most micros, like the Model 100 and IBM PC, handle *eight* data bits. So what do codes CHR$(128) through CHR$(255) represent? Answer: Whatever you want.

On the Model 100, bit pattern 10000000 (CHR$(128) looks like a stylized telephone. But on a Tandy 1000, it's the French *c* with a tail, called the *cedilla*. On Epson printers, CHR$(128) is interpreted as CHR$(0).

ASCII serves as more than a compu-

Text continues on page 52

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First, LUCID© is memory conserving. It will let you build a large spreadsheet—255 row by 126 column capacity. You build huge spreadsheets in your Model 100's RAM that could consume 80 to 100K on a desktop computer.

Secondly, LUCID© is fast. LUCID© is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

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

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

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

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

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

LUCID© has expanded "go to" functions that remember and produce a windowing capability.

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.

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 lookups against even massive X/Y charts of text or numerical information. 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, troubleshooting 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 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.

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 $99. on snap-in ROM. MasterCard, Visa or COD.

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Circle 13 on Reader Service Card

Putting the Notebook on Notebook Computing

A do-it-yourself battery pack that doubles as a protective cover for your portable.

By Mike White

There I was, speaking before hundreds of important people. A question was raised. Coolly, I reached for trusty Model 100 to look up the answer in my data base. I flipped the switch, the low battery light winked coyly, and then... nothing. The crowd grew nervous and my palms began to sweat; I needed answers, but my computer just wasn't talking.

We've all had similar experiences. For all its wonderful features, the Model 100 has one terrible fault — it gobbles batteries like mad. I get about one week out of a set of new alkalines, and at $4 per, it's getting to the point where I have to include batteries in my monthly budget (it's a losing battle, though; I do my budget on my Model 100).

There are several good external battery packs available, but they're all pretty expensive. I wanted a cheap and simple way to use ordinary flashlight batteries. Size D batteries have about five times the capacity of the AAs and thus last about five times as long.

This article describes a simple and effective battery pack that provides plenty of power, and at the same time, a protective case for the Model 100. You'll still be able to get at the connectors on the back, and the case can fold over to prop up the computer at a comfortable typing angle. The whole thing can be built for less than $10, and requires only a little drilling and soldering. No modifications of any kind are required to the Model 100, and you can even omit most of the soldering if you really want to.

WHAT IT TAKES

The heart of the project is a set of battery holders available from everyone's favorite electronics store, Radio Shack. Part number 270-403 is a nicely made holder for a single D cell. You'll need four of these.

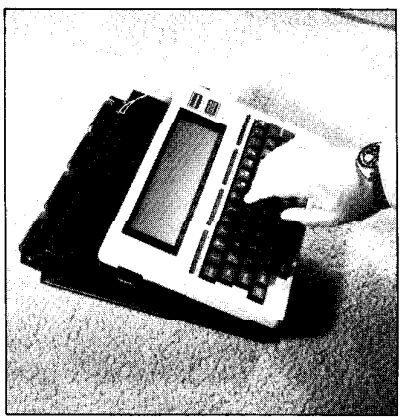
The case is made from a standard 3-ring looseleaf binder, available from any stationary or drug store. Get one with a two-inch capacity. We're going to remove the ring mechanism, mount the battery holders in its place and attach the Model 100 to the inside back cover of the binder with Velcro tabs. The resulting package is neat, easy to carry, and provides ample power and protection for your "notebook" computer.

Begin with the binder. Select a sturdy one in a color of your choice. Be sure that the binder you select has a glossy plastic finish. A highly textured or fabric finish will prevent the adhesive we'll use from sticking well. If you wish, you can get a binder with extra pockets or clips to hold papers or notes. Just be careful that any clips do not strike the Model 100 in its mounted position when the binder is closed.

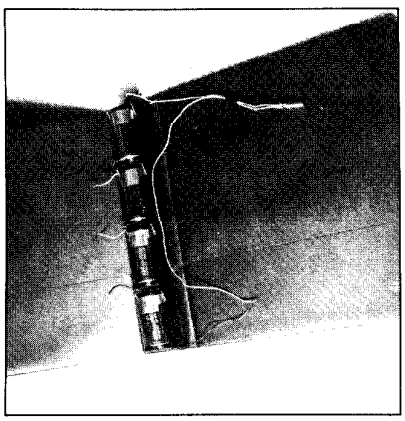
The ring mechanism is held in place by rivets (usually two). Carefully drill out these rivets using a drill bit just a little larger than the rivet body. Note that the head of the rivet is larger than the body. Remove the ring mechanism and discard it. Clean up any metal chips from the drilling.

The next step is to mount the battery holders. The holders go on the inside spine of the binder, right where the ring mechanism was attached.

Line up the holders against each other, centered on the spine. Mark the positions of the mounting holes (two per holder will do, on opposite sides and ends) with a pencil. You can use the square holes provided in the holders, or drill your own. Any holes you add should be along the side of the holder base to avoid interfering with



By folding over the top of the notebook, the case can be used as a typing stand.



After the attaching the four battery holders to the binder, connect their wires together.

The completed notebook battery pack.

battery insertion.

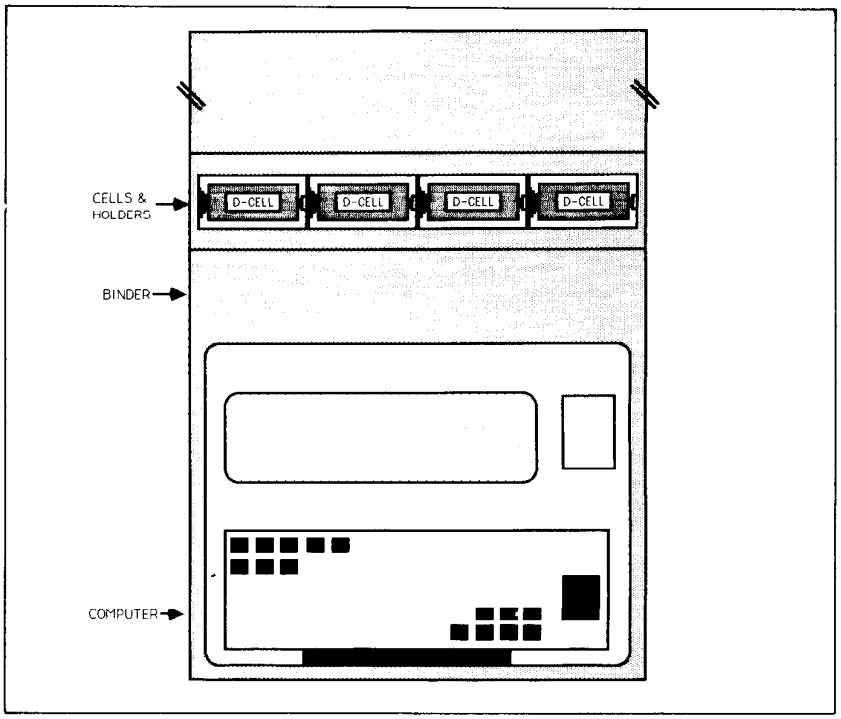
Remove the holders and drill the holes in the binder spine using a drill bit the same size as the mounting holes. It helps to place the spine against a support, like a piece of scrap wood, to prevent damage to the binder during drilling. Again clean up any debris, and put away your drill; no further drilling is required.

The battery holders can be mounted in one of several ways. Pop rivets do a neat job, or you can use small nuts and bolts. In either case, put a neatly cut strip of plastic tape over the exposed rivet or bolt heads on the outside of the binder to protect table-tops and things from scratches. For a quick and dirty job, you might try adhesive foam tape instead of rivets or bolts to hold the battery holders in place, although this won't be as sturdy.

Note that the holders must all be mounted with the positive end (red wire) toward the top of the binder.

MAKE THE CONNECTION

Now we're ready to do the wiring. The four holders must be wired in series. Place the mounted holders in front



Attach the four size D battery holders to the notebook's spine. All should be mounted with the positive end oriented in the same direction.

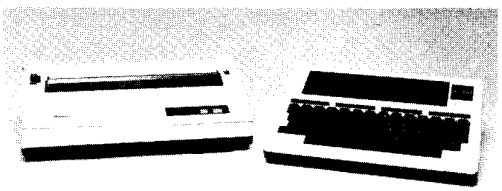
DON'T COMPROMISE!

Five reasons to buy the Axonix ThinWrite 80 Battery Powered Printer:

1. **Impact Printing** provides lower media costs, crisper printouts on ANY paper stock, and operation in harsh environments.

2. The **Wider Carriage** accommodates various form types including multicopy and 10 inch fanfold.

3. The ThinWrite Provides **Highest Resolution** for Epson/IBM graphics and **near letter-quality** in a portable printer.



4. You Will Have **World-Wide Service** available from hundreds of **CENTRONICS** service centers.

5. Both **Serial and Parallel Communications** are provided as a standard feature.

See your display in ANY LIGHT!

We backlight your favorite portable with an electroluminescent panel. We guarantee a quick turn around. And you'll receive the same high quality you've come to expect from Axonix.

The Thin E/L is priced from $200 to $350 depending on computer model. The ThinWrite 80 Battery Powered Printer is priced at $449 F.O.B. Salt Lake City, Utah.

15 day free trial on standard products.

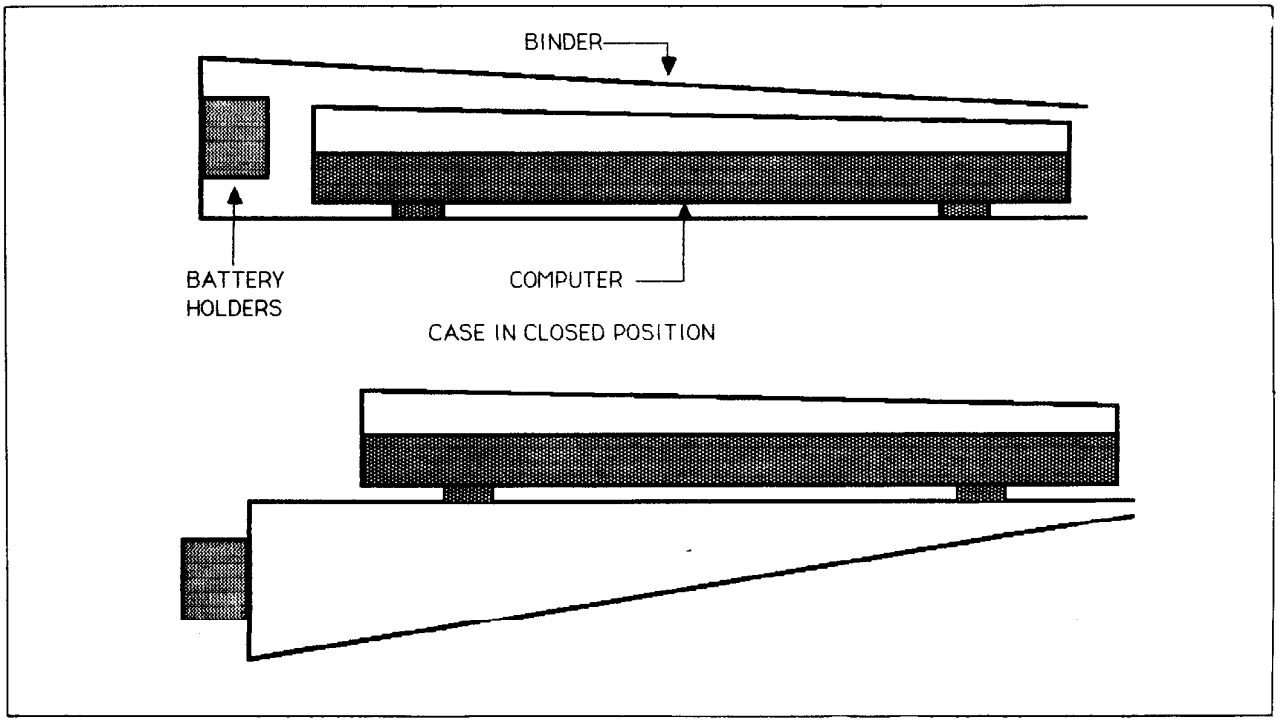
Dealer Inquiries invited.

VISA MasterCard

Axonix
The Portable Peripherals People.
417 Wakara Way
Salt Lake City, Utah 84108

Call (801) 582-9271

Circle 6 on Reader Service Card

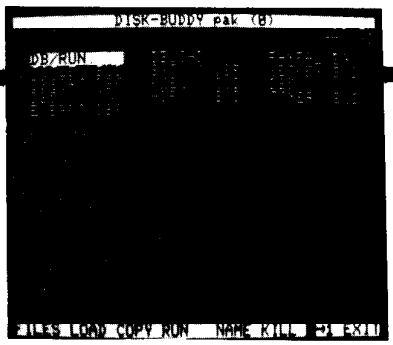


Side views of the notebook battery pack. The upper diagram shows the case in a closed position. The bottom diagram shows the top folded under for typing.

Civilize the DISK/VIDEO INTERFACE
MAKE SAVAGE THE MODEL 100

NOW AVAILABLE FOR THE MODEL 200

With DISK-BUDDY software for your D/VI, only function keys need touch your disk files!



Twelve programs for one low price, work together to give the TRS-80 Model 100 unique disk file handling abilities. Access disk files from menu, just like a RAM file. Commands you were tediously typing become simple function key selections. And that's just part of the power of the DISK-BUDDY PAK. It does things you can't:

- Create "superfiles" the length of the disk, over 170,000 bytes!
- Print out, or display on either screen, or copy to disk or other device, a disk data file *of any length*, **WITHOUT USING ANY ADDITIONAL RAM!**
- Furthermore, transfer records can be "filtered," an example:

  An address file on disk can contain more than 1300 entries. You can move to RAM, or screen, or printer, etc., those records which contain "California" and "Tennis" or whatever. Four logical modes of search are available.
- Also: Features to run, load, save, sort, kill, measure, append, and name, disk files and RAM files, and much more:

PCM Magazine (March, '85) said: *". . . an excellent buy" . . . "manual is extremely well written" . . . "will substantially increase the speed and ease of operation of the M-100 with the D/VI."* PCM

That was the idea in the first place.

TO ORDER THE DISK-BUDDY PAK (disk and manual): Send name, address, and check or money order for $39.95 plus $2.00 postage and handling to the address below. (For COD's call: 212-243-2129)

BuddySystems
220 West 24th Street
New York, NY 10011

Circle 4 on Reader Service Card

Get More **POWR** for Your **DISK**

Do you own a Tandy Portable Disk Drive? Do you enjoy the convenience and flexibility it adds to your 100 or 200? Then wait until you unleash its full POWR.

POWR to operate the disk using only **2k of RAM!**

POWR to save and load documents **directly from TEXT** to the disk!

POWR to LOAD and SAVE programs to the disk using BASIC commands!

POWR to OPEN disk files **from within BASIC programs** for input, output, or append!

POWR to **relocate** the disk software automatically to accomodate virtually any other program!

POWR to use a menu program to maintain disks and RAM **without typing file names!**

POWR to do more things than we can describe in this ad!

Interested? For $39.95, you get a 3.5 inch diskette with 10 files on it, and a 32-page manual that explains POWR-DISK simply enough for a beginner and thoroughly enough for an expert.

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$39.95 + $3.00 Shipping

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Acroatix Incorporated
P.O. Box 273
Wilmington, MA 01887
(617) 658-5550

Circle 3 on Reader Service Card

of you on a work surface, with the positive end (red wire) of all the holders pointing to the right. Take the red wire of the left-most holder, and securely twist its exposed end together with that of the black wire of the next holder

> The wires should be soldered together.

to the right. Be sure you have good metal-to-metal contact with the wires.

Do the same with each holder, twisting each red wire to the black wire of the holder to the right. When you're done, you should have one black wire left unconnected on the left-most holder, and a red one on the right-most holder. These two remaining wires will be connected to the power plug that goes to the Model 100.

The twisted wires should now be soldered together. Use a soldering iron or gun of moderate wattage (25 watts is about right, but it's not critical) and rosin-core solder. **Do not** use acid core solder.

You can omit the solder if you wish, and just leave the wires twisted together. This will work, but isn't as reliable. Be sure to insulate the connections with plastic electrical tape whether you use solder or not.

After the solder cools, neatly wrap each connection in electrical tape to insulate it, and tuck the wires down along the base of the holders. The wires can be held in place with more electrical tape. If you do a neat job and use black tape, the wires are not noticeable at all.

Next, we'll connect the power plug to the battery pack. The plug is Radio Shack part number 274-1569. Select two lengths of hookup wire, one about 16 inches long and one about six inches. You may also use a two-conductor wire, cutting the two conductors to the specified lengths.

Strip about ¼ inch of insulation from the end of each wire. Connect the short wire to the outer conductor of the plug, and the long wire to the center conductor of the plug. Don't forget to slip the plug cover over the wires before you connect them to the plug. Otherwise, you won't be able to get the cover on over them.

The connection of the wires to the

plug must be soldered. Unsoldered connections here will be very unreliable. If you can't solder, get a friend who can to help with this step.

Now connect the wire going to the center conductor of the plug to the black wire (negative) at the left end of the battery holders. The wire going to the outer conductor of the plug is then connected to the red wire (positive) at the right end of the holders. Solder (if possible) and insulate these connections. Screw the plug cover into place. Tuck the wires down along the battery holders, and tape as before.

