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VOL. 3 NO. 7

portable 100/200/600

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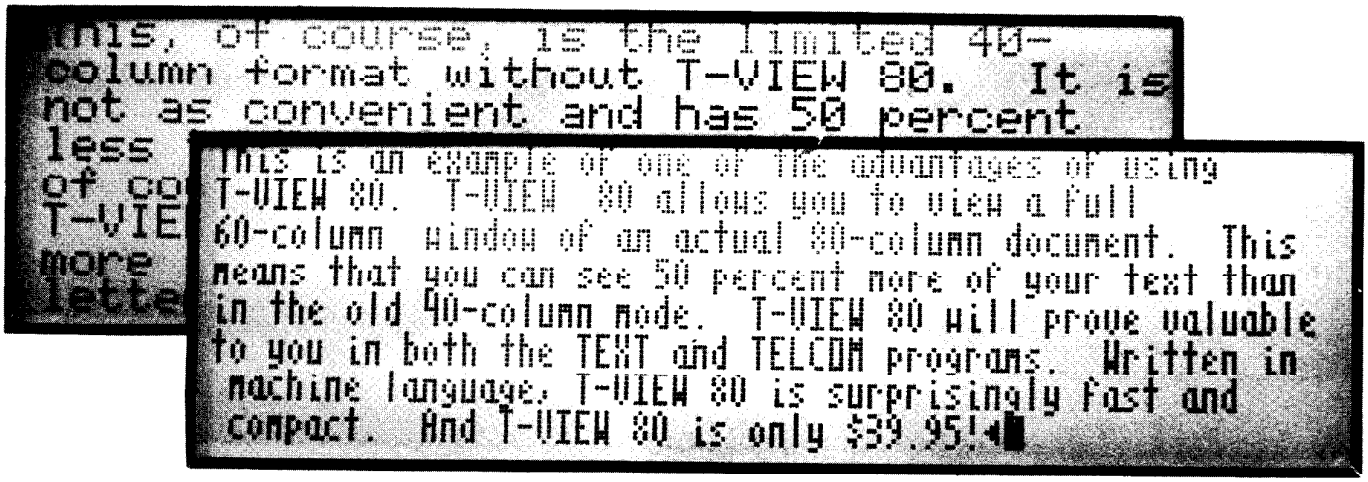

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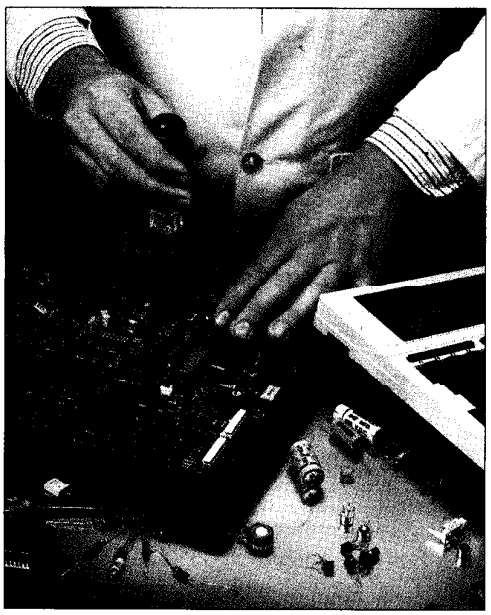

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Cover Photo by Benjamin Magro

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Editor
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Senior Editor
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Technical Editor
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Assistant Editor
Eva P. Thompson

Contributing Editor
Carl Oppedahl

Production Director
Peter D. Koons

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Circulation Manager
Loriel Peters

Subscriber Relations
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Business Manager
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MIS Director
Bonnie Hellevig

Publisher
James S. Povec

Associate Publisher
Carl Cramer

Editorial and Business Offices
Camden Communications, Inc.
Highland Mill, P.O. Box 250
Camden, ME 04843
(207) 236-4365
GEnie ID: LAPTOPS
Fax Tel. (207) 236-4738

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ROM WITH A VIEW

Building a Better Mousetrap

When I picked up my first portable, taking it apart was the last thing I thought about. I found ample enjoyment pounding away on its outside — there was no need to go tinkering with its insides.

My portable did everything I wanted. In those early days, I spent most of my time in TEXT mode. I used TELCOM once in a while. But generally I avoided doing anything that required an altogether different cable. Just the name *null modem* put me off. As for BASIC, well, at the time I wasn't even sure how to *spell* programmer much less be one.

But it's obvious other users aren't as timid. Once they get through the first 90-day warranty period, it's open season on their portable. Like hackers, these hardware gurus want nothing more than to make their laptop a better machine. So they throw in a resistor here or a double-pole switch there. Admittedly, it's never technologically earth-shattering but the alterations do make their life easier. And that's why we pass them on to you.

This month we feature a couple of do-it-yourself articles. One involves creating a self-charger within your 100. A practical way to reduce your dependency on batteries. The other is more educational and fun than practical. It explains how to connect a speech processor to your portable.

These articles are complemented by our cover story taken from contributing editor Carl Oppedahl's new book *Inside the TRS-80 Model 100* published by Weber Systems of Cincinnati, Ohio. Mr. Oppedahl's book is both detailed and informative. For anyone looking for an "everything you ever wanted to know about the Model 100" type of resource, *Inside the TRS-80 Model 100* comes highly recommended.

We've included a number of top knotch programming pieces and a few reviews as well. In fact there's a little something for everybody in here, so dig in. In the meantime, I'll go and put my portable back together.

WE'VE MOVED

As many of you have noticed, we no longer can be contacted on CompuServe. The reason is quite simple. Our presence there was based mainly on our sponsorship of the Model 100 SIG. Late last year, CompuServe decided that vendors properly should be sponsors of their respective SIGs. Hence, Tandy took over as sysop for the Model 100 SIG.

We could have maintained our presence on CompuServe, however, we chose against it. Instead, we decided to support a new online service owned by General Electric aptly called GEnie. The reasons are varied and none should be construed as a falling out between Compuserve and *Portable 100/200/600.*

One of the big drawing points of starting up with a new service is being involved in establishing a new Model 100 special interest group. Our SIG is very important to us. It allows us to keep in touch with our readers. In essence, it acts as an extension of our magazine.