ALMOST DONE

The Model 100 is held in place by four adhesive-backed velcro tabs. These are available in a variety of sizes and colors at most hardware stores. I used stock #H-101, a set of six pads. Turn your Model 100 over and clean the rubber feet with the alcohol wipe provided with the velcro. Attach a tab to each foot.

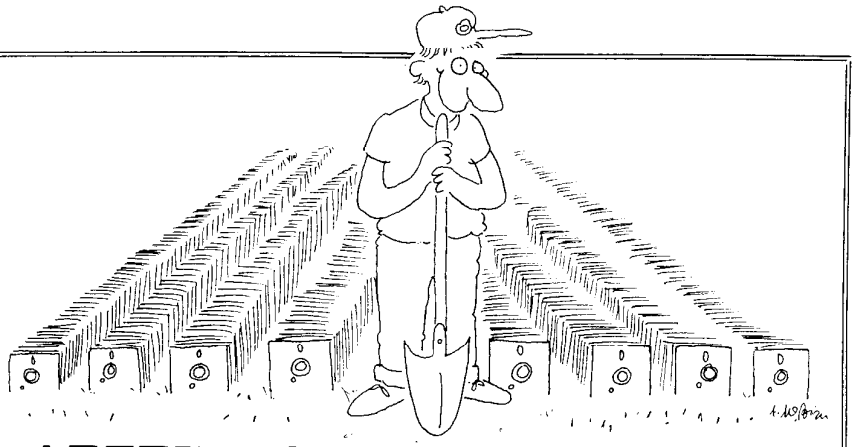
Clean the corresponding areas on the inside back cover of the binder, and attach the mating tab. Be sure to let the alcohol dry before attaching the tabs, and make sure they line up with the tabs on the back of your Model 100. You'll want to put the harder "hook" part of the velcro on the binder, and the fuzzy "pile" part on the computer.

Insulate connections with plastic electrical tape.

The velcro will keep the computer from slipping around, but **will not** support the weight of the computer. Always keep a firm hand around the computer when carrying it.

That's it! Check your connections, tuck in any excess wire, secure your Model 100 on the tabs, and insert four size D batteries into the holders. You can use ordinary flashlight, alkaline or nicad batteries. Be sure to observe polarity.

Plug the battery pack into the power jack on the right side of the computer, flip the switch, and you're computing with power to spare. And what's more, you have a handy, functional case to protect your computer from the vicissitudes of life.□



ATTENTION: Dyed-In-The-Wool Programmers, Hackers and Software Designers

Until now, one of the great limitations to computer publishing was the number of programs, ranging from wonderful to fascinating, that never see the light of day.

This was happening to some fine **BASIC** programs and machine-language routines that the editors of Portable 100 have been collecting for more than two years now.

PORTABLE PROGRAM REVIEW to the rescue. The editors of Portable 100 have started a newsletter to catch the programming overflow. Each month, you'll receive:

- The best of public domain software for the Model 100 and Tandy 200.
- In-depth technical analyses of telecommunications, graphics, sound commands, bar code scanning, direct serial port control and more.
- Programming tutorials covering advanced features of Tandy's surprisingly powerful laptops.
- A collection of useful BASIC subroutines that you can incorporate into your own programs.
- Comprehensive memory maps that show how the 100 and 200 organize **ROM** and **RAM** — and how to access ROM functions from **BASIC** programs.
- Listings, listings, listings — a monthly source of games, utilities, graphics, business applications, statistics, and on and on.
- And much, much more!

Your 12-month subscription to **PORTABLE PROGRAM REVIEW** will make your Tandy laptop more powerful than you ever imagined — while improving your programming skills and insight.

It's easy to get an information-packed issue of **PORTABLE PROGRAM REVIEW** delivered to your door each month:

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NOW AVAILABLE ON M-200

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. PCSG produced the first text formatter for the Model 100, now sold by Radio Shack as Scripsit 100. Now, 18 months later, PSCG introduced WRITE ROM. Those who have experienced it say WRITE ROM literally doubles the power of the Model 100.

WRITE ROM — as its name implies — is on a snap-in ROM. You simply open the little compartment on the back of the Model 100 with a quarter and press WRITE ROM in. It's as easy as an Atari game cartridge. You can use other ROM programs like Lucid whenever you wish.

WRITE ROM lets you do every formatting function you'd expect, like setting margins, centering, right justifying and creating headers and footers. But it does them under function key control.

WRITE ROM remembers your favorite format settings so you can print a document without any setup, but you can change any formatting or printing parameter 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.

In all there are 64 separate features and functions 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. 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 and sign-off protocol automatically.

Third, WRITE ROM has a wonderful feature called Library that lets you record favorite phrases, words or commonly used expressions (often called boilerplate).

Any place you wish Library text to appear you just type a code. WRITE ROM automatically inserts the text just like a Xerox Memory Writer. Picture what you can do with that kind of capability.

WRITE ROM is blindingly fast. No one can claim faster operation. Because it is on ROM it uses virtually none of your precious RAM. It works with any printer, serial or parallel. You can make a duplicate copy of a document file under a new filename. Rename or delete (kill) any RAM file with function key ease.

This description only scratches the surface of this amazingly powerful piece of software. Dot commands allow control of such things as margins, centering, line spacing and other changes in the middle of a document. Most are WordStar™ compatible.

A mailmerge 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 like superscripts that your printer supports, in a way that many users say "is worth the price of the program."

To underline you don't have to remember a complicated printer code. You just type CODE u, and to stop underline, CODE u again. The CODE key is to the right of your spacebar. Boldface? CODE b to start and stop. Easy to remember and do. Five different printer features of your choice.

We couldn't list all the features here. For example, you can select not just double space but triple or any other. You can use your TAB key in a document. WRITE ROM allows you to undent. This means you can have paragraphs with a first line projecting to the left of the rest of the paragraph. WRITE ROM has a feature unique for any word processor on any computer. It's called FORM. FORM is an interactive mechanism that lets you create screen prompts so that you or someone else can answer them to fill out forms or questionnaires.

With FORM, any place that you had previously typed a GRAPH T and a prompt in a document, WRITE ROM will stop and show you that prompt on the screen. You can type in directly on the screen and when you press F8 you see the next prompt. It goes to a printer or a RAM file.

Think how you can use FORM. A doctor or nurse could use it for a patient's history with each question appearing on the screen. An insurance salesman could use it for his entire questionnaire. You could construct a series of prompts to answer correspondence, typing the answers, even using Library codes. This feature lets you answer letters in rapid-fire fashion, each with personalized or standard responses.

Before WRITE ROM you had to be a programmer to create a series of prompts. Now it's as simple as GRAPH T.

PSCG makes the claim that WRITE ROM is the easiest, fastest and most feature-rich formatter for the Model 100. We're happy to offer WRITE ROM because it expands the 100 to a dimension of text processing you cannot equal on even larger computers.

We brashly state that WRITE ROM is the best you can buy. But put that to the test. If you aren't as excited as we are, return it for a full refund. Priced at $99. on snap-in ROM. MasterCard, VISA, American Express and COD.

PORTABLE COMPUTER SUPPORT GROUP

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Circle 34 on Reader Service Card

Carrying a Library in My Pocket

How to use a disk drive and database manager to keep your books in order.

By Bruce Wilson

I'm a bibliophile — that is, I love books. Consequently, I've acquired a large library over the years, with numerous books and other references covering several fields. Unfortunately, the more materials collected, the greater the difficulty in remembering what's there.

Therefore, when I joined the growing ranks of home computer nuts, among my chief objectives was to computerize my library so that I would use its many resources more effectively. But, as with so many good intentions, there never seemed enough time to tackle what appeared to be a tedious and time-consuming task.

After acquiring a Model 100, I was impressed with its convenience compared to my home desktop machine, especially its compact size and mobility. With the addition of Portable Computer Support Group's Chipmunk portable disk drive and some excellent business-related software, the Model 100 soon took over in nearly all of my professional applications.

The more I challenged it, the more useful it became. Large spreadsheets (rivaling those requiring a desktop), extensive word processing applications and frequent telecommunications were easily handled. Then I recalled my earlier objective — why not apply the Model 100 to my library? With its mobility, this application would offer a significant benefit not previously considered: I could carry the library in my pocket!

COULD THE 100 DO IT?

Pundits around the office were skeptical when the Model 100 was adopted for a number of spreadsheet applications which grew well beyond its 32 kilobyte (K) random access memory (RAM) capacity. Yet we made it work.

But when we started to consider a database involving more than 1,000 records, probably requiring well over 150K of memory, it seemed out of the question. To complicate matters, I wanted the database to be relational so I could use the computer to search the library for resources which fit a set of defined conditions. Perhaps this application would, at last, beat the Model 100?

Skeptics pointed out that my objectives would be better suited to a popular database package on a desktop machine. But I clung to the ultimate benefits of being able to carry my library with me, allowing me to screen its resources wherever I happen to be.

Maintaining a library database is a routine chore for a desktop. But for a 32K RAM Model 100, it would not be possible without the capability to employ external storage.

```
A Holy Life - 1 tape -- Bridges, Jerry
    General, ALL, Chr Living, Growth
    Taped msg, similar to book
    clt
    On Loan-

A Time for Anger -- Schaeffer, Franky
    Reference, ALL, Apologetics, Theology
    Reaction against attrack on Chr.
    clb
    On Loan-

A Woman's Workshop on Proverbs -- Bloem, Diane
    Study Aid, Women, Study, Growth
    Students' manual for Bible study
    cnb
    On Loan-

Acts Vol. I - Study Guide -- Swindoll, Charles
    Study Aid, --, --, Acts

    clpm
    On Loan-

Acts Vol. II - Study Guide -- Swindoll, Charles
    Study Aid, --, --, Acts

    clpm
    On Loan-

Addicted to Mediocrity -- Schaeffer, Franky
    General, ALL, Chr Living, Leadership
    20th Century Christians and art
    clb
    On Loan-

Adolf Hitler - Vol. 1 (to 1938) -- Toland, John
    WWII, Biographical, Germany, --
    Extensive account of Hitler's life
    hnb
    On Loan-

Adolf Hitler - Vol. 2 (1938-1945)    Toland, John
    WWII, Biographical, Germany, --
    Extensive account of Hitler's life
    hnb
    On Loan-

Adventures in the Redwoods -- Weaver, Harriet
    --, Geographical, US, --

    gnb
    On Loan-

Affirming the Will of God -- Little, Paul
    General, ALL, Chr Living, Growth
    How to discern God's will
    clpm
    On Loan-
```

A complete listing of the library database sorted by book title.

There's always Smooth Sailing with the –

Now available for Tandy 200

WEATHER FORECASTER

For the boater, sailor, aviator, traveler, fisherman, hunter and anyone who plans a trip or an event, our software cassette accurately predicts and projects up-to-date weather information. With the touch of your finger, instantly you'll know storm weather, moving and stationary fronts.

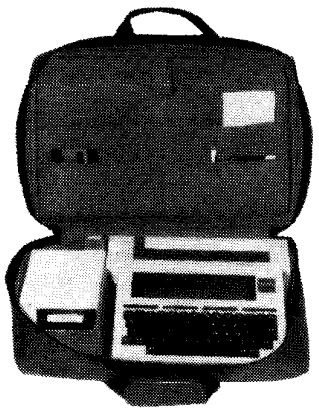
ONLY $19.95. A WEATHER FORECASTER for the personal computer Model 100 and an easy to read instruction booklet.

Please add $2.00 for shipping and handling charges. Michigan residents add 4% sales tax.

$19.95 Per Cassette

CAPS MARKETING 2555 Lake Drive, S.E. East Grand Rapids, MI 49506

Circle 76 on Reader Service Card



Brief Case Portability

$89.95

(Add $2.50 shipping & Handling per case in the continental U.S. Add $3.50 for Alaska & Hawaii)

Carry Case for Model 100 ••• and Accessories*

When you can't carry it..Bag It!

•**LP 100 Carry Case** holds the TRS-80 Model 100 (with or without rom bank), *disc drive, cassette data recorder, new **Epson** portable printer, power supply, accoustic cup, bar code wand, data discs, cassettes and your papers.

•**Two removable pouches** make a safe place for extra goodies. Remove the large pouch and you have a place for your printer.

•**Removable writing tray** is padded to protect your computer. Velcro® tabs hold it up out of the way when you are working on the computer.

•**Tough Cordura®** padded construction protects your precious contents from bumps and wear.

•**Removable padded dividers** keep the contents in place. Velcro® strips are furnished to allow the Model 100 to be used on the writing tray without fear of it sliding off.

•**Pockets, Pockets** and more pockets for your discs, cassettes, manuals and papers. Take the **LP 100** carry case and leave your brief case at home.

Communications Systems, 1430 E. Calvert, P.O. Box 1874, South Bend IN 46634, (219) 289-6709

Circle 12 on Reader Service Card

The addition of the Chipmunk disk drive, with its high access speed and 360K disk capacity, gives the Model 100 the equivalent of contiguous RAM extending well beyond its built-in 32K limit. If appropriate software could be found that could work files directly on disk, it would essentially eliminate the RAM limitations.

There's some excellent database software available in the Model 100 SIG, as well as several proven commercial packages. These would do quite well for applications having up to 150 records. But using them for a library of over 1000 records would require building several data files to accomodate the complete database, and then moving them back and forth between disk and RAM, for entering, sorting, searching and printing out records.

Portable Computer Support Group's PBASE.BA package, supplied with the Chipmunk, is designed to interface directly with the disk. Therefore it can accomodate a single data file of the size needed. There was some concern that, as a BASIC program, its slower speed might limit its effectiveness. But, however important this concern might prove to be, the availability of this software meant that the first obstacle had been overcome.

```
    Ttl: [Ttl                                ]
 Author: [Author                             ]
 Source: [Source                             ]
   Keys: [Key Word 1          ][Key Word 2   ]
      : [Key Word 3           ][Key Word 4   ]
 Dscrpt: [Dscrpt                             ]
  Codes: [A][B][C] OUT:[OUT                  ]
```

Sample library record. The actual size of each field is the space between the brackets.

DEVELOPING THE LOGIC

The second obstacle was unexpected. As it turns out, the first step in creating a database involves developing its "logic." That is, the content desired in each record and the thought process by which a user can gain access to it. This determines the format of the record.

For comparatively simple applications, such as mailing lists, there's only minimal logic involved. Most uses can be satisfied by sorting by name, zip code or town and affiliation (if for business or organization use). Therefore, the format for a mailing list record can be as simple as the standard name, address (with telephone, if desired) and possibly a code for organization.

To handle the variety of records involved in a library, as well as the different kinds of screening a user might

SHED A NEW LIGHT ON YOUR MODEL 100

The Glare Shield©

The Glare Shield© eliminates glare and eases eyestrain when using the M100. The frosted Acrylic diffuser spreads light evenly across the LCD for improved visibility without hot spots.

- Diffuser closes to form a dust cover.
- All cable ports remain accessible.

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OUR TRS-80s Have the Radio Shack warranty

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PORTABLE CHECKBOOK

The Practical Use of Your 100-200

MAIN MENU — PORTABLE CHECKBOOK

1. ENTER CHECK DATA	2. BALANCE
3. SAVE CKFILE TO DEV	4. PRINT CHECKS
5. PRINT CKFILE	6. SEARCH DATA

VISA MC

Writes to any check design. Accepts single or continuous checks. Creates and saves monthly records. Searches on *Name, Addresses, Date, Amount, Check #, Code or Purpose.* Allows for handwritten checks and deposits. For home or business. 1-505-624-0473. **$39.95**

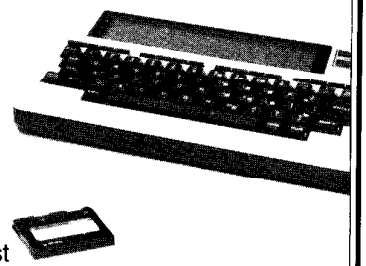
THE SHANNON GROUP, RT2 BOX 162 M, Roswell, NM 88201

NEW MASS STORAGE SYSTEM FOR ONLY $89.95

GREAT PERFORMANCE — INCREDIBLE PRICE

A&J Micro Drive would like to announce its new portable System 100. This mass storage system, designed for the Radio Shack Model 100, offers high speed storage for the price of a cassette.

The System 100, with electronics and software designed by A&J Micro Drive, uses the latest Micro Wafer Technology developed by Entrepo Inc. The new system combines high speed digital electronics with low cost, high performance Micro Drive Technology.



INTERESTED . . .

The 100's compact operating system is smaller than that of the Radio Shack Disk Drive. The latest release of the operating system may be down loaded by calling the computer at A&J Micro Drive using the simple instructions included with the unit.

The System 100 may be small enough to fit into a corner of your briefcase and require only 4 "AA" -size batteries for months of use — but don't be fooled, our new unit is packed with state-of-the-art electronics. It will give you ultra reliable program loading as fast as the disk, and twenty times faster than the cassette.

The System 100 uses a miniature endless loop tape cartridge called a Micro Wafer. The Micro Wafer, approxomately the size of a credit card, is completely enclosed in a protective housing. A built-in cover retracts as the tape is inserted into the drive, exposing the video-grade digital magnetic tape to the read/write head. Micro Wafers come in several lengths, allowing the customer to choose the length best suited to his application.

Manufacturer's Specifications

System 100
A&J Micro Drive
1050 E. Duane Ave. Ste "I"
Sunnyvale, CA 94086
(408) 732-9292

Price: $89.95

Baud Rate: 14,000 bits/second
Tape Speed: 10 inches/second
Capacity: 1.5K bytes/foot tape
10' = 15K bytes
62' = 100 K bytes
Lengths: 10, 20, 35, 50, & 62'
Power Supply: 4 "AA" cells
Connection: Uses RS-232 port
Cable: 30 inch RS-232 attached
Size: 6 x 4 x 2.5 inches
Weight: 24 ounces

STILL INTERESTED

The price of $89.95 includes a drive system with cable attached, one Micro Wafer, operating instructions and one-year membership to the A&J Bulletin Board.

Circle 1 on Reader Service Card

LIBRARY

desire, it became evident that a much more sophisticated format was needed. And that required a lot more thought and experimentation than was originally anticipated.

Entering the initial data into a large database is a time-consuming step. Therefore, it's best to iron out wrinkles in the record format before starting. Changes in record format almost always require that data be re-entered so it's properly aligned with the new format.

Unfortunately, this good advice was learned on the job. Having initially taken shortcuts in developing a record format, and being in a hurry to build the data file, several false starts resulted. The lesson learned from this experience: Think through the record format *before* using it.

After some experimentation to get everything within the seven line size constraints of PBASE, a record format was defined. It includes the principal identifying information (title, author, source), a one-line description, a field to indicate who borrowed the item, and fields for up to four key words and three one or two letter codes.

The example illustrated reflects the kind of record format which can be used for both listing and relational screening capabilities. In this case it addresses records, such as books, pamphlets and the like, which cover a variety of topics and contain a broad cross section of information. However, it can be used in modified form to fit many kinds of data bases.

Although this format may appear to be simple, it actually represents seven different variables, in addition to four fields which are normally used for sorting the entire file. With this many variables, there are literally thousands of possible discrete combinations which could be used to search the database. Only the description (Dscrpt) field is likely to serve as information alone. In addition, the source field (eg. publisher/master reference and date) has limited value for a home library.

SCREENING CODES AND KEY WORDS

Developing the record format proved to be but the first phase in the overall process of defining the logic. After much thought and some further experimentation with sample listings, generic codes and two sets of key words were developed to fit the intended logic and the two major categories of resources: history and religion.

Having separate sets of key words provides more flexibility and is easier to use. For example, the history category can be addressed with relatively simple logic; a short list of key words in several subdivisions covers the primary screening parameters most users would need. However, for the religion category, the wide variation in types of resources and their content calls for logic that is more sophisticated, having the capability to include the many combinations needed to fully address the database. This is illustrated in the sample listing.

> Pundits were skeptical when the 100 was adopted for spreadsheet applications.

Although there are still a few "wrinkles" in this logic — subsequent use has identified even more "good ideas" — the actual compilation of the data could begin and the unexpected obstacle represented by this effort was overcome.

USING THE DATABASE

Developing the database logic was taxing because it required much thought and experimentation. But the most time-consuming phase is still that of entering the data into records. In addition to typing in the descriptive information, time is needed to assess each record and select the appropriate combination of key words.

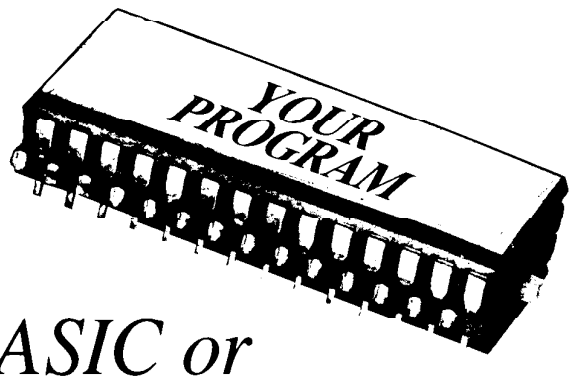
Accuracy is especially important in the way the records are entered. A misspelled key word will result in that record being missed when screening (a good reason for using short key words, or abbreviations, not the kind shown here).

Another concern is to guard against impatience. It takes several seconds to "save" a record. You must wait while the information is recorded in the proper location (alphabetically by the last field sorted). When this is complete, the screen clears and a blank record reappears, ready for the next entry.

If data is typed in while the previous

Text continues on page 39

Your own Program on a ROM



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Circle 30 on Reader Service Card

Checkbook Reconciler

By Terry Sargent

I'm not ordinarily inclined to do the programming for something I can get from someone else. But in this case I've failed to find a suitable program anywhere. So I spent a few minutes and wrote one.

The problem was to use my Model 100 to help me easily balance my checkbook. I also wanted a permanent record in case, as usually happens, I've made an error somewhere along the line and am off by a penny.

The program uses 772 bytes of memory. For the sake of simplicity, I've defined deposits as a negative check amount. If a printer is attached and a copy of the reconciliation is needed, enter a lowercase *p*, otherwise just hit Enter at the printer question.

The printer copy is designed to follow a standard checkbook layout with check amounts on the left, deposits in the middle and the balance on the right. To get the proper spacing on the printed copy and the screen, align characters on the screen with the printed program copy. The screen limitation of 40 characters is dealt with by backlighting any deposit amount on the screen.

No escape feature is used. To exit the program, you use the SHIFT-BREAK sequence to return to the menu.

CHECK.BA, a checkbook reconciliation program.

```
10Ø REM Checkbook
11Ø REM By T. Sargent
12Ø B = Ø
13Ø H = Ø
14Ø C = Ø
15Ø CLS
16Ø PRINT "Checkbook Program"
17Ø PRINT
18Ø PRINT "Enter deposits as negative check amount"
19Ø PRINT
2ØØ INPUT "Enter 'p' for printer copy"; H$
21Ø IF H$ = "p" THEN H = 1
22Ø IF H = 1 THEN LPRINT "Checkbook Computation as
    of "; DATE$; " at "TIME$; "."
23Ø LPRINT
24Ø LPRINT
25Ø INPUT "Enter old balance"; B
26Ø CLS
27Ø PRINT USING "Old balance =
                $#####,.##"; B
28Ø IF H = 1 THEN LPRINT USING "Old balance =
                                $#####,.##"; B
29Ø INPUT "Check amount"; C
3ØØ IF C < Ø THEN PRINT CHR$(27); "p";  USING
    "Deposit Amt of     $####,.##"; -C
   :PRINT CHR$(27); "q"
31Ø IF H = 1 AND C < Ø THEN GOTO 38Ø
32Ø IF H = 1 THEN LPRINT USING "Less Ck Amt of
    $#####,.##"; C
33Ø B = B - C
34Ø PRINT USING "New balance =
                $#####,.##"; B
35Ø IF H = 1 THEN LPRINT USING "New balance =
                              $#####,.##"; B
36Ø C = Ø
37Ø GOTO 29Ø
38Ø LPRINT USING "Deposit Amt of
              $#####,.##"; -C
39Ø GOTO 33Ø
4ØØ END
```

What's the Score?

By Bob Green

Members of my family are avid game players, especially games where it's necessary to keep a running score. With pencil and paper, however, there are often problems with accuracy. So one night we brought out the Model 100 and I composed a simple one-liner to keep an accurate tally:

```
10 INPUT X,Y:T1=T1:X:T2=T2+Y:
  PRINT T1,T2:GOTO 10
```

Yet, as with most BASIC programs, simplicity was not sufficient. For

Text continues on page 55

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Circle 72 on Reader Service Card

Traveling with Your Portable

Tips from a seasoned traveler on taking your laptop abroad.

By Stephen R. Lankton

I felt as uncertain with my Model 100 connected to the telephone in a Zurich hotel as E.T. looked with his communication contraption in the woods. But during that first trans-Atlantic telecommunication adventure I reaffirmed something I once learned and had then forgotten: the Model 100 is easy to work with. At the same time, I realized something I've never forgotten: the Model 100 is easy to travel with.

Of course traveling with your portable is not something to take lightly. Whether you'll be calling CompuServe from the Vatican or just doing a little typing and keeping track of travel expenses, you should take some things into account before you go.

For example, if you take your Model 100, what else will you need to take? What hardware, software and what precautions? Do you leave your investment in your hotel room? Do you take it to restaurants to be safe? What about plays, castles and ski lifts? What do you do for electrical power? How do you handle customs? What about random access memory (RAM) and external storage? What do you do about X-rays? Should you plan to use it on planes?

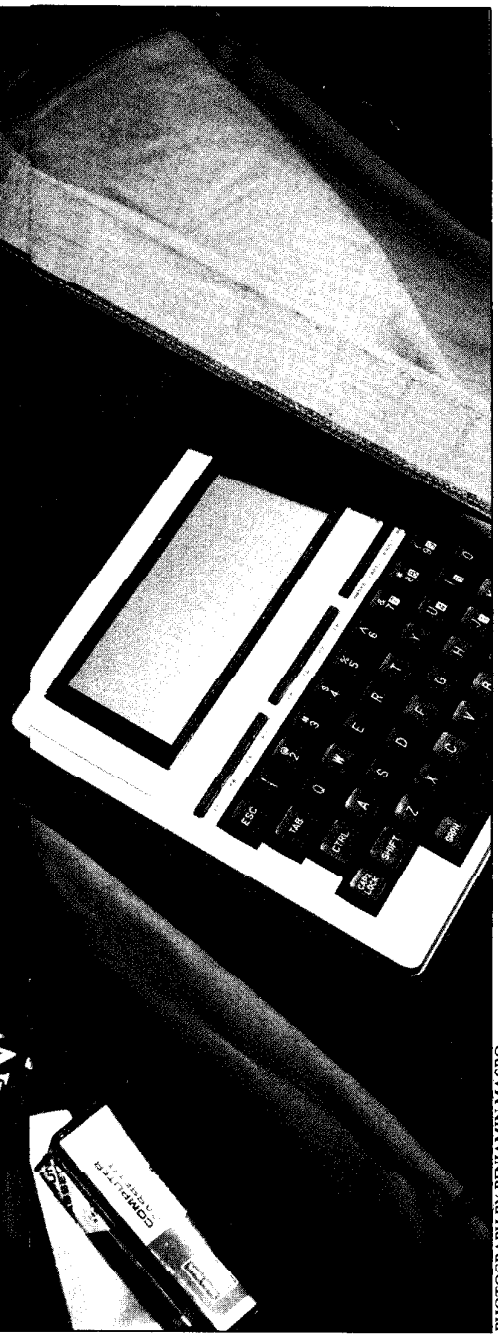
Many people have realized by now that the ability to take an electronic notebook with them on a trip saves time, adds efficiency and improves organization, not to mention the convenience and just plain fun.

In the unlikely event you haven't a clue about what your 100 can do for you on a trip, consider general business writing. This may include proposal planning, depositions, manuals, reports, manuscript composition, editing and correspondence. Granted, some things are better done on paper, but information such as itineraries, names and numbers or expenditures are best kept on a computer because they change so often. Your portable lets you keep everything in a central location.

Speaking of things in one location, portables let you bank by modem. This is not only easy but extremely important if you need to pay bills when you're on the road. In Iowa, for example, you can wire income from a local bank to your computer-accessed account in another bank. Then, the next day, from New Orleans you can pay the monthly bill to American Express, Visa and so on.

Having a portable with you allows you to send your literary efforts to a desktop for additional word process-

Text continues on page 58



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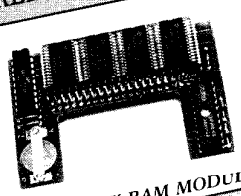

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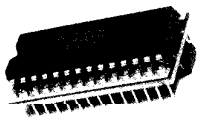
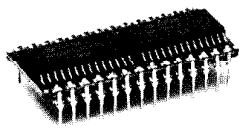


MODEL 100 8K RAM MODULE



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Write ROM — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. FORM lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit ... surpassed our highest expectations for quality and clarity."

Lucid Spreadsheet: This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

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System 100: Good Memory, Small Package

By Kevin P. Murphy

Like most lap portable users, I want memory, memory and more memory. Like most of us, I don't want to pay an arm and a leg for that memory. So, when I saw the A&J MicroDrive advertisement for a respectably-sized, portable memory device at a reasonable price, I was interested. I ordered the System 100 microdrive unit for use with my Radio Shack Model 100 lap portable.

The A&J advertisement had indicated that the unit could be expected to arrive in approximately six weeks; it arrived in only two. I was mildly impressed — I'm just an ordinary user, not a Peter McWilliams who might have been expected to publicize their product.

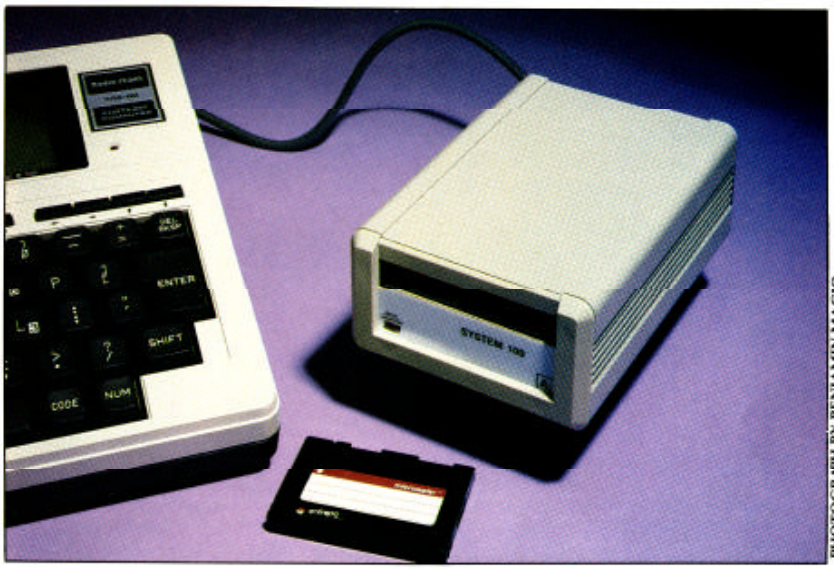
The drive unit was well-secured inside a sturdy cardboard box lined with some fairly thick but spongy foam lining. A&J recommends saving the box to transport the unit, and I think that's a good suggestion. There are separate compartments for the drive and its attached connector cable, and for "microwafers," as the miniature data cassettes are called.

A DIFFERENT TWIST

The manual that I received was supplemented by an update sheet that clarified the unusual startup procedure for the drive: The operating system is downloaded via the Model 100's modem from the manufacturer's bulletin board. One advantage of this procedure is that purchasers may avail themselves of the latest version of the operating system as updates are created. All updates are free to anyone owning a System 100.

The operating system comes in two flavors. The first, the original version, allows storage of only eight files per microwafer and is 5620 bytes long. The latest version lets you put up to 28 files on a tape — at the expense of an additional 600 bytes of memory.

Although I am far from expert in the use of the telecommunicating features of my computer, the procedure was delightfully easy using the short BASIC program provided by the manufacturer.



PHOTOGRAPH BY BENJAMIN MAGIO

Initializing the software was also easy once it had been downloaded from the manufacturer's bulletin board. Problems (and there were some) were largely the product of my own lack of knowledge. More about that later.

Now, on to the System 100 itself. I noticed that the faceplate containing the "door" through which microwafers are inserted was loose at one corner and that there was no apparent way for the average user to rectify it. I have written to A&J to inquire about a remedy — I am reluctant to return the drive because it works so well, but I may have to if the front plate represents a serious problem. Despite that blemish, the system seems to operate flawlessly.