Our SIG on GEnie is called Laptop RoundTable, and our company user name is LAPTOPS. So give the RoundTable a try sometime: Use any of the local access numbers listed in our December Telcom column or call GEnie Customer Assistance at (800) 638-9636. We'd like to hear from you.

Park M. Morrison
Senior Editor

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Trouble Getting Organized

I've entered the program CALNDR.BA ("Datebook for the Disorganized," *Portable 100,* July, 1985) on my Tandy 200 and am having trouble running the program. When I press the F4 key to get today's appointment, I get the error message OS 800. Is there a modification to the program for the 200?

I would appreciate advice on this problem as I would like to use it. I enjoy your magazine and look forward to each issue.

I especially enjoyed your article and review of the Tandy Disk Drive. I'm going to purchase one in the near future and the review was helpful in making my decision. Any information on the new operating system that was mentioned in the article will be welcome. Keep up the good reporting.

Francis W. Harper
Elmira, NY

An OS error means that you are "out of string space." In other words there is insufficient memory space available to store the string variable. Your computer ran out of space while trying to assign data to the variable A$ in line 800.

The solution to your problem is change line 100 in the listing to: 100 CLS: CLEAR 1000. *That will allocate 1000 characters of memory space for strings, giving you ample room to run the program.*

Your error is not Tandy 200 specific. This fix will work for both the 100 and 200. — Ed.

MORE ON THE SUBJECT

I've been a subscriber to *Portable 100* since its first issue. I look forward to every issue. *Portable 100* makes me look good when I use my Model 100.

In October's GIGO section another subscriber, Gary L. Blodgett submitted an enhancement to the CALNDR program by R.E. Mendenhall (*Portable 100/200* July 1985). The program is one of my favorites. The addition of the clock only makes it better.

I'd like to offer a couple more suggestions to further enhance CALNDR.

1. In lines 24, 36, 37 and 780: Since the primary purpose of a calendar is to keep track of appointments, I changed the name of the text file in each line from NOTE.DO to APPT.DO. These lines should read:

```
24 'A$:LINE FROM APPT.DO FILE
36 'M2:MONTH FROM APPT.DO FILE
37 'D2:DAY FROM APPT.DO FILE
780 OPEN "APPT.DO" FOR INPUT
    AS 1
```

This change requires you to open APPT.DO text file instead of NOTE.DO.

2. In lines 500, 510, 520, 530, 540 and 550: I changed the function key assignments and eliminated the word "KEY" in each line. This makes a neater screen display and seems to be more efficient and easier to use.

```
500 PRINT@22, "F1 — APTS TODAY
510 PRINT@62, "F2 — APTS OTHER
520 PRINT@102, "F3 — NEW MO/YR
530 PRINT@142, "F4 — NEXT MONTH
540 PRINT@182, "F5 — PREV MONTH
550 PRINT @222, "F6 — STOP PRGRM
```

3. In line 580: These GOSUB routines have to be changed to agree with the reassignments of the function keys. This should read:

```
580 ON KEY GOSUB 780, 720, 660, 600,
630, 1020
```

4. Line 590: This line was changed per the enhancement by Gary Blodgett. Included is the addition of lines 1030 and 1040. Both changes are listed below:

```
590 IF INKEY$ = "" THEN GOSUB 1030
    :PRINT@265, CHR$(27);) "p"; T$;
    CHR$ (27) "q" :GOTO 590
1030 PM$="AM" :H = VAL (LEFT$
    (TIME$,2)) :IF H>=12 THEN PM$ =
    "PM" :IF H>12 THEN H=H-12
1040 T$ = STR$(H) + RIHGT$(TIME$),6)
    + PM$ :RETURN
```

The addition of this clock program really completes the CALNDR screen display.

5. Line 750: I changed the print instruction "ENTER DATE" to "DATE" and its address on the screen from 262 to 265. This was necessary because when you select F2 the EN from ENTER would fill the first two fields of the time lne. This change cleared that problem.

```
750 PRINT@265, "DATE";
```

6. In line 870: All I did here was add a "CLS" command and a print address to the instruction. It now reads:

```
870 CLS :PRINT@40, A$
```

7. In line 880: Added a print statement and it's now:

```
880 PRINT :PRINT "PRESS ENTER TO
    CONTINUE"
```

8. Line 980: I added a CLS command along with printing addresses. It should read:

```
980 CLS :PRINT :PRINT@249, "NO
    FURTHER APPOINTMENTS"
    :PRINT @295, "PRESS ENTER"
```

The last three changes print only one appointment at a time on the screen.

These suggested modifications are not earth shattering. They clean up the screens and give the program an expensive look.

Finally, one other comment. I also loaded David Straayer's BASIC lister program from your October issue. All I can say about it is — it's great. Not having to load a new program to TEXT eliminates a lot of problems.

The CALNDR program and the lister are excellent pieces of software for the Model 100. They're worth a lot more than the value of my subscription for the last two years.

Sorry for being so long winded, but I wanted to share these changes with your readers and hope they enjoy them.

Jerry Nelson
Carmel, IN

Thanks for the modifications. The CALNDR program has proven to be one of the most popular programs we've run to date. For more extensive additions see the article "Maintaining the Datebook for the Disorganized" in this issue.

Portable 100 welcomes readers thoughts and comments on ways to improve published listings. If you've been tinkering and have come up with some additional code that you'd like to share, send it along with appropriate explanation to GIGO Editor, c/o Portable 100, P.O. Box 250, Highland Mill, Camden, ME 04843. Be sure to include your name and address. — Ed.

PRAISE AND PROBLEMS

I've been using a Model 100 for about nine months now and find it indispensable in my business, which includes

travelling at least 25% of the time. I use the Model 100 in the office as my communication terminal for Easylink (Western Union) access to electronic mail, TELEX and OAG. On the road in places like Korea, Taiwan, Japan and Australia where I do not have convenient access to data communication networks, it becomes my "secretary." To accomodate my storage requirements during travel, I've upgraded to Traveling Software's 96K RAM and have just recently obtained the Tandy Portable Disk Drive (PDD).

I have therefore read with great interest the outstanding November 1985 article on the PDD. Kudos to Park M. Morrison for a comprehensive and fair article. And hooray for J.D. Hildebrand. The operating system is definately archaic and I look forward to the new software. Today isn't soon enough!