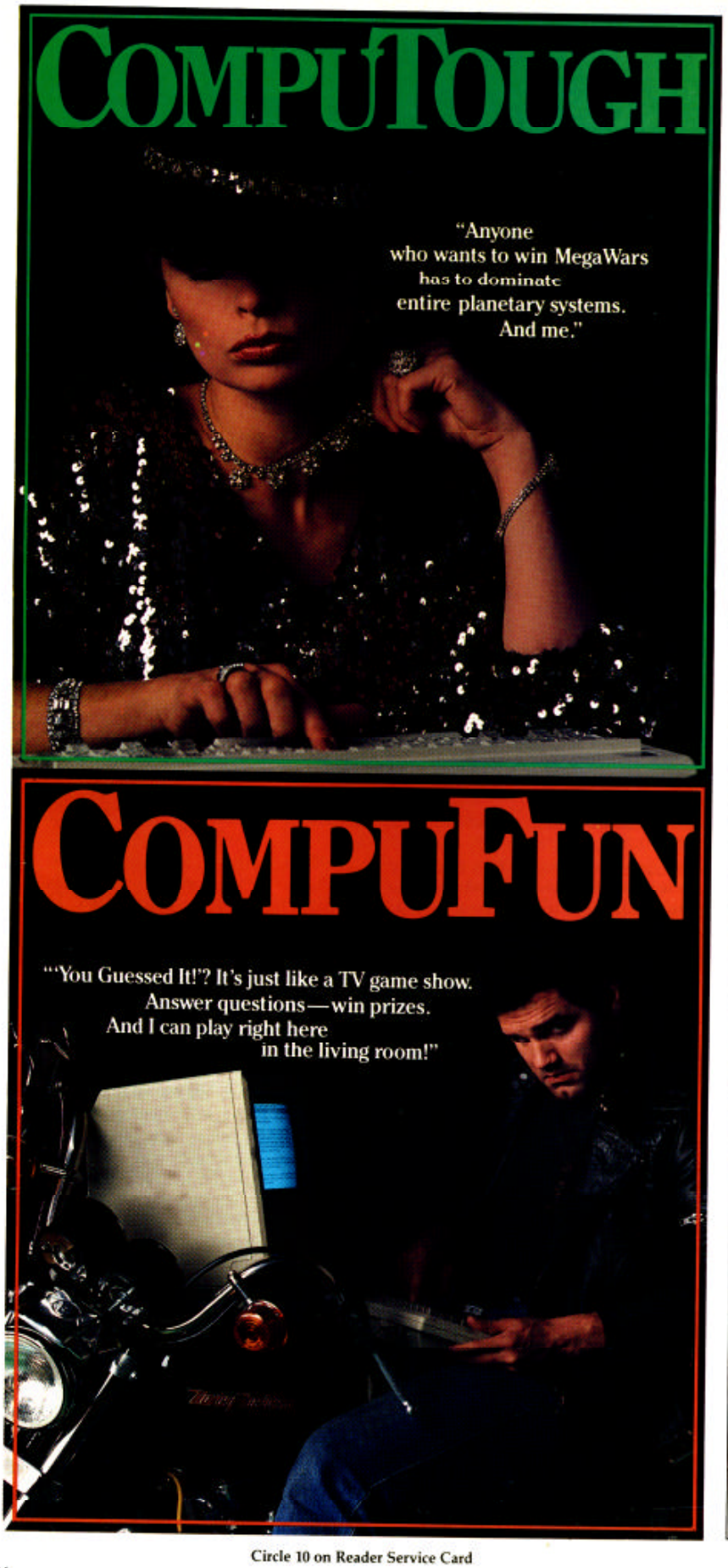
To one accustomed to five-inch floppy disk drives, this is truly a petite memory system. The entire drive measures a mere 5.9 by 3.7 by 2.5 inches, and weighs less than two pounds with four batteries (type AA) installed in the sturdy aluminum case. Use of alkaline batteries should yield about 20 hours of actual use, and a warning light indicates when batteries need replacing.

The microwafers come in sizes ranging from 10 feet to 62 feet. Storage capacity varies from 15 kilobytes (K) to 100K respectively.

The microwafers are superficially similar to audio microcassettes. They are different, however, being slightly larger and completely enclosed within their case. A sliding cover opens when the microwafer is inserted into the battery-powered drive system, and closes again when the microwafer is removed. This same insertion/extraction turns the power of the drive system on and off. The manual warns you to remove the microwafers from the drive unit when not exchanging data, because the batteries will drain as long as the microwafer is in the unit.

The microwafers, like floppy disks, must be formatted before they can be used to store information. The procedure is simple. Insert the microwafer, label side up, arrow pointing into the drive. Enter the BASIC mode (these instructions are specific to the System 100 in use with the Radio Shack Model 100 — other systems may vary somewhat) and, when you receive the "ok" prompt, type *RUN X:F:WAFRNAME*. "Wafrname" is the name that you wish to give the microwafer (to a maximum length of eight characters).

The microwafer is formatted into sectors, and a file directory is created.



Circle 10 on Reader Service Card

REVIEWS

When formatting is complete, the display indicates the space available on the microwafer, and returns to the BASIC mode.

While I didn't run a comparative test between the microdrive and my microcomputer's disk formatting time, I had the subjective impression that the microwafer formatted faster than my single-sided, double-density floppy disk drive. Naturally, the length of the cassette tape is a determining factor for formatting speed.

That is also true regarding data access time. Thus far, using 20 foot (32K) and 50 foot (80K) microwafers, I've found the microwafer to be fast enough to compare favorably with floppy disks. It is much faster than ordinary cassette storage and retrieval speeds, which I abhor. A&J states that the system operates at 14,000 baud, compared to 200 for the cassette and 19,200 for the Radio Shack Portable Disk Drive.

System 100
Microwafer memory system
A & J MicroDrive
1050 I East Duane Avenue
Sunnyvale, CA 94086
(408) 732-9292
$89.95.
Circle No. 152

VERSATILE PERIPHERAL

The microdrive is treated as external drive A by the computer. Where BASIC commands would ordinarily call for a RAM or CAS prefix, commands to operate the microdrive are generally prefixed with A:.

One of the important exceptions to that procedure is the command for displaying the microwafer directory. In that case, you simply type LFILES and the directory of the current microwafer will be displayed, one file at a time. Pressing Return displays subsequent files, one per Return until the directory has been completely displayed. The amount of available space is then indicated and the system returns to the BASIC prompt.

The microdrive system can store three different types of files: compiled BASIC, ASCII and machine language. The directory will indicate both the file type and the length of the file. A BASIC file may be saved either as a compiled BASIC file or as an ASCII file, which may be loaded directly into the TEXT

mode of the computer.

The user's manual has the usual typos and has a couple of text gaps where procedures are not quite fully explained, but the gaps can be reasoned through without too much difficulty. Overall, the manual does its job adequately, enabling even an impatient user like me to get "up and running" quickly.

While it still must pass the test of time, the microdrive unit appears to be a fine adjunct to my lap portable, and an excellent buy at the regular price of $89.95 — I was even more fortunate in benefitting from a special pre-1986 sale price of $69.95.

Microwafer prices range from $3 for the 10 foot to $4.50 for the 62 foot size. They may be purchased through A&J, however, they are also available through most Smith Corona (typewriter) dealerships.

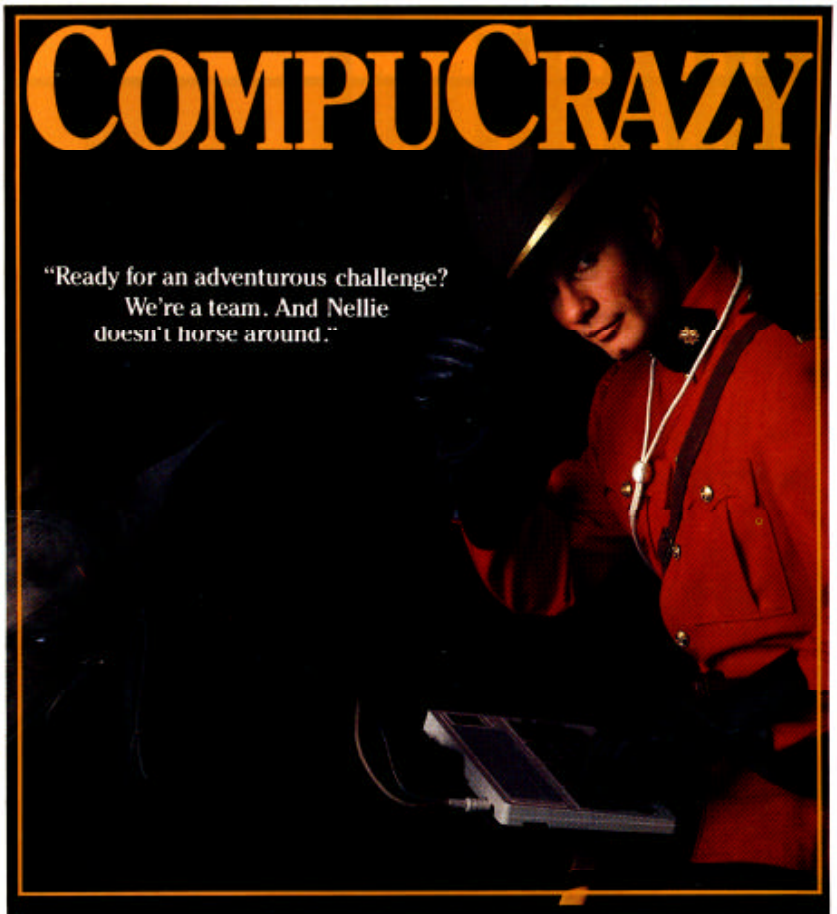
SUPPORTIVE QUALITY

As far as support is concerned, I had an experience with the bulletin board that may be representative. For reasons which I shall discuss shortly, I had to download the software more than once from the bulletin board. I received an error message and ran the BASIC modem program a second time, again receiving an error message. Since I had used their BASIC program successfully before, I reasoned that the problem must be with the bulletin board.

I called a third time, this time using A&J's voice line. I spoke to a gentleman who later identified himself as Jim Maynard and, after a short explanation, he asked if I was (my System 100's serial number) and I acknowledged that I was. He had noticed some difficulty when I called, and after some additional discussion, he asked me to call back in ten minutes. I did, and Maynard indicated that he had rebooted the bulletin board and that it should work properly. It did.

Portablility and utility are of the utmost importance to me. Now when I am in the field doing research that often pushes the available Model 100 memory to the limit, I can take along this highly portable memory expander and not worry about running out of storage space. At home, the combination of Model 100 lap portable, System 100 microdrive and Write ROM enables me to operate somewhat independently from my larger microcomputer, a welcome backup in the event of conflicting project schedules, or when

Text continues on page 38



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portable 100/200/600

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maintenance problems require a trip to the "computer hospital" for my micro.

Earlier, I alluded to some problems that resulted from my own lack of skill. I think that it may be worth sharing those problems for others who, like me, may be far from the "hacker" level of proficiency.

I don't really understand the installation of machine language programs, therefore I am less than proficient in manipulating several of them into place in memory without overlapping, neutralizing each other or crashing the system completely.

I had previously installed a menu utility software program called, appropriately enough, "Menutility," purchased from Custom Software of Wellington, Kansas.

What I didn't know when I first installed the System 100 software, was that the two programs occupied some overlapping space when routinely installed. Naturally, the system froze and I had to cold boot. Thus, I was obliged to reconnect with A&J's bulletin board — a call from Chicago to California — to reload the system software.

Somehow I realized that there was a problem of overlap between the two programs and I made what I believed was the necessary adjustment to the Menutility location instructions to enable both to coexist. I was right, up to a point.

When I reinstalled both programs, I was amazed to find that I only had about 8K of memory left, and this in a computer that is normally a 32K machine! I felt like reviving a slightly revised 60's song, entitled "Where has all the Memory Gone?"

Finally, in desperation, and in clear testimony to my overall inexperience with these things, I cold booted again to get rid of the Menutility program. I was reasonably successful except that a ghostly part of that program reappeared every time I went in and out of the TEXT-Write ROM options, resulting in the disappearance of several thousand bytes when least expected.

Eventually, I reinstalled the Menutility software, after first clearing its place in memory, and that seemed to leave me with more available memory — about 4K more, which still isn't a lot, but at least I now had the System 100 microwafers for storage, so I felt less cheated.

A&J has since responded to the problem of overlapping programs by providing a relocator option when loading the operating system. As a default, the operating system loads at memory location 57344. The relocator gives you a choice of installing the software at the default location or at position 36000 to 56000 (at increments of 1000) — wherever it won't interfere with other programs.

My mistakes were not over yet, though. It took me two more long-distance downloads before I realized that I also could have stored the system on regular cassette for back-up. I had, of course, stored the system software on a microwafer as one of my first acts after formatting. When I crashed the system the first time, I realized that I could not reload the system from a microwafer because the computer no longer had the operating system within it. To show you how slow the human mind can be, it wasn't until that point that I finally realized that the user's manual meant for the purchaser to use the *regular* cassette system when it said "cassette backup" is permitted. Working with computers is an instructional, as well as labor-saving, process.□

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PROMPTEXT — for Radio Shack Model 100 users who do repetitive information gathering — the kind requiring standard headings or data field labels that go into the file always in the same order. It's for any standardized data gathering — surveys, logs, medical records, scientific measurements, diaries, customer info —you name it.

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record is still undergoing the save operation, there's a risk that it will cause the program to assume the new data is part of the previous record and cause an error.

This happened several times during the entry of the nearly 700 records. Although the errors appeared to clear after each instance, at least one record in the data file is apparently confused and the ongoing use of the database is thereby inhibited while PCSG investigates the cause for this (and, hopefully, a way to overcome it without redoing the entire data file).

When completed and ready for use, the database file can be conveniently accessed using the Model 100. However, hard copy output is still preferable in many cases. Once again a specific format is necessary, tying back to the coding used in creating the record format.

Anticipating the kinds of needs for the library database, two print formats were developed: a complete listing and an abbreviated form. When printing, any words or symbols outside of the brackets will be printed for every record. The information found in each field will then be printed where the brackets and field identity are placed.

PBASE stores the record and print formats, as well as the data files, on the disk, calling them up when needed. This makes it convenient to use a dedicated disk, with several different formats that can be used for different purposes.

> Iron out wrinkles in the record format before starting.

For the library application, the data file has reached the 150K range (680 records) and will probably end up at 250K when finished. This is a routine chore for a typical desktop, but for a 32K RAM Model 100 it would not be conveniently possible without the capability to employ offline storage.

The combination of the Model 100 with the Chipmunk, both operating on battery if needed (although PBASE really "exercises" the disk drive, so battery life is limited) represents a capability which can easily compete with its larger, immobile brothers.

Access time using the Find function is reasonably short (several seconds for the top field, and up to 30 seconds for other fields). Although it can sort on any field in the record format, it is somewhat slow in this mode.

Entering and changing records is a simple matter. Using Find to screen through a series of records, each record can be called up, resaved (if modified) and the next in series displayed by using one function key.

Deleting records is similarly easy, a one-key step followed by a confirming *Y* to prevent inadvertent erasure.

Perhaps the most useful aspect of the database is in the combination of its Print and Find features. After entering a desired combination of key words (and codes) on a blank record, the Print command will operate in the Find mode, selectively printing each record which matches the combination set. It is not a rapid process, however, and can take up to an hour or more for combinations which select as many as 100 records.

Text continues on page 51

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Circle 20 on Reader Service Card

Truth in Taping

A short program that verifies text files on tape.

By Carl Oppedahl

If you save an important file on tape, you'll want to be sure you can load it back into the computer later. Occasionally a particular cassette may contain a blank spot or other defect that might make loading impossible. But when you're saving the file to tape, nothing will reveal that the blank spot is present — you'll only learn it when you try the load later.

The Tandy 200, like its sibling the Model 100, has a CLOAD? command which allows you to verify a BASIC file which you've stored on tape. After you use CSAVE to record the .BA file to tape, you rewind the tape and use CLOAD? to play back the file. CLOAD? compares the tape file with the .BA file on a byte-by-byte basis, letting you know whether everything matches. If the write operation was unsuccessful, the verification will fail. The idea is that you will learn promptly that the tape was no good.

But neither computer has a built-in command for verifying files *other* than BASIC programs (.BA files). This article tells how you can verify .DO files on tape using a simple BASIC program.

THE SPECIFICATION

I'll describe the process I went through to complete the program since it will reveal a bit about the inner workings of the Tandy 200 (and Model 100). First of all, the program would need to open two files; one on tape and one in RAM. It would read both files, comparing them byte by byte, and announce the result. I wanted to minimize the number of keystrokes required to execute the program, and I didn't want to have to do any of it in machine language.

The program logic was pretty simple — open two files and execute a loop in which they are compared until the end of file is reached. Assume for the moment that the tape is opened as file 1, and the RAM file is opened as file 2. On many computers, the comparison loop would contain something like:

```
100 IF EOF(1) OR EOF(2) THEN (done)
110 LINE INPUT#1, I1$
```

Verification program for the Tandy 200. To modify it for use in the Model 100, change FCB to 64668 and SND to 65348.

```
100 'Cassette Save Verifier
110 MAXFILES = 2
120 CLEAR 100
130 ON ERROR GOTO 380
140 FCB = 63311
150 SND = 64756
160 CLS
170 PRINT
180 PRINT "Cassette DO-file verifier"
190 PRINT "Push 'play'"
200 PRINT "Searching cassette for .DO file..."
210 OPEN "cas:" FOR INPUT AS 1
220 PRINT "Found: CAS:";
230 F$ = ""
240 FOR J = FCB TO FCB + 5
250 P = PEEK(J)
260 IF P <> 32 THEN F$ = F$ + CHR$(P)
270 NEXT
280 PRINT F$; ".DO"
290 GOSUB 370
300 OPEN F$ FOR INPUT AS 2
310 PRINT "Found: RAM:"; F$; ".DO"
320 GOSUB 370
330 PRINT "Verifying..."
340 IF EOF(1) OR EOF(2) THEN 350 ELSE IF
    INPUT$(1,1) = INPUT$(1,2) THEN 340 ELSE CLOSE
   :PRINT "Files do not match -- verify fails!"
   :GOTO 420
350 IF EOF(1) AND EOF(2) THEN PRINT "Verify
    successful!"
   :GOSUB 370
   :END ELSE PRINT "Files not same length -- verify
    fails!"
   :GOTO 420
360 IF PEEK(SND) THEN RETURN ELSE SOUND 15000, 80
   :RETURN
370 IF PEEK(SND) THEN RETURN ELSE FOR I = 5 TO 8
   :SOUND 5000 / I, 10
   :NEXT
   :RETURN
380 IF ERR = 52 THEN RESUME 390 ELSE IF ERR = 18
    THEN RESUME 410 ELSE ON ERROR GOTO 0
390 PRINT "RAM file "; F$; ".DO not found!"
400 GOTO 420
410 PRINT "Tape I/O error! Try again."
420 GOSUB 360
430 END
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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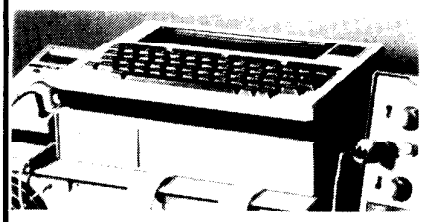

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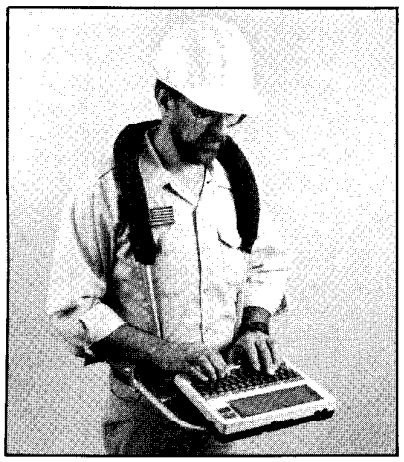

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VERIFY

```
120 LINE INPUT#2, I2$
130 IF I1$=I2$ THEN 100 ELSE (fails)
```

This approach will inevitably crash if attempted on the 200 (or 100). This is because strings like I1$ or I2$ cannot be longer than 255 characters. However, the text returned by LINE INPUT may be quite long, limited only by the size of the .DO file. So an LS (string too long) error will arise, from which there is no prospect of recovery.

The same problem comes up if you use INPUT# instead of LINE INPUT#. Study of the BASIC manual reveals another input method, the INPUT$ function. It obtains a specified number of characters from the open file. Up to 255 characters may by requested. So you might think of using a comparison loop like this:

```
100 IF EOF(1) OR EOF(2) THEN (done)
      ELSE IF INPUT$(255,1)=INPUT$
      (255,2) THEN 100 ELSE (fails)
```

This fits neatly in one elegant line of BASIC, and runs fast since it does everything 255 bytes at a time. It, too, is doomed to failure, however. Microsoft made the first argument of INPUT$ pointless because there's no way to guard against the end of file.

In the example given, assume the length of the .DO file is not an exact multiple of 255. Thus the last INPUT$ will seek 255 characters but actually get less. This will produce an error. Even if you check EOF every time, the program will crash.

It should now be clear why everyone who uses INPUT$ always supplies a first argument of 1, and that value is what I used in the final version of my verification program, discussed below.

MAKE IT SIMPLE

Having decided how to do the comparison, I wanted to simplify the procedure. The program, as developed thus far, opened with a question for the user, "What filename to compare?" The program then opened that file on tape and in RAM, entered the comparison loop, and finished.

But this required the user to type in a filename, calling for half a dozen keystrokes and increasing the number of opportunities for the program to go wrong. It is quite easy, for example, to get a character or two wrong when you hastily type a filename. Then you have to start the program over.

I wanted the program to figure out

the desired filename itself. Now, it is easy enough to PEEK in RAM to get the names of all the .DO files, but if there are two or more, the user must still somehow select the desired one.

But tape is simpler because you store a file starting at the beginning of the tape, and that file is what you want to be able to verify. I figured there must be a way to simply extract from tape the name of the file there, then use that name to open the RAM file.

The resulting program requires no keystrokes at all, other than those required to run the program. You simply rewind the tape and set it to play, then select the verification program from the main menu. It runs the tape until a .DO file is found, displays the filename of that .DO file on the screen, and looks for it in RAM. Then the files are compared, and the results are displayed. If there is a second copy of the program on tape (a sensible precaution), you simply run the program again. It opens the next .DO file on tape and repeats the above process.

BEEP IF IT HURTS

Like most of us, I like to use little beeps to indicate program progress and error conditions. But if you are in a library or courtroom, you may wish to keep the computer quiet. I use the SOUND flag to silence beeps. If you're going to be in a quiet place simply go into BASIC and type SOUND OFF and the program will be silent.

One of the best ways to make a program goof-proof is to let a new user subject the program to all sorts of abuse, including all possible keyboard and data inputs. Since there's no keyboard input to this program, a whole range of goofs need not be guarded against.

I finally decided only two errors could arise often enough to deserve coverage: the RAM file might be missing or there might be an untimely end to the cassette read operation. The latter may be caused either by a framing or parity error or by the user pushing Shift-Break.

Had the program been written in machine language, it would take no longer to run than a Load operation in TEXT. The BASIC program takes about 50 percent longer solely because the verification loop, with its single-character INPUT$ functions, requires so much BASIC manipulation. Nonetheless, a wait of less than a minute is worthwhile when you can relax and rely on your tape backups.□

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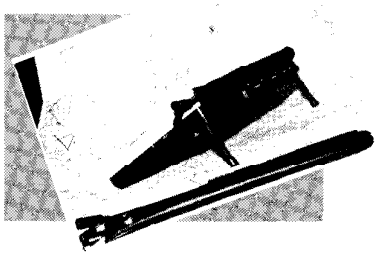

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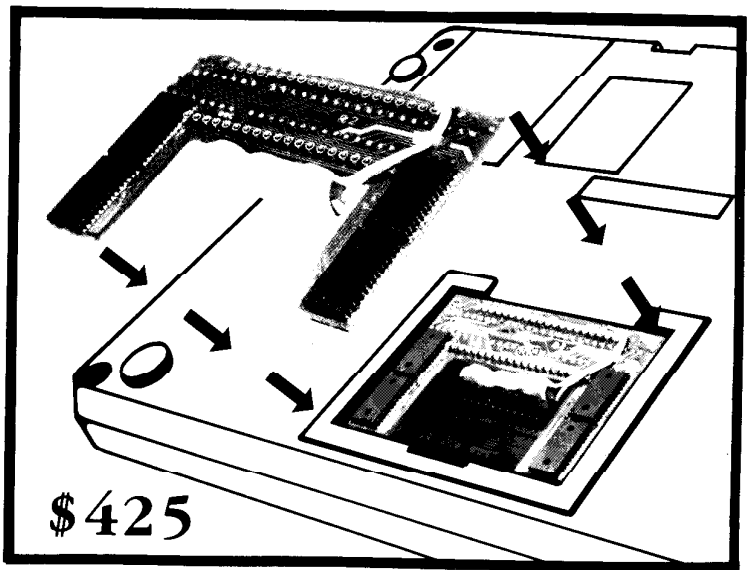

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What is really great is that you can copy a file from one bank to another with just a function key.

Each bank is like having another Model 100, and all the built-in programs as well as any snap-in ROM programs appear in all four banks and work the same way. Your widebar cursor moves from file to file and you access any file or run any program just by pressing ENTER.

What lets you copy any file from one bank to another is a snap-in ROM from PCSG called RAM+, that comes at no extra charge. It just pushes right into the little socket in that same compartment with the 96K expansion unit.

Not only does this firmware let you copy a file from bank to bank, but you can make a copy of any file within the same bank instantly with a function key. Great for Lucid spreadsheets!

Copy a file from bank to bank with a function key

You can also rename a file, or kill any file with just a function key. Plus you can do a whole lot of other useful things like setting the date, day and time with function key ease. You even have a function key that lets you use non-Radio Shack printers without having to make those tricky dipswitch settings.

RAM+ lets you cold start any one of your banks without affecting the other three. That means that anytime you want you can clean out a bank's entire memory, but leave intact all the files in the other banks.

What is also fantastic is that you don't have to have the ROM in place to use the additional RAM. Whenever you take out the snap-in ROM it leaves behind a tiny machine code program that lets you switch from bank to bank just by pressing ENTER.

This lets you use your ROM socket to snap-in other ROMS like LUCID spreadsheet, WRITE ROM text processor, or DISK+ ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM+ ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

And what has made a lot of people happy is that the system bus, located in the same compartment, is left free for you to plug in a DVI or the Holmes Engineering/PCSG portable disk drive.

The ability to copy a file from bank to bank instantly with a function key, plus all of the other features make this RAM extension truly an engineering masterpiece.

Some people hesitate when they think of installing something, and then others are skeptical that any additional hardware could be as good as the Model 100 itself. That's why we sell these 96K expansions on a 30 day trial. Simply return it within 30 days for a full refund if you are not satisfied. Priced at $425. MC VISA COD.

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Circle 33 on Reader Service Card

Sum of the Parts

The agony and ecstasy of making fractions add up.

By Alan L. Zeichick

It's no myth: Computers, despite their marvelous number-crunching powers, aren't really that good at simple arithmetic. Everyone knows that one divided by three times 30 equals 10 — right? But try this on your Model 100 or Tandy 200:

```
10 IF 1 / 3 * 30 = 10 THEN PRINT
  "Right" ELSE PRINT "Wrong"
```

The answer is "Wrong"; the computer returns a value of 9.9999999999999 — close, but not quite correct. Why the incorrect answer? Because computers allocate fixed resources to variables, and when there's a repeating decimal like 1/3, computers just can't produce the infinite amount of decimal places required to yield an exact answer.

For all practical purposes, of course, computers are accurate enough. And even if they're not, there are simple little tricks that we can use to fake the accuracy. Try this:

```
10 IF ABS((1 / 3 * 30) - 10) < .0005 THEN
  PRINT "Right" ELSE PRINT
  "Wrong"
```

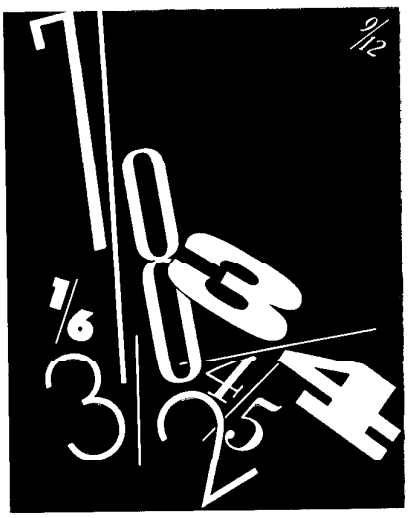
That test works. What we're saying, in effect, is if our value is within .0005 of 10, accept the value. This technique of using *acceptable tolerances* (in this case, .0005) is a very common programming practice.

TEACH AN OLD LAPTOP NEW TRICKS

When it comes to decimals, we can't ever hope for complete accuracy. But if we teach our computer how to cope with ordinary fractions, we can have as much accuracy as we need.

Unlike decimals, a fraction is an exact answer. A fraction is nothing more than the ratio of two numbers: one divided by three is exactly 1/3. Multiplying that by three yields 3/3, which reduces to an absolutely exact 1.

Many applications for fractions abound. How many square inches are there in a rectangular piece of plywood 73 3/16 inches by 97¾ inches? According to FRACT.BA, the fraction program



in listing one, we would have 457,861 square sixty-fourth inches. That boils down to 7154 5/64 square inches.

Teaching the laptop how to handle fractions isn't very tough. Since normal numeric variables aren't equipped to handle the job, we'll use two: TP (top) for a fraction's numerator, and BT (bottom) for the denominator. Actually, we're using an array with TP(1) being the numerator of the first variable and BT(3) being the denominator of an arithmetic operator's result.

A fraction program like FRACT.BA has several parts: reading fractions from the keyboard, reducing fractions to their lowest form, displaying them attractively on the screen, and performing the four basic arithmetic operations (addition, subtraction, multiplication and division).

Before writing the program, several decisions had to be made. One was to treat all fractions as *improper*; that is, 1.5 would be displayed 3/2, not the proper 1½. That makes the program shorter, but if proper fractional output is desired, the changes to the fraction-display subroutine at lines 1770 to 1820 shouldn't be hard to make.

The arrays TP and BT are also treated as double-precision, as are the temporary variables DV, SM and TG used while reducing fractions. Using double precision allows the use of "larger" fractions while, unfortunately, slowing down the program. If smaller numerators and denominators are all that will be needed, you can change the DEFDBL in line 1520 to DEFSNG.

A third decision limited the FRACT.BA program to the Tandy 200. The basic algorithms used in the program will run on the Model 100, of course, but too much information would have to be crammed into the small eight-line display. If you're a Model 100 owner and you want to use FRACT.BA, delete lines 1220 to 1370, 1410 and 1700. Change the GOTO in line 1390 to go to line 1380. Also, remove the first PRINT from lines 1190 and 1200. You'll have to refer to Table 1 for the program functions, since they won't be displayed on the screen.

ADDING IT UP

Of the 10 single-keystroke commands that control FRACT.BA, two of them, *1* and *2*, read variables from the

Listing 1. The FRACT.BA program for calculating with fractions.

```
1000 ' Fractional Arithmetic
1010 ' Alan L. Zeichick
1020 '
1030 ' Initialize variables
1040 '
1050 GOSUB 1510
1060 '
1070 ' Go to the main menu
1080 '
1090 GOSUB 1180
1100 '
1110 ' End the program
1120 '
1130 MENU
1140 '
1150 ' ====================
1160 ' Main function menu
1170 '
1180 CLS
     :PRINT "Variable A:";
     :VA = 1
     :GOSUB 1770
```

GRAPHIC BY ELIZABETH MARITATO

FRACTIONS

```
1190 PRINT
    :PRINT "Variable B:";
    :VA = 2
    :GOSUB 1770
1200 PRINT
    :PRINT "Result:    ";
    :VA = 3
    :GOSUB 1770
1210 '
1220 PRINT @ 25, "   Functions"
1230 PRINT @ 65, CHR$(27);"p [1] A = ?
    "
1240 PRINT @ 105, " [2] B = ?     "
1250 PRINT @ 145, " [3] B = A     "
1260 PRINT @ 185, " [4] A = R     "
1270 PRINT @ 225, " [5] R = A"; CHR$(155);
    CHR$(154); "B  "
1280 PRINT @ 265, " [6] R = A + B "
1290 PRINT @ 305, " [7] R = A - B "
1300 PRINT @ 345, " [8] R = A * B "
1310 PRINT @ 385, " [9] R = A / B "
1320 PRINT @ 425, " [0] Exit      ";
    CHR$(27);"q"
1330 PRINT @ 490, "Fraction Calculator"
1340 '
1350 CT = 0
1360 IF CT = 0 THEN PRINT @ 530, CHR$(27);
    "p Please press a key "; CHR$(27);
    "q" ELSE IF CT = 25 THEN PRINT @ 530,
    " Please press a key "
1370 CT = (CT + 1) MOD 50
1380 F$ = INKEY$
1390 IF F$ = "" THEN 1360
1400 IF F$ < "0" OR F$ > "9" THEN 1380
1410 PRINT @ 530, "   ... Working ...  "
1420 VA = VAL(F$)
1430 IF VA = 0 THEN RETURN
1440 ON VA GOSUB 1610, 1610, 1870, 1870,
    1870, 1950, 2040, 2130, 2220
1450 '
1460 GOTO 1260
1470 '
1480 ' ============================
1490 ' Initialize the system
1500 '
1510 DEFINT A, C, E-R, U-Z
1520 DEFDBL B, D, S, T
1530 TP(1) = 0
    :BT(1) = 1
1540 TP(2) = 0
    :BT(2) = 1
1550 TP(3) = 0
    :BT(3) = 1
1560 RETURN
1570 '
1580 ' ============================
```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Circle 18 on Reader Service Card

```
1590 ' Input a variable
1600 '
1610 CLS
1620 PRINT "Defining variable "; CHR$(VA +
     64)
1630 PRINT
1640 INPUT "Numerator (top)"; TP(VA)
1650 BT(VA) = 1
1660 INPUT "Denominator (bottom)"; BT(VA)
1670 BT(VA) = INT(BT(VA))
1680 IF BT(VA) = 0 THEN PRINT "A
     denominator of zero is not allowed."
    :GOTO 1650
1690 TP(VA) = INT(TP(VA))
1700 PRINT @ 530, "   ... Working ...  "
1710 GOSUB 2310
1720 RETURN
1730 '
1740 ' ============================
1750 ' Display a variable's value
1760 '
1770 PRINT, TP(VA)
1780 LT = LEN(STR$(TP(VA)))
1790 LB = LEN(STR$(BT(VA)))
1800 IF LT > LB THEN PRINT, STRING$(LT +
     1, 241) ELSE PRINT, STRING$(LB + 1,
     241)
1810 PRINT, BT(VA)
1820 RETURN
1830 '
1840 ' ============================
1850 ' Assign variables
1860 '
1870 IF VA = 3 THEN TP(2) = TP(1)
    :BT(2) = BT(1)
1880 IF VA = 4 THEN TP(1) = TP(3)
    :BT(1) = BT(3)
1890 IF VA = 5 THEN TG = TP(1)
    :TP(1) = TP(2)
    :TP(2) = TG
    :TG = BT(1)
    :BT(1) = BT(2)
    :BT(2) = TG
1900 RETURN
1910 '
1920 ' ============================
1930 ' Add A and B
1940 '
1950 VA = 3
1960 TP(3) = TP(1) * BT(2) + TP(2) * BT(1)
1970 BT(3) = BT(1) * BT(2)
1980 GOSUB 2310
1990 RETURN
2000 '
2010 ' ============================
2020 ' Subtract B from A
```


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Circle 47 on Reader Service Card

FRACTIONS