I have experienced a problem that you may be able to help me with. When I attempt to load a program from the PDD that has been saved in .BA format to any of the three banks of the 96K RAM, I get a bank crash and a locked keyboard. If this happens in bank two or three, I can get into the first bank by turning the Model 100 off then back on. My recovery method is to use the TS "BANK" program from a usable bank and enter the locked bank with the "cold start" technique given in Traveling Software's manual. As a preventive measure, I've changed all programs on the PDD to .DO format, but this is a bit of a pain. Any suggestions?

Your articles are great. Keep up the good work and thanks for the service to the portable computer family.

Terry Sargent
Honolulu, HI

WISHING FOR MIRACLES

What is the mechanism for communicating from BASIC to the TEXT functions of the Model 100.? For example, I want to write a program in BASIC to PRINT DATE$, and then have it cued into the TEXT program so I can type in a code and the date will appear in my document.

E. John Hamlin
Waverly, OH

You have a great idea. Unfortunately, as is, the Model 100 doesn't provide any way to access a BASIC program from TEXT. However, there are a number of text processing programs that may help you out. For example, Write ROM from Portable Computer Support Group allows you to print out a footer with "today's date" if given the proper code. Others, such as Micro Demon's Supera are capable of similar functions.

Contact Portable Computer Support Group, 11035 Harry Hines Blvd., No. 207, Dallas, TX 75229, (214) 351-0564. Contact Micro Demon, Inc., P.O. Box 50162, Columbia, SC 29250, (803) 733-0980. — Ed.

WISH LIST

I applaud your future disk operating system for the Tandy Disk Drive. What would massively extend the use of the Model 100 and Tandy 200 is a ROM implementation of the DOS that would allow:

1. Random access read/write
2. Merge files on the disk and, along with read/write, print out from disk (overcome memory limits of RAM) to LCD or printer.
3. Search/retrieve of disk data fields with user specified begin/end entry formats (carriage returns are too valuable within a long record).
4. Up and download in TELCOM with easy displays of RAM/DISK contents while online.

Quite a wish list for the post-Christmas season, but I'm sure I would not be the only person willing to pay dearly for it.

Tyler Parr
Cleveland, OH

We've received many "wish lists" from our readers regarding the operating system for the Tandy Disk Drive. We'll do our best to accomodate your needs. — Ed.

A LSTFIL UPDATE

The following are some changes I've made to the LSTFIL program ("Finding a Needle in a Haystack," Portable 100, November, 1985) that improve its performance. They are summarized below:

1. Line 190 is optional. It's not necessary to have file directory bytes displayed.

2. Change line 210 to include numbers within the .DO file name. Line 210 should therefore read: 210 CC=CC+1: IF AA>47 AND AA<91 AND CC>3 THEN GOTO 230 ELSE GOTO 270: REM ONLY LAST 8 BYTES OF FILE ENTRY.

3. To make the sound effects a little less harsh, change BEEP in lines 270 and 450 to SOUND 3000,20.

4. Line 410 is optional. It isn't necessary to display file contents during each search. Deleting this line will speed up the program.

5. Insert PRINT TT$ in line 450 so only a statement containing an item being searched is displayed. Therefore, line 450 should read: 450 IF INSTR (TT$,IT4(D))>0 THEN PRINT: PRINT TT$: PRINT CHR$(27); "p"; "Item desired, "; CHR$(34); IT$(D); CHR$(34);", is in "; AA$: SOUND 3000,20: PRINT CHR$(27); "q": STOP

6. Line 450 is not necessary and should be omitted.

7. It should be noted that it's important whether the item being searched is or isn't upper case.

Leo S. Reich
West Orange, NJ

IN SYMPATHY

I sympathize with Kay A. Buck and her problem in sending files to an Apple.

I'm able to read and write to disks for 25 other computers, including IBM, but not Apple or Commodore.

One solution to her problem is to buy an Osborne 1. This computer is no longer manufactured, but service is available and the price is $500 or less.

I'm writing this letter on a Model 100. When I go home this evening, I'll transfer it to my Osborne at 7200 baud. The transfer will be done using an inexpensive cable between RS-232 ports and a public domain program called OTERM (an acronym for Osborne Terminal Program). I'll then format it with Wordstar and send it to my printer. The Osborne usually comes bundled with BASIC, Wordstar and dBase II.

One further suggestion. I, too, have used my Model 100 in a library. I thought that the key clicks might distract other patrons. Thanks to the article "Rubber Band Plays Silently on Model 100" (*Portable 100*, October 1984), I was able to eliminate them by pulling the key caps off from the top using a bent paper clip and snapping a one-quarter inch rubber band around each shank. If you have a friend who has braces, his orthodontist should be happy to provide an envelope of the rubber bands.

Ralph Nottingham
Deerfield Beach, FL

FOR WANT OF A BARGAIN

I'm a hopelessly addicted bargain hunter, especially when the bargain happens to relate to my computing needs. I enjoy sharing my finds with

Text continues on page 43

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

Infoworld rated Lucid's performance "excellent"

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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, breakevon 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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First with software for the Model 100

PORTABLE COMPUTER SUPPORT GROUP

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Dallas, Texas 75229

SENTRY.CO: Changing of the Guard for the Model 100

BY M.J. NUGENT, JR.

Most password protection systems have problems. Here's a machine language combination that will provide hassle-free security.

Password protection programs have been written, rewritten and generally tossed about for some time now, and a few have proven to be quite effective. But all the password schemes I've seen still suffer from a few drawbacks. Most are written in BASIC, and must be defined with the IPL command. They won't work if the machine is turned off while you're in TEXT or at the MENU. Many can be defeated by pressing the PRINT key followed by SHIFT/BREAK or CTRL-C. They take up directory space and often too much RAM, and password length is sometimes limited.

What's needed is a method that works immediately and automatically each and every time the machine is powered up, regardless of whether it was turned off from BASIC, TEXT, MENU — whatever. It must work even if the machine turned itself off via the ten minute "time out" feature. It must be simple and take up as little of your valuable RAM as possible.

UNDER LOCK AND KEY

Here's the second-to-last password program you'll ever need. Type in the following code:

```
10 CLS
20 INPUT "PASSWORD"; P$
30 MENU
```

Now, instead of SAVEing it, just type NEW, because you're not going to need one of these again!