```
2030 '
2040 VA = 3
2050 TP(3) = TP(1) * BT(2) - TP(2) * BT(1)
2060 BT(3) = BT(1) * BT(2)
2070 GOSUB 2310
2080 RETURN
2090 '
2100 ' ============================
2110 ' Multiply A and B
2120 '
2130 TP(3) = TP(1) * TP(2)
2140 BT(3) = BT(1) * BT(2)
2150 VA = 3
2160 GOSUB 2310
2170 RETURN
2180 '
2190 ' ============================
2200 '
2210 ' Divide B into A
2220 TP(3) = TP(1) * BT(2)
2230 BT(3) = BT(1) * TP(2)
2240 VA = 3
2250 GOSUB 2310
2260 RETURN
2270 '
2280 ' ============================
2290 ' Reduce a fraction
2300 '
2310 IF TP(VA) = 0 THEN BT(VA) = 1
     :RETURN
2320 '
2330 SM = TP(VA) / BT(VA)
2340 IF SM = INT(SM) THEN TP(VA) = SM
     :BT(VA) = 1
     :RETURN
2350 '
2360 SM = BT(VA) / TP(VA)
2370 IF SM = INT(SM) THEN BT(VA) = SM
     :TP(VA) = 1
     :RETURN
2380 '
2390 IF ABS(TP(VA)) > ABS(BT(VA)) THEN TG
     = ABS(BT(VA)) ELSE TG = ABS(TP(VA))
2400 DV = 1
2410 '
2420 IF TP(VA) = 1 OR BT(VA) = 1 OR DV >
     SQR(TG) + 10 THEN RETURN
2430 DV = DV + 1
2440 TP(0) = TP(VA) / DV
2450 BT(0) = BT(VA) / DV
2460 IF INT(TP(0)) <> TP(0) OR INT(BT(0))
     <> BT(0) THEN 2420
2470 TP(VA) = TP(0)
2480 BT(VA) = BT(0)
2490 TG = TG / DV
2500 GOTO 2420
```


CONTROL YOUR WORLD

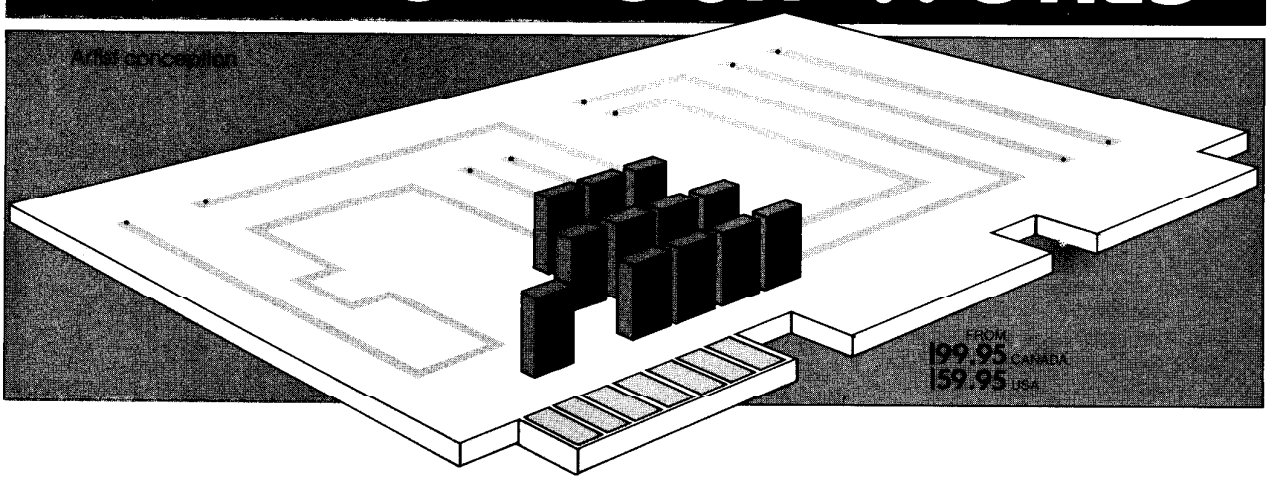

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Table 1.List of the FRACT.BA commands. Note that these use the arithmetic, not function, keys.

1. Define variable A
2. Define variable B
3. Assign B the contents of A
4. Assign A the previous result
5. Swap variable A and B
6. R is the sum of A and B
7. R is the difference between A and B
8. R is the product of A and B
9. R is the quotient of A and B

Table 2. Formulas for fraction arithmetic

Variable A: $\frac{TP(1)}{BT(1)}$ Variable B: $\frac{TP(2)}{BT(2)}$ Variable R: $\frac{TP(3)}{BT(3)}$

Addition: TP(3) = TP(1) * BT(2) + TP(2) * BT(1)
BT(3) = BT(1) * BT(2)

Subtraction: TP(3) = TP(1) * BT(2) - TP(2) * BT(1)
BT(3) = BT(1) * BT(2)

Multiplication: TP(3) = TP(1) * TP(2)
BT(3) = BT(1) * BT(2)

Division: TP(3) = TP(1) * BT(2)
BT(3) = BT(1) * TP(2)

keyboard. If *1* is pressed, the numerator and denominator will be read into variable A's TP(1) and BT(1). Similarly, *2* reads into variable B, at TP(2) and BT(2).

Commands *3*, *4* and *5* transfer information between the variables. The first command copies variable A into variable B — handy for squaring a number or transferring a value before *4* is pressed. That key copies variable R — the result of an arithmetic operation —into variable A for use in another calculation. And *5* exchanges the values of variables A and B.

Commands *6* through *9* are the arithmetic functions. Refer to Table 2 for the algorithms for fraction arithmetic. Look familiar? They're the same rules you slaved over in grammar school.

The trickiest operation is the process of reducing a function to its lowest terms. Reducing fractions changes 50/100 to its simpler equivalent ½.

The reduction subroutine located at lines 2310 to 2510 is the most complex in FRACT.BA. Let's run through the algorithm: For simplicity, I'm going to call the numerator of the variable the *top*, and the denominator the *bottom*.

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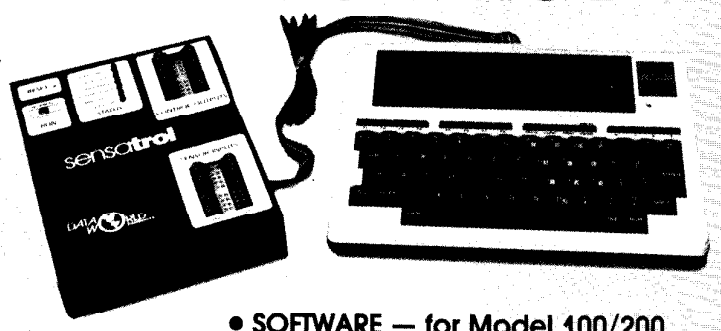

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Step 1: If the top of the fraction is equal to zero, set the bottom to one and return. In other words, the fraction equivalent of zero is 0/1. Notice that there is no way of ending up with a bottom equal to zero — division by zero is an undefined operation.

Step 2: If the bottom divides evenly into the top, we have a whole number. So set the top equal to the quotient and the bottom equal to one and return.

Step 3: If the top divides evenly into the bottom, we have a reciprocal. So set the bottom equal to the quotient and the top equal to one and return.

Step 4: Create a variable called the *target.* Determine whether the top or bottom has the lesser absolute value, and assign that value to the target.

Step 5: Create another variable, called the *divisor,* and set it equal to one.

Step 6: If either the top or the bottom is equal to one, or if the divisor is greater than the square root of the target, then the fraction is in lowest terms. So return.

Step 7: Add one to the target.

Step 8: Determine if the target divides evenly into *both* the top and the bottom. If it does, then divide it into the top, the bottom and the target and repeat step 8. If it doesn't, go back to step 6.

How about running through the process with the fraction 123/321?

Step 1: The top doesn't equal zero.

Step 2: The bottom doesn't divide evenly into the top (as would 4/2), so we don't have an integer.

Step 3: The top doesn't divide evenly into the bottom (as would 3/6), so we don't have a reciprocal.

Step 4: The target (TG in the listing) is set equal to the smaller of 123 and 321, or 123.

Step 5: The divisor (DV in the listing) is set equal to one.

First iteration step 6: Neither the top nor bottom equals one. And the divisor (1) is not greater than the square root of the target (the square root of 123 is 11.09), so we continue.

First iteration step 7: Add one to the divisor, so that it is now equal to two.

First iteration step 8: Neither the top nor bottom is evenly divisible by the divisor (two), so go back to step 6.

Second iteration step 6: Neither the top nor bottom has changed, and (two) is less than 11.09.

Second iteration step 7: Add one to the divisor, setting it equal to three.

Second iteration step 8: Both the top and bottom are evenly divisible by three. Therefore, set the top equal to 123/3 or 41, and the bottom to 321/3 or 107. Also divide the target of 123 by three, yielding 41. And now do step 8 again.

Second iteration step 8: Neither the new top nor bottom is evenly divisible by three, so go back to step 6.

Third iteration step 6: Neither the top nor bottom is equal to one, and the divisor (three) is less than the square root of the target (6.86).

It so happens that the following iterations are uneventful until the divisor reaches the value 7. At that point, because it's greater than the square root of the target, we know that we'll never find numbers than can be evenly divisible into both the top and bottom. Therefore, the fraction 123/321 has been reduced its lowest terms, 47/107.

REUSABLE CODE

The FRACT.BA subroutines can be used for other application programs as well as a simple fraction calculator. So don't complain about the accuracy of your computer — go back a step, and use fractions. Hmm, the next step: perhaps a computerized abacus?□

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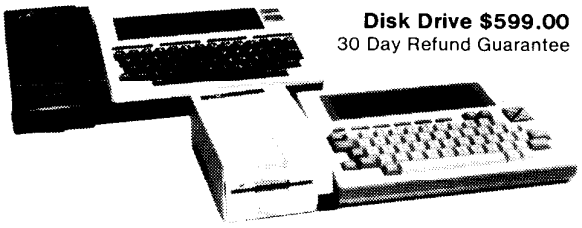

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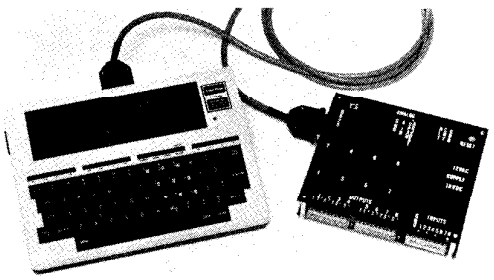

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But in spite of the time required, this feature allows entering the database with some specific information requirements and receiving a hard copy listing of the available records which fit these requirements. The same information can be printed to the screen, but for more than a few records it's preferable to go the hard copy route.

BE SURE TO BACK IT UP

Once the database master file is complete, it's a good idea to print a complete listing of it to keep as a backup in case of any problems. And speaking of a backup, if there is an application where routinely making a backup disk copy of a file is essential, this is it.

PBASE (similar to its popular cousins used on desktop computers) operates with two files, which it automatically creates and retains. One has a .DA extension and the other a .NX. These go with the .DO record format created by the user but do not have to have the same name (although it's convenient to do so).

The .NX file is automatically created whenever a .DA file is setup (via user action in logging on). It serves as the control for the data file and is continuously updated while the records are being entered or changed. As is evident by warnings in the PBASE instructions, this file is fragile and can be easily damaged.

Accuracy is important when entering records.

A separate program, PBREC.BA, is included with the PCSG-supplied software, which can be used to recover .NX files in the event of damage. However, this recovery capability is not 100 percent. The best protection against the likelihood of losing many hours worth of effort is to regularly back up the entire database disk because the .DA and .NX files cannot be copied by themselves with Load/Save commands.

One minor complaint with PBASE, compared to other database packages which are available for the Model 100, is its limited printout format capability. There are no provisions for printing headers, page numbers or other information independent of each record. Anything included in the print format will be printed on every record. Page length cannot be specified, so it's important to carefully set the number of lines in a print format to avoid typing over the page perforations.

IS IT WORTH IT?

Although it required more effort than was originally expected, the creation of the library database has provided all the benefits hoped for in the original objective. Its performance, while somewhat slow, gives the user the same functions which are routinely available in the much larger packages employed by desktop microcomputers. And, despite the skeptics, it has clearly demonstrated that the Model 100, equipped with a high speed disk drive can handle even the challenges of a large database, with the added benefit of mobility. It's both possible and convenient to carry a library in my pocket.□

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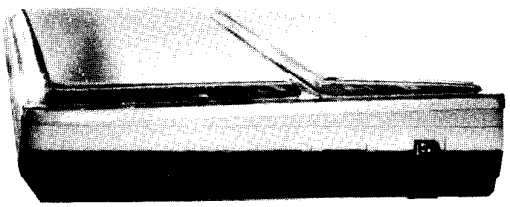

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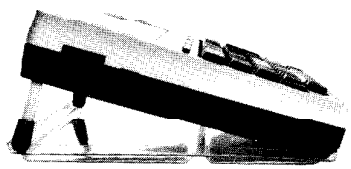

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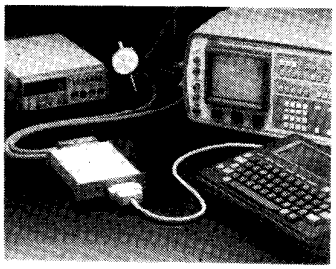

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Circle 23 on Reader Service Card

Code	Abbreviation	Meaning
CHR$(00)	NUL	Null
CHR$(01)	SOH	Start of Header
CHR$(02)	STX	Start of Text
CHR$(03)	ETX	End of Text
CHR$(04)	EOT	End of Transmission
CHR$(05)	ENQ	Enquiry
CHR$(06)	ACK	Positive Acknowledgement
CHR$(07)	BEL	Ring the Bell
CHR$(08)	BS	Backspace
CHR$(09)	HT	Horizontal Tab
CHR$(10)	LF	Line feed
CHR$(11)	VT	Vertical Tab
CHR$(12)	FF	Form Feed
CHR$(13)	CR	Carriage Return
CHR$(14)	SO	Shift Out
CHR$(15)	SI	Shift In
CHR$(16)	DLE	Data Link Escape
CHR$(17)	DC1	Device Control 1
CHR$(18)	DC2	Device Control 2
CHR$(19)	DC3	Device Control 3
CHR$(20)	DC4	Device Control 4
CHR$(21)	NAK	Negative Acknowledgement
CHR$(22)	SYN	Synchronization
CHR$(23)	ETB	End of Text Block
CHR$(24)	CAN	Cancel
CHR$(25)	EM	End of Medium
CHR$(26)	SUB	Substitute
CHR$(27)	ESC	Escape sequence
CHR$(28)	FS	File Separator
CHR$(29)	GS	Group Separator
CHR$(30)	RS	Record Separator
CHR$(31)	US	Unit Separator

The 32 control codes defined by the ASCII standard.

Binary	Decimal	Symbols
0000000 - 0011111	CHR$(00) - CHR$(31)	Control codes
0100000 - 0101111	CHR$(32) - CHR$(47)	English punctuation
0110000 - 0111111	CHR$(48) - CHR$(63)	Numbers and symbols
1000000 - 1011111	CHR$(64) - CHR$(95)	@, A-Z, and symbols
1100000 - 1111111	CHR$(96) - CHR$(127)	', a-z, and symbols

By looking at the first three digits, the computer can tell into what category a character falls.

ter alphabet. It controls computer punctuation — special symbols that serve the same functions as the English period and roadside yield sign.

Computers who share the ASCII standard use 32 special symbols called *control codes* to communicate instructions. Remember telegrams: *SEND MONEY STOP I NEED TO PAY THE RENT STOP END*? Just as we don't use the word *STOP* at the end of a normal sentence, but use a little dot instead, so computers use special punctuation marks.

When you press Ctrl-S to tell CompuServe to temporarily stop a transmission, you're using one of these punctuation marks: CHR$(19), commonly known as *XOFF*. Similarly, pressing Ctrl-Q to continue sends CHR$(17), *XON*. Strictly speaking, these codes are known as *Device Control 4* and *Device Control 2* respectively. Along with CHR$(18) and CHR$(20), they control the physical environment of a mainframe or minicomputer terminal. For example, one of these codes may be used to turn on or *enable* a CRT's dedi-

Character	IBM	Model 100
Heart	3	158
Diamond	4	157
Club	5	156
Spade	6	159
Male	11	149
Female	12	150
Up Triangle	17	143
Up-Down	18	146
Proofreader's Paragraph	20	175
Proofreader's New Page	21	169
Up Arrow	24	152
Down Arrow	25	153
Right Arrow	26	154
Left Arrow	27	155
Down Triangle	31	167
Cent	155	180
British Pound	156	163
Inverted Question	168	220
One Half	171	174
One Fourth	172	172
Checkerboard Pattern	176	255
Box Vertical	179	245
Box Right Side	180	249
Box Top-Right Corner	191	242
Box Bottom-Left Corner	192	246
Box Bottom Center	193	248
Box Top Center	194	243
Box Left Side	195	244
Box Horizontal	196	241
Box Center	197	250
Yen	157	176
Box Bottom-Right Corner	217	247
Box Top-Left Corner	218	240
Block Characters	219	239
	220	231
	221	233
	222	234
	223	232
Greek Small Beta	225	185
Greek Small Pi	227	136
Greek Capital Sigma	228	139
Greek Small Mu	230	165
Plus/Minus	241	141
Approximate	247	140
Degree	248	166
Root	251	137

A list of codes and non-standard symbols that the Tandy laptops and IBM-compatible MS-DOS computers share.

cated printer port. Because ASCII defines the use of these codes, computers, printers and terminals of different brands and operating systems can communicate.

METHOD TO THE MADNESS

Of the 32 ASCII control codes, many aren't used by today's microcomputers, but they're still present. While imagine other computer devices that might use these codes. The separation codes, CHR$(28) through CHR$(31), would have meaning when reading from a digital tape drive. The header, text and end-of-transmission codes — CHR$(1) through CHR$(4) — make sense in terms of a teletype machine. And several codes, including NAK, ACK and EOT, are used by the XMODEM file-transfer protocol.

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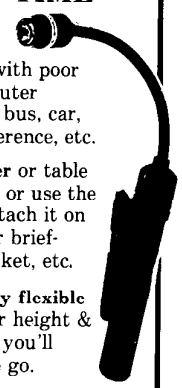

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Circle 7 on Reader Service Card

TELCOM

It may look like the ASCII codes are assigned purely at random, with numbers starting at CHR$(48), upper-case letters beginning with CHR$(65) and lower-case at CHR$(97). But remember that ASCII is a seven-bit binary code.

By glancing at the first three bits of each ASCII character, the computer can tell immediately into what category it falls: control code, punctuation, numeric or alphabetic.

That leads to a little trick, by the way, for converting letters to and from upper case. If A$ contains a single letter, the statement

```
A$ = CHR$(ASC(A$) AND 95)
```

makes A$ upper case, whether it was before or not. That's useful following an INKEY$ loop. Similarly,

```
A$ = CHR$(ASC(A$) OR 32)
```

returns a lower-case letter. Of course, if A$ *doesn't* contain a letter, the result has a fifty-fifty chance of being the original character — but it won't ever be alphabetic.

JUST SNEAKING BY

Like the 55 mile-per-hour speed limit, not all rules are followed — and sometimes with good reason.

When IBM designed the character-generation ROM (read-only memory) for its new personal computer, it realized that the first 32 ASCII codes were wasted — for display purposes, that is. So it found characters for CHR$(0) through CHR$(31), from the infamous happy faces to musical notes to arrows. So if you're trying to use software written for a version of Microsoft BASIC running on a desktop computer, such as the IBM PC or Tandy 1000, be aware that statements like PRINT CHR$(14) are intended to produce characters, not special functions.

Fifteen of those control-code symbols have equivalents on the Model 100 and Tandy 200 — but above CHR$(127), in ASCII's undefined region. Included is a list of those codes, as well as the non-standard symbols that, purely by coincidence, the Tandy laptops and IBM-compatible MS-DOS computers share.

CAN'T SNEAK BY

Not all questions about standards have clean, easy solutions, like "Use CHR$(152) instead of CHR$(24) for an up-arrow." A frequently asked question is "How can I make my Model 100 or Tandy 200 talk with, and upload to, an IBM mainframe?"

The quick answer is, "You can't, at least not without special software." IBM-type mainframe computers use many older and different standards. One is EBCDIC instead of ASCII — but that's not the biggest concern here, although that prevents the use of most special symbols. These mainframes won't recognize that Ctrl-S and Ctrl-Q are intended to temporarily pause a transmission.

Most unmodified mainframes expect to see a carriage return — CHR$(13) —and a line feed — CHR$(10) — at the end of each line transmitted. The Tandy laptops, by default, send only the carriage return, and the mainframe doesn't recognize the end of the line. However, this problem can be overcome with the BASIC TELCOM menu (*Portable 100, March 1986*) or with other telecommunications programs such as X-TEL from Sigea Systems.

With the Model 100 and Tandy 200 switched to linefeed mode, the laptop may be used as a dumb terminal on most IBM mainframes. A note: Some mainframes require the unusual setting of seven data bits, two stop bits and even parity.

Uploading to a mainframe is a special problem. IBM mainframes, because of their history, expect only one computer to be talking at a time. It's like CB radio: If one person's talking, he can't hear the other party. So the listener should wait for the "go ahead" before keying the mike.

Similarly, most mainframes expect the remote user to send only one line at a time. The end of that line, which may be up to 132 characters long, is signaled by the CR/LF which tells the mainframe "over." The mainframe then processes the transmission — ignoring any other input from the terminal — and gives its reply. When it's done, it sends a final CR/LF combination followed by a period — CHR$(46). This *unlocks* the terminal, which is free to send another line.

The problem? The Model 100 and Tandy 200 don't understand that they must wait for the period (called the *herald*) before sending each line, so they send more and more data, most of which is ignored by the mainframe.

The solution? Special telecommunications software for the Model 100 or Tandy 200, designed to emulate some of the basic functions of TELCOM but having line-at-a-time file upload, waiting for the herald.

Any brave programmers out there?□

SCORE.BA, a program for keeping a running total of game scores. Output is directed to screen or printer.

```
100 ' Game Scoring Program
110 '
120 CLS
130 C = 0
140 INPUT "How many players"; P
150 IF P = 0 THEN MENU
160 DIM S (P), T (P)
170 '
180 FOR X = 1 TO P
190 PRINT "Player"; X; "is ";
200 INPUT N$ (X)
210 NEXT
220 '
230 INPUT "Do you want a continuous printout (Y/N)
    "; A$
240 IF A$ = "y" OR A$ = "Y" THEN LPRINT "NAMES",
    "TOTALS", "AVERAGES"
250 '
260 C = C + 1
270 CLS
280 PRINT "Entering scores for round"; C
290 '
300 FOR X = 1 TO P
310 PRINT N$ (X),
320 S (X) = 0
330 INPUT S (X)
340 NEXT
350 '
360 CLS
370 PRINT "Name", "Total and Average"
380 '
390 FOR X = 1 TO P
400 T (X) = T (X) + S (X)
410 PRINT N$ (X), T (X); INT (T (X) / C)
420 IF A$ = "Y" THEN LPRINT N$ (X), T (X), INT (T
    (X) / C)
430 NEXT
440 '
450 PRINT "Press any key..."
460 A$ = INKEY$
470 IF A$ = "" THEN 460 ELSE 260
```

example, sometimes there were four players and the program only allowed for two. Therefore, a loop was added permitting ranges using arrays. Microsoft BASIC allows arrays of up to 10 items without dimensioning. By adding to the listing the program could now count, total and print scores. With the use of arrays, name strings could be added to personalize the scoring. An LPRINT option was added for verifying scores on hardcopy.

Some family members wanted to know what their average points per play were, so a counter (variable C) was added and printed under column headings that reflected name, total and average. The integer function was used to avoid long decimal printouts on screen and paper. The PRINT USING feature of BASIC could be used to give decimal results limited to tenths, hundredths, etc.

You could add some fancy bells and whistles to the program but even as is it's functional, takes up very little memory space and adds a special touch to family fun.

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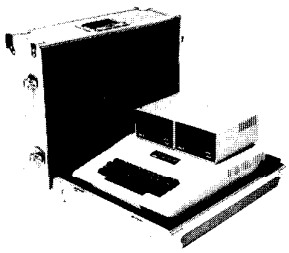

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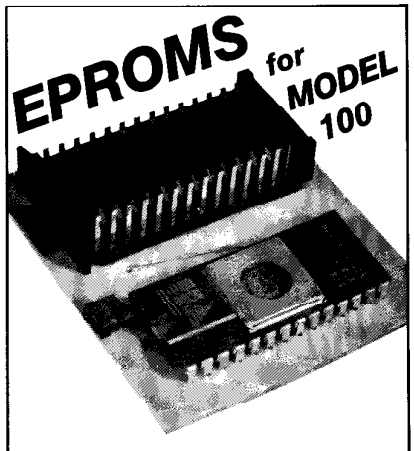

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Character to Pixel Conversion

By Robert Hartwell

If you've ever struggled with pixel row and column calculations and tried to correlate pixel coordinates to the "PRINT @" statement, this program could be a welcome relief. Its output is highly graphic, which makes sense when dealing with a graphic format.

Model 100 BASIC supports mixed line graphics and ASCII characters. The command *PRINT @ n, c* displays a character of text represented by *c* at the screen location *n*. Locations run from 0 in the upper left to 319 at the lower right corner of the screen. The command *LINE (a,b)-(c,d)* draws a line using pixel coordinates which range from (0,0) at the upper left to (239,63) at the lower right. If you wish to mix the two formats in a graphic display, you have to convert from character position to pixel coordinates, which can be trying.

Here's a simple program which calculates the conversion for you and gives the results in a graphic format. The starting menu tells you all you need to know for operation.

The graphic presentation includes one vertical and one horizontal line which cross at the *PRINT @* position. The display labels character position, plus the pixel row at the base of the character position and column at its leading edge. For pixel simplicity and clarity, labels are numeric only. You'll figure out which is which with just a moment's inspection of the graphic display.

MAP RA, a program for converting character position to pixel coordinates. Displays character position, pixel row at base of character and pixel column at leading edge.

```
100 REM Model 100 graphic display character
    location
110 REM R. Hartwell, November 1985
120 CLS
130 PRINT "Displays char position as ";CHR$(255)
140 PRINT "  Shows pixel locations:"
150 PRINT "     - at the base of the char"
160 PRINT "     - at the leading edge of the char"
170 PRINT "  Press any key to exit the display,"
180 PRINT "  Enter no value to return to Main
    Menu"
190 CP = 999
200 INPUT "  What character position"; CP
210 REM
220 IF CP = 999 GOTO 460
230 IF CP < 0 OR CP > 319 GOTO 130
240 CR = CP \ 40
   : REM char row
250 CC = CP MOD 40
   : REM char column
260 CU = 7 + 8 * CR
   : REM row at base of char
270 CS = (CP - 40 * CR) * 6
   : REM column at edge
280 REM
290 CLS
300 POKE 63056, 128
310 IF CR > 3 AND CC <= 30 THEN PRINT @ CC, CS;
    ELSE IF CR > 3 AND CC > 30 THEN PRINT @ CC -
```

```
    5, CS; ELSE IF CC < 3Ø THEN PRINT @ CC + 28Ø,
    CS; ELSE PRINT @ CC + 275, CS;
32Ø IF CC > 1Ø THEN PRINT @ (4Ø * CR), CU; ELSE
    PRINT @ (4Ø * CR) + 35, CU;
33Ø PRINT @ CP, CHR$(255);
34Ø IF CC < 3Ø THEN PRINT @ CP + 2, CP; ELSE PRINT
    @ CP - 5, CP;
35Ø REM
36Ø LINE (CS, Ø) - (CS, 63)
37Ø LINE (Ø, CU) - (239, CU)
38Ø IN$ = INKEY$
39Ø IF IN$ = "" GOTO 38Ø
4ØØ POKE 63Ø56, Ø
41Ø CALL 16964
42Ø CLS
43Ø REM Unlock the screen
44Ø GOTO 13Ø
45Ø REM
46Ø POKE 63Ø56, Ø
47Ø CALL 16964
48Ø MENU
```

Quick and Easy Typing

By Frank W. Schrader

The last thing I needed while suffering the trauma of making out checks and licking foul tasting 22-cent stamps to get my monthly bills paid was to fight with a sophisticated word processing program for the simple chore of typing an envelope, form or coupon. However, after several aborted attempts, I had to drag out my old but faithful typewriter.

That's what prompted me to write the following quick-to-load, easy-to-use BASIC program. It overcomes most the printing format limitations that got me scrambling for my Smith Corona. I've used it on my Model 100 with a TRS-80 DWP 210 printer.

The temptation to add to it was successfully resisted, but feel free to modify it as you desire. With some ingenuity it can be easily modified to spoil envelopes and louse up forms.

TYPE.BA allows you to print envelopes and fill out forms using your portable.