This is SENTRY, a machine language combination lock which intercepts the Model 100's power-up routine to wait for a user-defined combination of keys, turning the machine off if the exact combination is not pressed within 30 seconds. The combination can be any desired number of keys and can include function keys, BREAK/PAUSE, PRINT, CAPS LOCK — any keys at all! Nothing but a cold boot can defeat it! SENTRY uses no directory space and only 146 bytes of RAM. Best of all, SENTRY is simple to use.

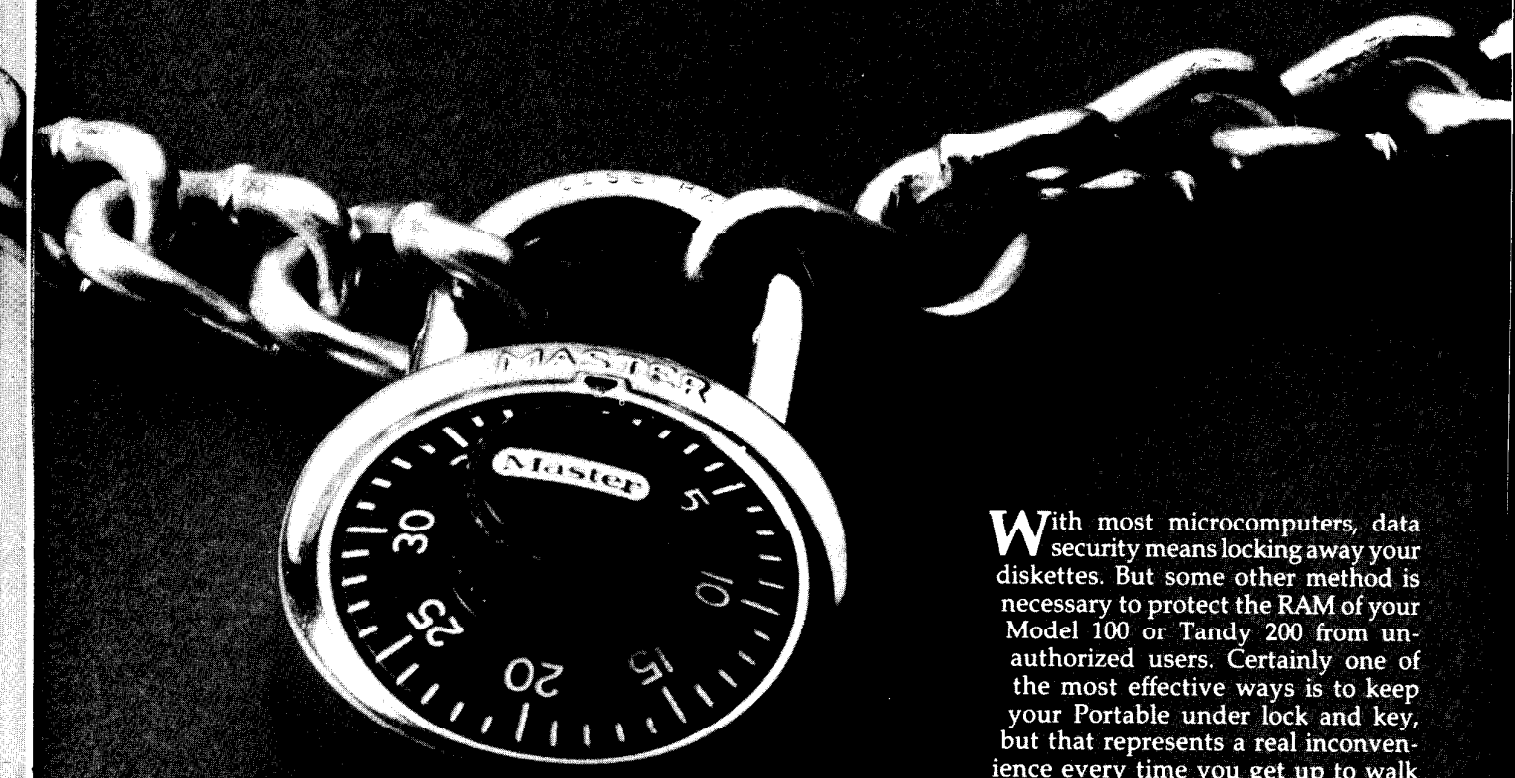
The SENTRY.BA program installs SENTRY.CO and allows you to define your own key combination. So, type it in, and let's do it! Be sure to back up all your important files, because we're messing with machine language here, and mistakes can send your data into the Twilight Zone.

Now, run SENTRY.BA, and you'll see that SENTRY.CO is not installed (of course!) and you're presented with three choices: Remove, Install, and End. Press I, and you're prompted for your desired key combination. For now, let's use something simple, like "abc." Press all three keys *simultaneously*, holding them down for at least ¼ second. This gives SENTRY.BA enough time to record this key pattern. When you release all three keys, the machine beeps and installs SENTRY.CO in high memory, resetting HIMEM to protect it. After a few seconds, the SENTRY.BA

Text continues on page 56
Listing begins on page 55

SECRET.BA: Protecting .DO Files Through Encryption

BY BILL QUALLS



With most microcomputers, data security means locking away your diskettes. But some other method is necessary to protect the RAM of your Model 100 or Tandy 200 from unauthorized users. Certainly one of the most effective ways is to keep your Portable under lock and key, but that represents a real inconvenience every time you get up to walk away from your desk. Another common method is to alter the appropriate bit in the RAM directory to make the file invisible from the main menu. Additionally, various public domain password programs have been suggested, but many of these can be bypassed by using the PAUSE key followed by the BREAK key. There is a better way.

Data encryption represents the best means of protecting your data for several reasons. First, protection can be done on a selective basis: you only need to encode those files whose data is of a sensitive nature. Second, the encoded data can be backed up to cassette or diskette just like any other .DO file. Such data without the ap-propriate key is useless. Third, encrypted data can be freely transmitted over the telephone lines or via electronic bulletin boards. Finally, BREAK, PAUSE and an onslaught of PEEKs and POKEs will prove ineffective. The encrypted data can be freely distributed: Without the key it is of no value.

It's the Holmes Engineering/PCSG "chipmunk"

PORTABLE Disk Drive for the Model 100/200

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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 of 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."

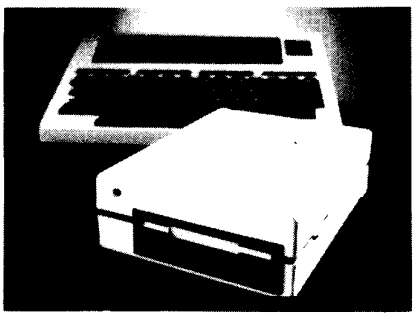
The calendar program is usable for two reasons, first it is designed correctly, and second you have the memory (358K) on the diskette to log and access a tremendous amount of notes over a long period of time.

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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Circle 37 on Reader Service Card

One method of foiling such attempts to "break" a code is to use several ciphers. For example:

Letter	Code 1	Code 2	Code 3
A	B	C	D
B	C	D	E
C	D	E	F
D	E	F	G
E	F	G	H
F	G	H	I
G	H	I	J
"	"	"	"
"	"	"	"
Y	Z	A	B
Z	A	B	C

For the first letter use Code 1, for the second letter use Code 2, for the third letter use Code 3, for the fourth letter use Code 1, for the fifth letter use Code 2, and so on.

Letter	Use Code	Becomes
C	1	D
A	2	C
B	3	E
B	1	C
A	2	C
G	3	J
E	1	F

Thus CABBAGE becomes DCECCJF! Under such a coding scheme, one letter may have several meanings. In our example, "C" means both "A" and "B". The more codes you use, the more cryptic your data will become.

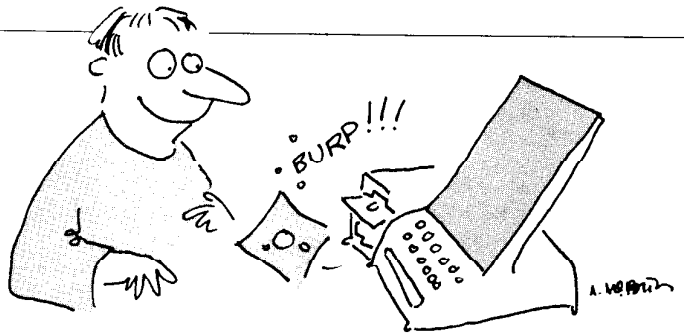

Table 1. Examples of how different SECRET.BA coding keys work.

TEST.DO

This is a test of SECRET.BA which will encode and decode .DO files.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 !@#$%^&*()

Encoded with key = CHERYL

=VTk [\ L sW \b ge <3.JDFq0, iQWN'
iRZW d'L]O] SWR \dUXRP z-= ^h^Nas

/-;C7/53Ai=5;9GOC;A?MUIAGE
SKQO]eYQWSbk.W][iqe]caowkc
)1%w#!/7+s f8"phlk'"u

Encoded with key = Q-SOFT

K;bh cj Z '.jG dR Jr<G1N%o:
q.<\] q'?e QhZB]Z [e7 YQ]f7^ (;" [Uf\F'

n;80?=tA>6ECzGD<KI&MJBQO,S
[Y6]ZRa.<a.XgeBif^mkHoldsq
&x-+b/,$3' t5ixv1yyn#

This type of coding algorithm is very tedious and prone to error when done by hand, but not when handled by your Tandy!

SECRET.BA uses much the same process for encoding your files. See the example shown in Table 1. (I suggest you create TEST.DO as shown for testing SECRET.BA.) Each letter of the "key" determines the code to be used for the corresponding letters in the .DO files, and the length of the key determines the number of codes used. The examples show how variations in the key have a pronounced effect upon the encryption of the data.

Encryption represents the best means of protecting your data.

SECRET.BA will allow any length key, up to 255 characters. Alphabetic, numeric, blank or graphic characters may be used. A temporary file, [TEMP].DO, will be renamed to the name of the source file. Note that once SECRET.BA has been run, either an encoded or decoded version of the data will exist, but not both. An error in the key entry could be disasterous; consequently, the key must be entered twice for verification purposes. Note that leading and trailing blanks are significant, as is the use of lower case vs. upper case letters. If you wish to retain the source data then remove the KILL and NAME statements from line 60 as follows:

60 IFEOF(1)THENCLOSE:
PRINT"done":
MENU

Only those printable characters common to the keyboard and line printer have been used (ASCII values 33 through 122 inclusive). This is done so that a hard copy of an encoded file could be produced should that be necessary.

To decode a file, follow the same procedure as encoding, but enter a "D" when prompted at line 30. Should you make a mistake in entering the key, the resultant file will be garbage. (After all, what kind of security would it be otherwise?) However, as long as you know what the key should have been you can recover by re-encoding with the wrong key, then decoding with the correct key. □

Listing 1. The SECRET.BA program protects files through encryption.

```
  5 REM 'SECRET.BA: FILE ENCRYPTION PROGRAM
 1Ø MAXFILES = 2
   :DEFSTR A, K, X
   :DEFINT I - J
   :O$ = "[TEMP].DO"
   :CLS
   :PRINT @45, ".DO File encryption by Q - Soft"
   :FOR I - 1 TO 3ØØ
   :X = INKEY$
   :IF X = "" THEN NEXT I
 2Ø CLS
   :FILES
   :LINE INPUT "Source file? ";I$
 25 OPEN I$ FOR INPUT AS 1
   :OPEN O$ FOR OUTPUT AS 2
 3Ø CLS
   :PRINT
   :LINE INPUT "(E)ncode or (D)ecode? ";A
   :IF A - "D" OR A - "D" THEN A = "DE" ELSE IF A = "E"
    OR A = "E" THEN A = "EN" ELSE BEEP
   :GOTO 3Ø
 4Ø PRINT
   :LINE INPUT "Enter key? ";K1
   :CLS
   :PRINT
   :LINE INPUT "Re-enter to verify? ";K2
   :IF K1 <> K2 THEN BEEP
   :PRINT
   :PRINT " < Verification error > "
   :GOTO 4Ø
 5Ø CLS
   :PRINT @45, "Begin ";A;"code process...";
 55 FOR J = 1 TO LEN(K1)
 6Ø IF EOF(1) THEN CLOSE
   :PRINT "Done"
   :KILL I$
   :NAME O$ AS I$
   :MENU
 7Ø X = INPUT$(1, 1)
   :I = ASC(X)
   :IF I < 33 OR I > 122 THEN 1ØØ ELSE IF A = "DE" THEN
    9Ø
 8Ø I = I + ASC(MID$(K1, J, 1))
 81 IF I > 122 THEN I = I - 9Ø
   :GOTO 81 ELSE GOTO 95
 9Ø I = I - ASC(MID$(K1, J, 1))
 91 IF I < 33 THEN I = I + 9Ø
   :GOTO 91
 95 X = CHR$(I)
1ØØ PRINT #2, X;
   :NEXT J
12Ø GOTO 55
```

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MORE MEMORY Interactive Solutions does not occupy RAM memory, so frees your precious RAM for larger data files.