```
1Ø CLS
2Ø PRINT "Type in required text."
3Ø PRINT "Check for correctness."
4Ø PRINT "If OK, hit Enter."
5Ø PRINT "Position paper using space bar or tab
   and platen roller or Enter."
6Ø PRINT "When ready, hit GRPH P to print."
7Ø LINE INPUT "Text? ";B$
8Ø A$ = INKEY$
9Ø IF LEN(A$) = Ø THEN 8Ø
1ØØ IF ASC(A$) = 128 THEN LPRINT B$: GOTO 7Ø
11Ø IF ASC(A$) = 129 THEN 8Ø
12Ø LPRINT A$;
13Ø GOTO 8Ø
14Ø END
```


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TRAVELING (from page 30)

ing or to become part of a parent document when your trip is over. Of course, you need a desktop waiting in the office. A printer and any one of a number of text formatters available for the 100 will allow its printed output to look as fine as many expensive desktop word processors.

Correspondence composed on the road can also be mailed from a hotel room with proper preparation. I'm not talking about Easyplex on CompuServe that requires your recipient to also be on CompuServe, but rather services like MCI Mail.

MCI Mail will store and laser-print your letterhead and signature and transmit your message anywhere in the world. The transmitted message is then transferred to a conventional letter and envelope and delivered to the recipient's door or box. Many countries can even receive overnight mail, and several large cities can even receive four- and two-hour delivery.

Think of the convenience of being able to send a letter from your hotel room in Seattle to New York or Brussels and have it arrive the next day, signed and on your letterhead!

So much for creativity, accountability and correspondence; let's travel with the Model 100.

One of the first things to consider when traveling with a portable is how you'll carry it. Sure, the Model 100 is light enough at home going from office to car or from meeting to meeting — but try taking it to England, Paris, Rome, Munich, Tel Aviv, Melbourne, Wellington and Zurich regularly! Usually carrying it in an empty briefcase is too heavy for long trips.

BAGS AND CARRYING CASES

I strongly recommend that your portable be carried in a bag with a shoulder strap. Mine hangs just above my bill fold pocket, allowing me free hands and slipping behind me and out of harm's way in crowded places.

Several carrying bags are commercially available. I've been very satisfied with a $15 bag I purchased in a department store that handled Brother typewriters. It's a semi-snug fit and allows accessories to be taken along easily. The bag has been dropped from luggage carts a few times with no ill effects. The tote bag by Radio Shack is also nice, and being deeper than the typewriter bag, it allows me to leave my Six-ROM Bank (by Portable Computer Support Group) attached.

If you don't carry your portable on the plane with you, it's a good idea to pack a shoulder bag in your suitcase for security reasons. Never leave the 100 unattended in hotel rooms, seminars, lunch breaks or restaurants. You probably have between $800 and $2,000 in your system, and that much value should be with you or checked into a hotel safe when you leave your room.

> First consider how you'll carry it.

I take my little shoulder bag so that the 100 can go out of the hotel with me for the evening. It stays under the table at restaurants, and beneath my feet at lunches and at plays. If it will interfere with walking through Mad King Ludwig's castle, Stonehenge or the Louvre, I'll check it into the hotel safe.

AIRPORT SECURITY AND CUSTOMS

So now we're on the road and our first encounter is the airport security checkpoint. I've always allowed my Model 100 to be X-rayed. When traveling with software on cassette or disk, however, be sure to have those items hand checked. X-raying, at the level done, doesn't damage read-only memory (ROM) chips or stored data.

Before you leave the country, think ahead about what to take with the Model 100. Your first thoughts might concern electrical adapters, but you should also consider its "papers." When you re-enter and attempt to clear U.S. Customs with your shiny new Model 100 and some other fancy gadgets, you might have to prove ownership.

Most of the time customs officials seem to have their minds on drug smugglers and terrorists. But when they come across your Model 100, you'll likely be barraged with questions about the nature of your trip, your line of work, how you use the device and, most importantly, where you bought it.

In these cases, avoid detainment and frustration by taking a preventative measure before you leave. Locate the closest customs office and take your Model 100, RAM banks, disk drives, cassette machine, ROM Banks, modems or any other hardware so it can be registered. Ask for Form 4457 entitled, "Certificate of Registration for Personal

Effects Taken Abroad."

In a few minutes you'll leave with a slip of paper that can be kept in the battery compartment until needed. It's all you'll need to prove that the equipment came with you.

AIRPORTS AND AIRPLANES

It's logical to want to take your portable notebook for all those lonesome (and wasted) evenings in another city or another country, but don't forget that you have to get there first. I find the time spent in an airplane is usually my most productive time and having the Model 100 with me en route is essential.

This brings to mind several concerns: Is it permitted on the airlines of my choice? Will it disturb other passengers? Am I comfortable unveiling this device and typing on it in public? What about security and the possibility of theft in airports?

One good rule of thumb is: Don't ask for someone's okay — just proceed as if you're in the right. On a Swiss Air flight to Zurich, the man beside me was green with envy watching me work for a few hours. He had called the airline office about bringing his Data General One and was told he could not take it on board. So he checked it. I didn't ask and all I received were the admiring glances of the flight attendants and one pilot who was interested in getting a RAM upgrade for his own computer.

As for bothering other passengers, I put rubber bands on my keys so they don't click and clack when I type (*Portable 100, October 1984*). Basically, this involves no more than carefully pulling each key cap straight up and off of the keyboard, placing two orthodontic rubber bands on the keypost and replacing the caps. I highly recommend this procedure.

Although most airlines allow in-flight use of portables, some frown on the use of any peripheral device that requires wires to connect it to the Model 100. That means the Prairie Pack might be spotted and thwarted, but the ROM bank battery pack would probably never be a problem. Cassette and disk drives, however, are out.

STORAGE DEVICES

One of the hardest questions to answer is how to store text and programs when traveling. You can try several mechanisms: cassette, disk, RAM extensions, bubble trays and telephone.

From my experience, you really only have three choices. One is to use only the RAM in the 100 and/or an expansion module and keep your work load within that limit. That's risky, especially on long trips.

Another is to take a disk drive with you. In the hotel room it's tough to think of a more convenient and reliable way to store dozens or hundreds of pages of text and also take various programs with you "just in case." The battery power need not be a problem as I will explain later.

Choice three is telecommunication. Before disk drives, I used the computer in my office as an external storage device while traveling. To telecommunicate, you'll certainly want to have communication software that allows you to transmit with error checking. I do this even for text files because I want the document that the office receives to be the same as the one that I send. With the proper program you can send and receive any file or program that the 100 can handle from literally anywhere in the world (depending on the quality of the connection).

I've used Radio Shack's acoustic couplers, the BlackJack modem and direct connect cables for telecommunicating. What I prefer is a little trick that I stumbled onto about two years ago. I made a "more direct connect cable" from the Radio Shack direct connect cord. Why? Because many hotels don't have modular jacks for their phones and acoustic cups often don't make reliable connections.

If you've ever disassembled the jack on the direct connect cable you found that only two wires are used to connect it to the phone lines: red to red and green to green. Using an extra direct connect cord, cut the modular phone clip off and put alligator clips on the red and the green wires. It's very easy.

Next you'll need to unscrew the voice cap of the phone (which, by the way, won't work on public phones). Once the mouthpiece cap is off, connect the clips to the two wires in the mouthpiece. You have a fifty percent chance of getting it right even with no experience. No harm will come to the 100 if you do it backwards.

With the clips in place, you can auto dial with the log on string you use in ADRS.DO, but I prefer to manually dial and negotiate all the hotel and overseas operators.

Sometimes the mouthpiece won't come off, so I go one step further: I simply unscrew the base of the phone and clip my cable to the red and green

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Circle 22 on Reader Service Card

wires there. Then I'm hooked up just as if I did the direct connect. Hotel personnel who have seen me do this are more amazed than distressed and I've never had a problem.

In some countries the wires are not red and green. I've found out through experimentation that the 100 doesn't mind if you hook it up wrong. It just politely won't send or receive. What I do is clip the alligators to some other combination of the three or four incoming wires and try again.

BATTERIES & FOREIGN CURRENTS

Power is everything when you're talking about computers. But what do you do for electricity when abroad? There are really four common considerations to power in my travels: power on the way, power in the field, power in the hotel, power in the meeting.

The 100, with fresh batteries, will easily see a person through a conventional meeting — even one that lasts for a greater part of a day. However, the prospect of taking half a briefcase full of AA batteries is not very appealing.

I've been using rechargeables in my machine for over a year with no difficulty. In fact, I altered the wiring of the power jack to allow the recharging to be internal and automatic using some simple instructions I found on CompuServe's Model 100 SIG.

But if that type of hardware hacking is not attractive to you (it would void the warranty of new machines), it's perfectly suitable to recharge with regular General Electric or Radio Shack rechargeables.

With rechargeables, I get through meetings and the plane flight but by the time I'm in the hotel, it's necessary to recharge. In other countries this presents two problems. One is getting your plugs to fit into an outlet. This is easily solved by using a wall plug adapter kit such as that found in any airport gift shop.

The second problem is matching the voltage. Most European countries use a 220 to 240 volt standard as opposed to 110 to 120 volts in the United States. Radio Shack sells an AC adapter that transforms the 240 to 110 (cat. no. 273-1401) and another that outputs the 6 volt direct current (DC) needed by the computer (cat. no. 273-1650).

I have an adapter from Prairie Power's portable battery pack that does this function nicely. I use the AC adapter for recharging batteries in the ROM bank or in the 100. At night the 100 is plugged into the adapter charging with an alarm program on, and when I'm out of the hotel in the daytime teaching, the adapter recharges the disk drive batteries. This arrangement provides maximum use of one adapter and I never have power worries.

THE EQUIPMENT USED

I've often suffered anxiety by traveling with software and peripherals that turned out to be poorly matched. I'll therefore mention some of the equipment I've found most helpful so I can impart a tangible and usable example of traveling with the 100.

I use Sigea System's X-TEL (2,823 bytes) and Telecommuter (on my desktop) for transfer by modem and by direct cable connection. This one product allows high speed transfer of any type of file (.BA, .CO, .DO, .CA, .TS, etc.) over the phone or when sitting side by side.

I've used just about every communication and transfer program that's worth looking into, and that includes some prototypes that aren't available yet. I'm sold on Sigea's products because they work easily and leave files stored on the disk in ASCII, which is acceptable to both the Model 100, Telecommuter or any other word processor.

For those who don't want long distance phone bills, extra RAM is a must. I stick with the reliability of PG Design's 64K Module and transfer program (*Portable 100, September 1985*). This gives me a total 96K which is ample storage.

PCSG's ROM Bank is a very handy item for two reasons: battery life and immediate availability of ROM-based programs. I find both these features indispensible. I frequently use PCSG's Write ROM and Lucid as well as Traveling Software's Ultimate ROM.

The Six-ROM Bank adds about a pound of weight to the 100. That can be a blessing and a curse. The curse is that you have to drag more dead weight around with you. The blessing is that the Model 100 feels more substantial as a tool — it rests on your lap better if nothing else.

As for the ROMs themselves, maybe they're right for you and maybe not. For starters, they provide applications without taking up valuable RAM. Write ROM will also allow you to call home and transmit a file but it doesn't offer the interactive flexibility of X-TEL.

Lucid and Ultimate ROM are very useful when traveling. They provide simple operations for tracking trip expenses and the like. Ultimate ROM's database and outline creator provide capabilities for quick data entry and retrieval to sketching the many things that lend themselves to an outline format such as lists, textbooks, grants and proposals.

The latest version of PCSG's Disk Plus is intended to work over the phone lines. A couple of drawbacks to it, however, are that access to your computer is not password protected and it stores data in its own unique format. My suggestion, if you're going to telecommunicate, is to buy dedicated communication software for the home-based computer. The investment is well worth it.

Since I learned to travel and telecommunicate before disk drives were available, I've only recently begun using a desktop for additional storage. Now if I'll be creating more than RAM can store or more than I care to use long distance for, I'll take a disk drive.

There's also a wealth of information available online from the Compuserve Model 100 SIG. Not only is help from other users available, but many companies including Tandy, Sigea, PCSG, Holmes and others are right there to help users with simple or technical questions or difficulties. This can be especially helpful on the road.

GOING HOME

In my regular visits to Zurich, Munich and other foreign cities I've found the Model 100 indispensible. If you're planning a trip with your portable remember the necessary tools and safeguards:

- Carrying case
- Extra RAM
- Disk drive and disks
- Voltage adapter
- Plug adapter
- Direct connect cable (and a modified one)
- Extra batteries or rechargeables
- Customs' registration forms

By the way, all my first transoceanic message said was that Zurich looked lovely all decorated for Christmas, the candy stores were all made up like candy canes, dangling strands of lights were suspended over the street like a canopy of stars, and the lobster and escargot at the restaurant (from which I was typing) were wonderful. Well, traveling with the 100 is a tough job, but somebody has to do it.□

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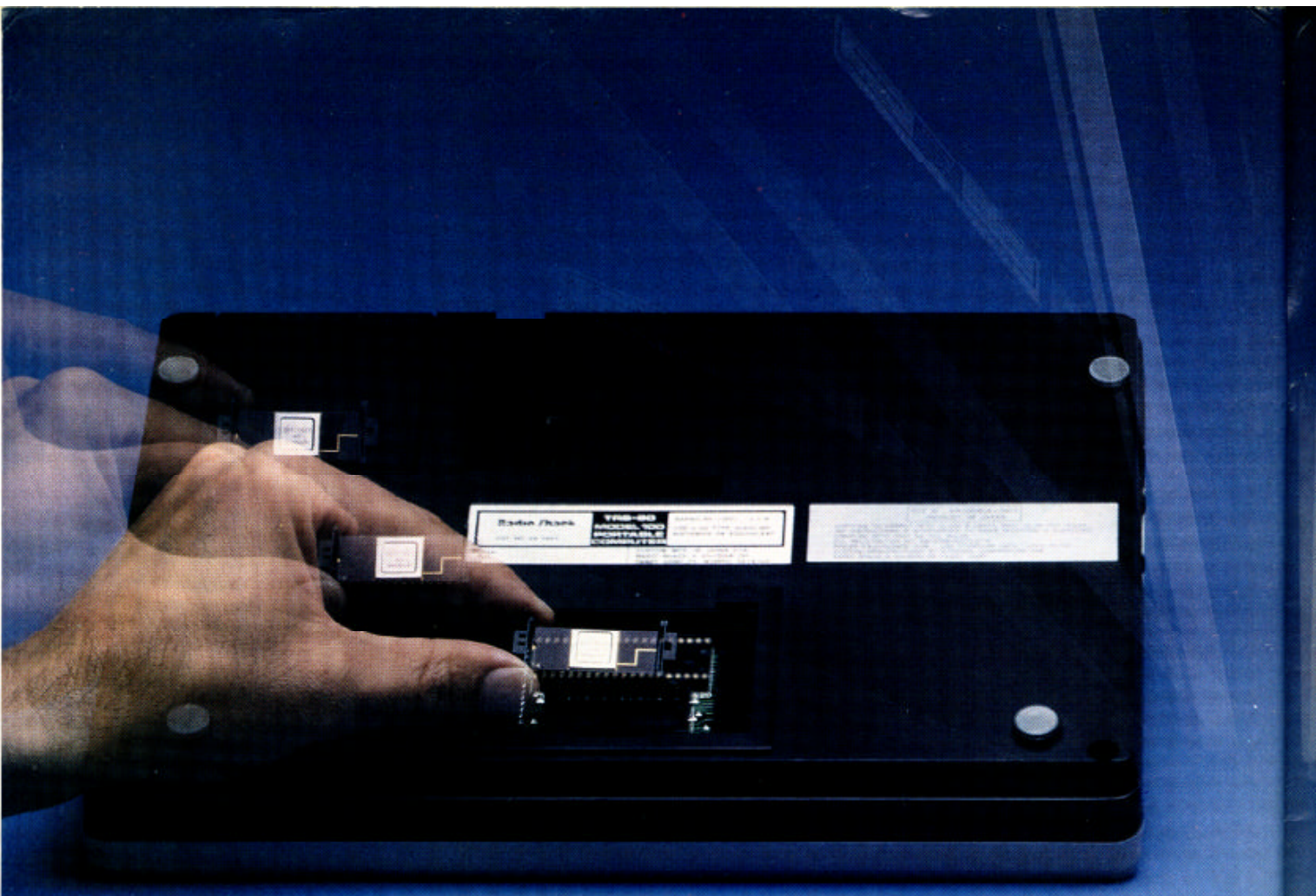

IF YOU'RE MISSING THIS,

Add Multiplan or Interactive Solutions to

If you own a Model 100, then you already know. You know that the Model 100 comes with five built-in management programs. You know about the full-size typewriter-style keyboard and the direct-connect modem and telephone auto-dialer. But did you know how easy it is to boost your portable's power with Multiplan or Interactive Solutions?

You're really missing out if you don't know how easy it is to supercharge your Model 100. Just turn your machine over, pop in either of these high-performance ROM modules, and you've got a powerful little machine that can do anything from complex spreadsheet analysis and calculations to sales forecasts, profit-and-loss projections, budgeting, pricing, engineering calculations and much more.

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Information stored in Data Manager, the data base, can be utilized by Data Calc, the spreadsheet program. The Word Processor allows you to merge Data Manager information into your text. Or you can select any part of a Data Calc worksheet and add it to any text file in Word Processor.

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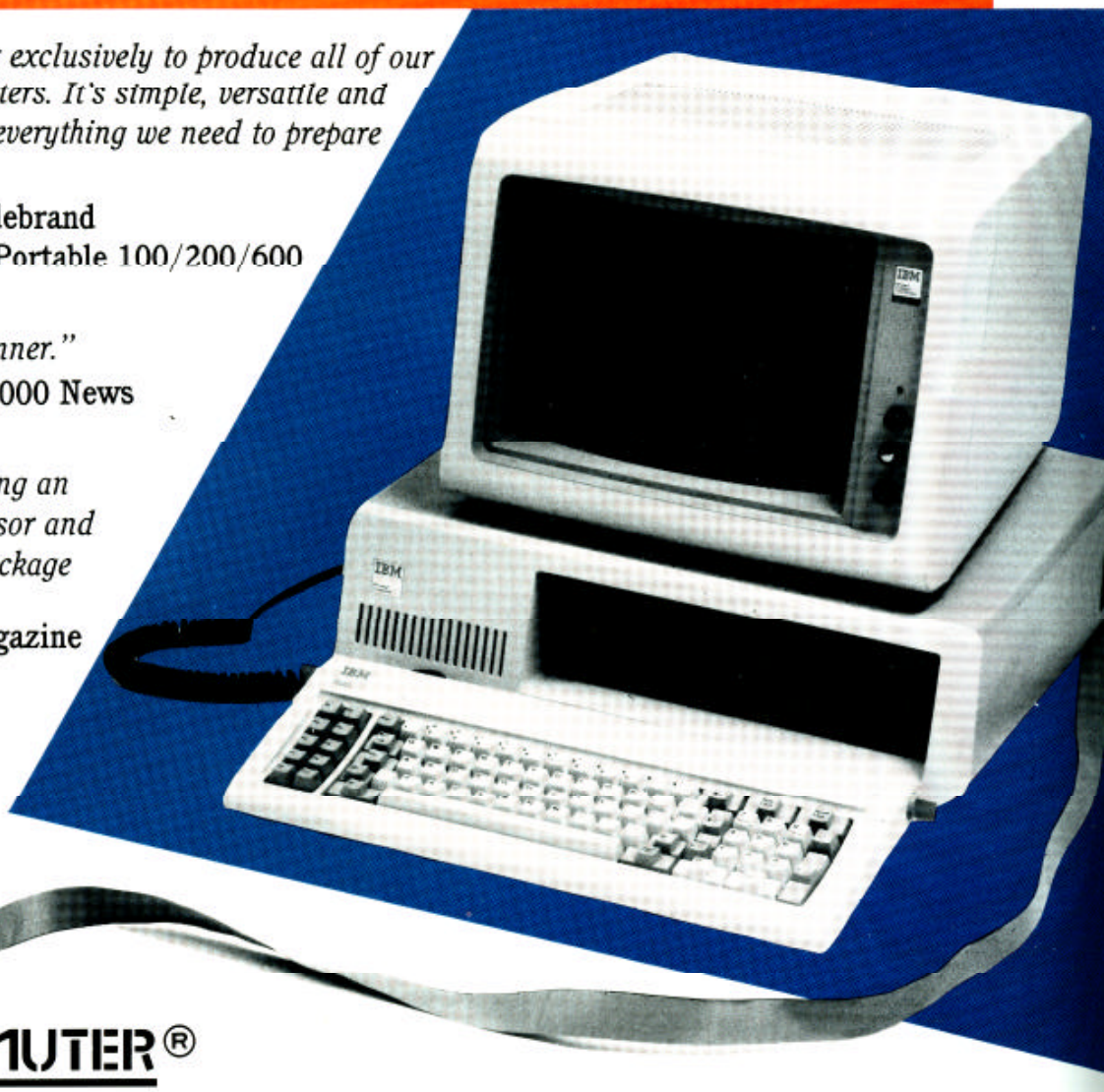

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THE FIRST BARRIER

The Tandy portable disk drive is an amazing little 1¾ pound disk drive that operates on 4 AA batteries. And what is even more amazing is that it costs only $199. But one thing missing is a true operating system to unleash the power of this product. Without TS-DOS, the Tandy disk drive is a nice and fast replacement for a cassette recorder. With TS-DOS, this disk drive turns your laptop computer into a real powerhouse that can be accessed easily and directly from any BASIC program.

TS-DOS looks exactly like your regular files menu, but now you can do such things as save the complete contents of your computer to disk at once, create files up to 100K in size with the append function, or even view the contents of a disk file without having to transfer it into your computer first. And TS-DOS only occupies 400 bytes when not in use. While using TS-DOS, you will need only 2-4K.

TS-DOS is only $69.95. If you own the Ultimate ROM II, or are purchasing it now, you can get TS-DOS at a $20 discount. TS-DOS comes on a 3½" disk and works automatically with the Ultimate ROM II or can be initially loaded using FLOPPY.CO with the Tandy Models 100/200 or by using a cassette drive with the NEC PC-8201

THE SECOND BARRIER

Until now, the Tandy and NEC laptop computers were not easily used with IBM desktop computers. Traveling Software has broken this barrier with a product called "LAPDOS," which allows the Tandy portable 3½" disk drive to be plugged into and used with any IBM PC or compatible with a serial port. LAPDOS can be operated as a RAM-resident utility on your IBM, which means you can call it up with two keystrokes while using your favorite word processor, spreadsheet, or other software. You could be in the middle of Wordstar, for example, and read in any text files from your portable disk drive.

LAPDOS allows you to easily use your database, spreadsheet, or word processing files while on the road with your Tandy or NEC laptop computer. In fact, LAPDOS includes a program called "The Exchanger" which allows you to use ThinkTank and Sidekick files with the IDEA! outline processor available from Traveling Software on a software chip called The Ultimate ROM II.

LAPDOS is only $89.95, which includes a special hardware adapter which allows the disk drive to plug into any IBM PC or compatible computer with a serial RS232 port. The LAPDOS software comes on an IBM 5¼" disk with a complete owner's manual. And if you already own the Ultimate ROM II, or are purchasing it now, you will receive a $20 discount off the cost of LAPDOS.

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