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Interactive Solutions *integrates* all of your data information in Mod 100. With a touch of a function key, you can easily:

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- Generate a report in **Data Base** program and move to the **Word Processor**.
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Datebook for the Disorganized Chapter Two

By Wartan Jemian

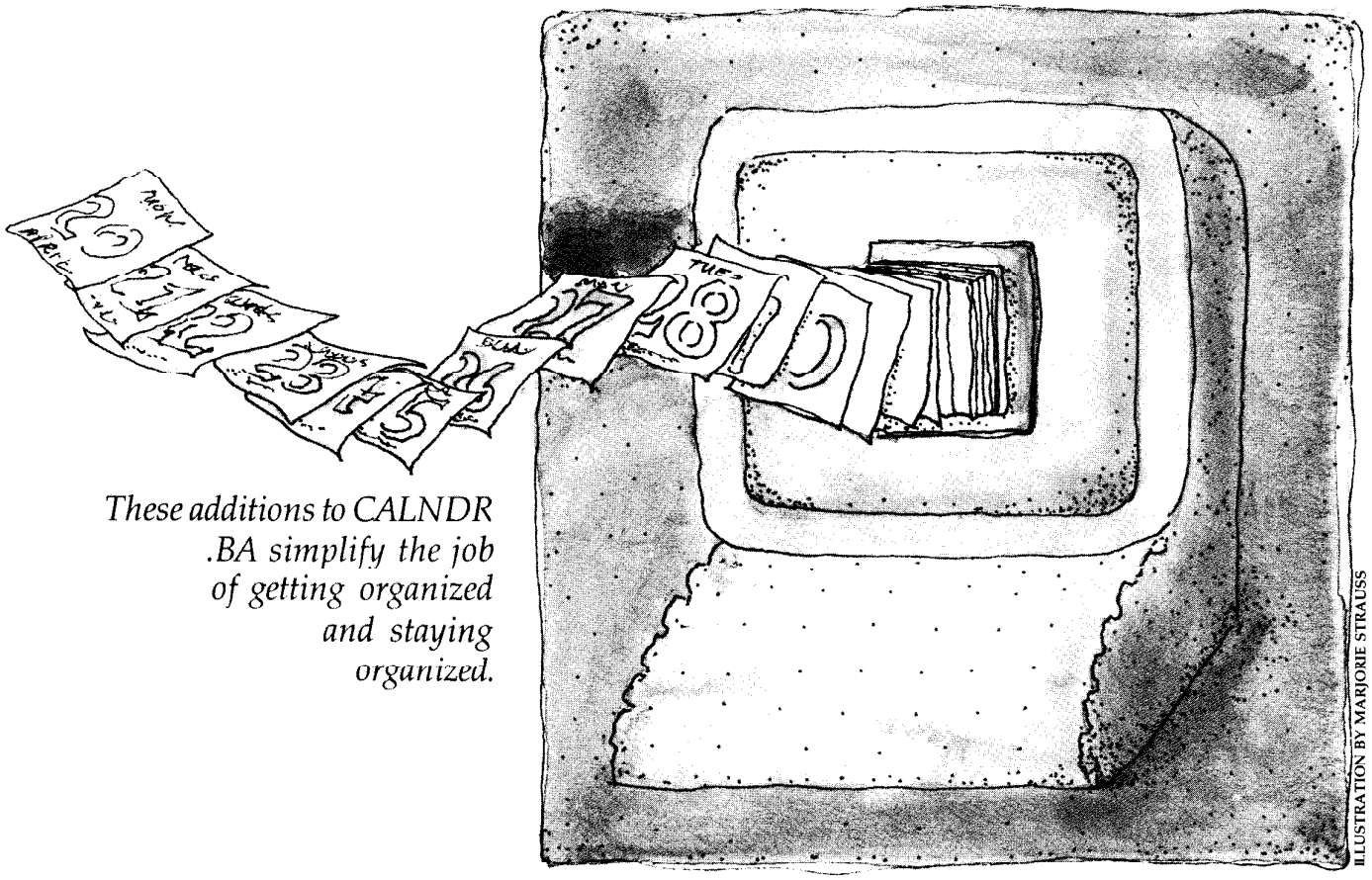

ILLUSTRATION BY MARJORIE STRAUSS

These additions to CALNDR .BA simplify the job of getting organized and staying organized.

If you're at all like me, you picked up your Model 100 and started keying in the CALNDR program by Ray Mendenhall as soon as you skimmed his article "Datebook for the Disorganized" (see *Portable 100/200,* July 1985). The calendar feature is a real prize and the schedule operations are great. Call them up with the calendar in view. This will make a manager out of anyone.

However, I quickly learned that there was room for improvement. Not to take away from Mr. Mendenhall's fine work but I wanted a greater interaction between the program and the "datebook" file. One of the difficulties I had was on recalling an item that should be in the file, I'd leave CALNDR, select and open NOTE.DO, and oops!-..."forgot what the item was." This is akin to alligators and ponds.

PUTTING THEM TOGETHER

The solution, of course, is to have those editorial functions available in CALNDR.BA. Even SCHEDL doesn't offer this service. Therefore it was imperative that these operations be coded, which was completed in its initial form within the week. Since my regular employment has kept me out of town and on an overtime schedule a bit more time has elapsed. However, during that period the program has served me well and conveniently.

I'll probably always make notes on scraps of paper, but I've been carrying

Text continues on page 58

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With the Tandy 600's larger display and expanded memory, Multiplan spreadsheet analysis can hold more information. Word processing is as easy as using MS-Word. You'll have quicker access to documents, and better storage with the built-in disk drive. File is an electronic data base for names and addresses, expenses, client billing, inventory and more. And you can keep a large number of different files on the pocket-size diskettes. With Telecom and the Tandy 600's built-in modem, you're able to communicate with other computers over phone lines and access national information networks. Telecom will even dial the phone number of anyone listed in the File program. Calendar helps you keep track of daily tasks and activities.

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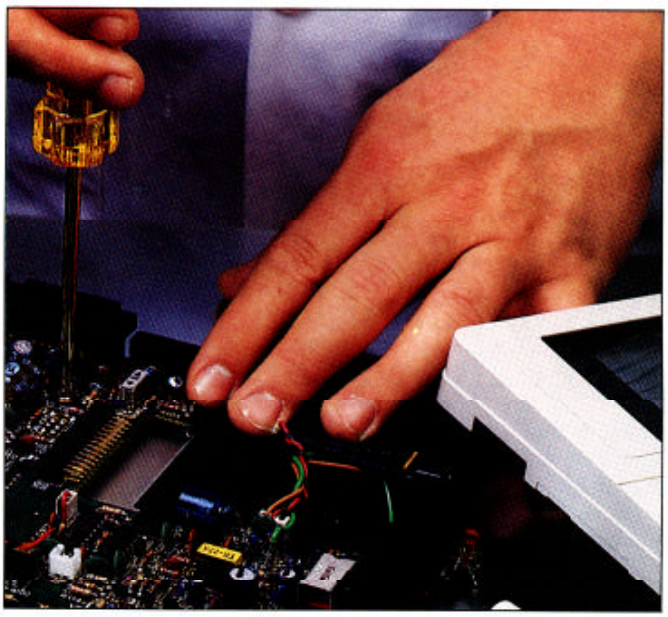
Circle 54 on Reader Service Card

Understanding the Hardware of the Model 100

It may be small, but it's complicated.

By Carl Oppedahl



The Model 100 uses an 80C85 microprocessor. The letter "C" indicates it is a CMOS version of the 8085 device, which means it draws very little power. Most of the integrated circuits in the Model 100 are CMOS devices. This was done to conserve battery power. For this purpose, 8085 is used to reference this microprocessor rather than 80C85, since the devices are so similar.

Communication between the 8085 central processing unit (CPU) and the rest of the world is accomplished almost exclusively through the input/output ports. The 8085 has four ways of communicating with the circuitry:

- the 65536 memory addresses which are used in the Model 100 for random access memory (RAM) and read only memory (ROM) access
- the 256 I/O ports, of which twelve are currently used in the Model 100
- the serial input and output pins, used in the Model 100 for cassette I/O
- the interrupt pins which are used for various purposes.

MEMORY LOCATIONS

The CPU has the ability to load to and from a large number of memory addresses, selected by turning on and off combinations of the sixteen address lines. The number of distinct addresses is two to the sixteenth power, or 65536.

In the Model 100, the bottom half of this so-called address space contains read-only memory or ROM. Depending on certain port outputs, memory accesses within this part of the address space connect with the standard ROM chip M12 or a chip in the optional ROM socket M11.

In other words, PEEKs to addresses below 32768 yield one set of values if the standard ROM is selected, and another set of values if the option ROM is selected. When the computer is turned on, it sets itself to the standard ROM.

Read-only memory, as its name suggests, cannot be written to. If you try to change its contents, by means of a POKE in BASIC or a store instruction in machine language, you'll find its contents unchanged. Fortunately, you cannot cause any harm to the ROM by doing this.

The top half of address space (numerically speaking) is set aside for RAM chips, shown in Figure 1. An 8K machine has RAM soldered in place from E000 to FFFF with three sockets in the area from 8000 to DFFF. A 24K machine has a RAM soldered in place from A000 to FFFF and a single socket for 8000 to 9FFF.

Optional RAM modules can be installed. They can be plugged into any vacant sockets and the CPU will be able to access them, but the ROM operating system will only "discover" and use the RAM that extends in an unbroken series down from FFFF.

PHOTOGRAPH BY BENJAMIN MACRO

Text processing power that no other program can equal.

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

WRITE ROM is the definitive word processing extension for the Model 100. PCSG produced the first text formattor 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.

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The serial input and serial output pins of the CPU, SID, SOD (pins 5 and 4 respectively) are used for cassette input and output. The interrupt pins of the CPU (pins 6, 7, 8, 9 and 10) provide a variety of inputs to the CPU. The cassette and interrupt pin assignments are shown in Table 1.

When the 8085 executes an IN or OUT instruction, several things happen. The CPU asserts the IO/M* line, indicating that it wants to talk to an I/O device rather than a memory chip. The eight-bit port address is made available on the address lines. Actually, the CPU offers the port address twice, once on the top half of the sixteen address lines, and again on the bottom half. Next, the CPU waits for an I/O device to offer or accept an eight-bit byte of data.

The eight address lines used to select I/O ports are connected to an *address decoder*, one or more integrated circuits whose task it is to interpret various possible combinations of off and on among the eight lines. Other devices are then activated accordingly. Most of the port address decoding duties in the Model 100 are performed by M16, which takes bits 7, 6, 5 and 4 of the port address as input and determines which port integrated circuit, if any, is activated. This is shown in Figure 2.

The connection of the IO/M* signal to M16 insures that M16 responds only

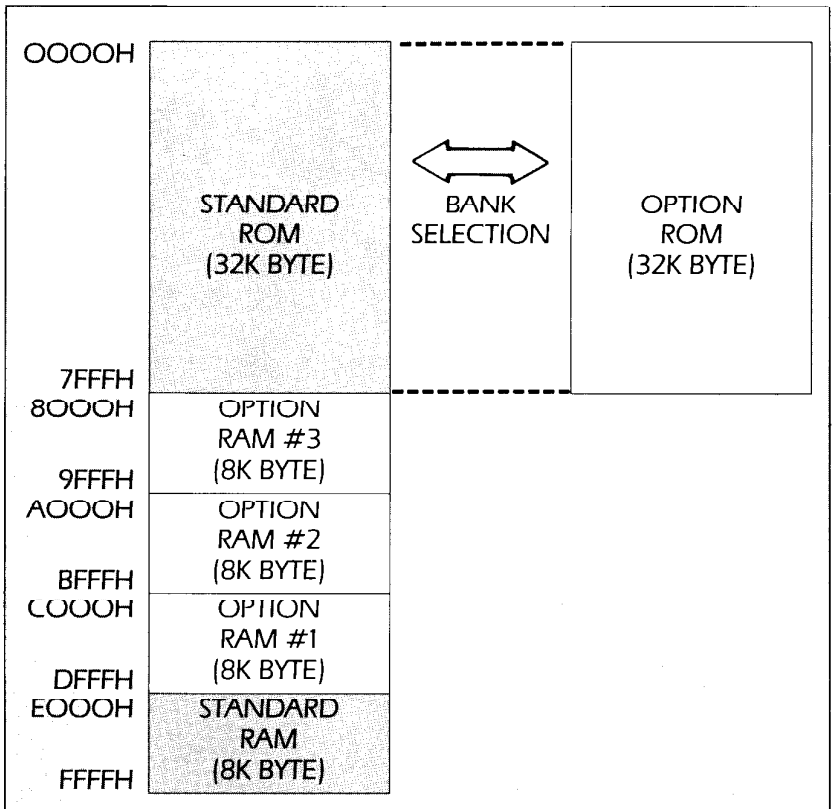


Figure 1. Memory map

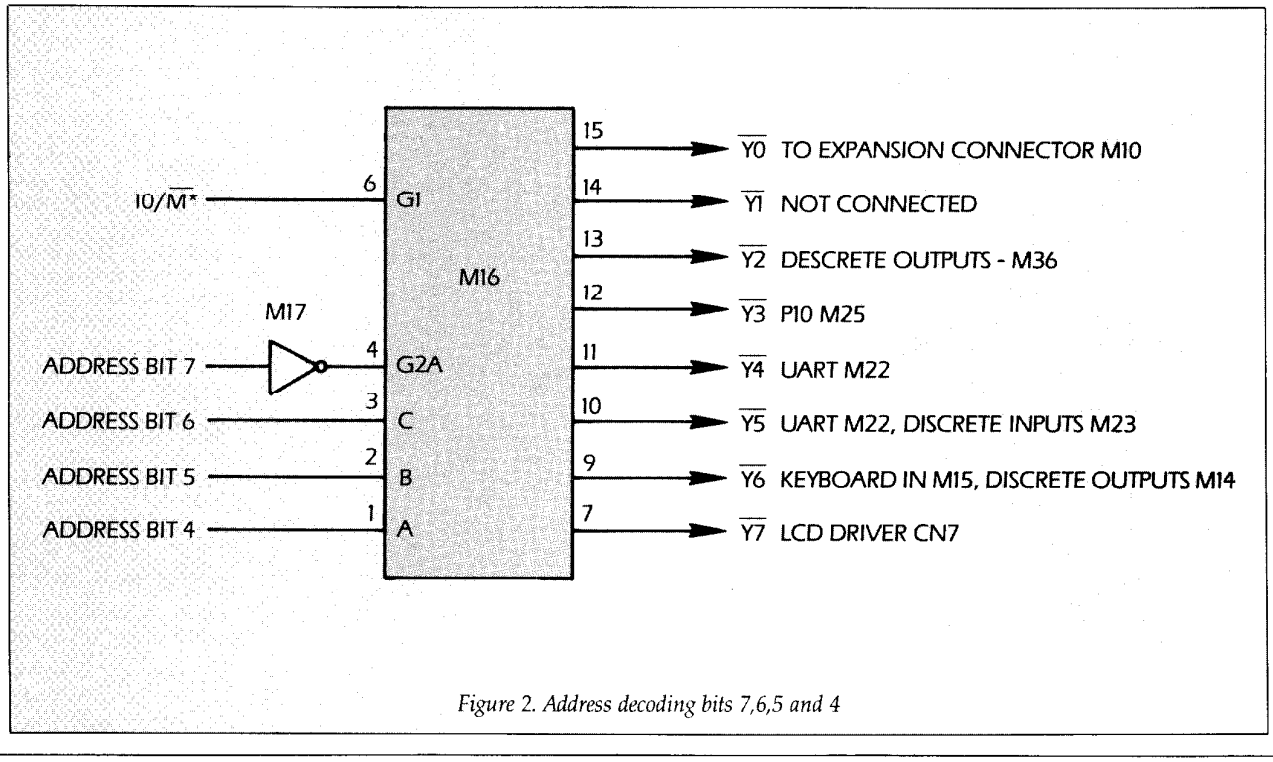


Figure 2. Address decoding bits 7,6,5 and 4

Table 1. Input/Output signals originating or terminating at the CPU chip

Pin	CPU Name	Signal	Function
4	SOD	SOD	Serial output to cassette
5	SID	SID	Serial input from cassette
7	RST 7.5	TP	256-Hertz pulse
8	RST 6.5	DR	UART data received
9	RST 5.5	BCR	Bar-code reader input
10	INTR	INTR	Expansion bus pin 17

Table 2. Input port hardware

Y	Port	Integrated Circuit
Y3	BB	M25-PIO (port C)
Y4	C8	M22-UART (receiver buffer)
Y5	D8	M23-buffer
Y6	E8	M15-buffer
Y7	FE,FF	CN7-LCD connector

Table 3. Output hardware and access to contents

Y	Port	Integrated Circuit	Contents
Y2	A8	M36-flipflop	FAAE
Y3	B8	M25-PIO	Not available
Y3	B9	M25-PIO (port A)	Input port B9
Y3	BA	M25-PIO (port B)	Input port BA
Y3	BC,BD	M25-PIO (divider)	Not available
Y4	C8	M22-UART transmitter	Not available
Y5	D8	M22-UART control	Not available
Y6	E8	M14-Flipflop	FF45
Y7	FE,FF	CN7-LCD connector	

Table 4. Port numbers

Port Number	Input Fuction	Output Function
00-6F	Not used	Not used
70-8F	See text	See text
90-9F	Hobby use	Hobby use
A8*	Not used	Phone/modem
B8 (&B0)	Not used	PIO divider control C3-start 43-stop
B9 (&B1)	Port contents	Parallel outputs: LCD, LPT, KB control, clock/calendar
BA (&B2)	Port contents	Output pins (see table 6)
BB (&B3)	Input pins (see table 7)	Not used
BC (&B4)	Not used	PIO divider lower byte
BD (&B5)	Not used	PIO divider upper byte and mode
B6, B7, BE, BF	Not used	Not used
C8*	UART incoming data	UART outgoing data
D8*	Input pins	UART control
E8*	Keyboard input	Output pins (see table 8)
FE*	LCD	LCD
FF*	LCD	LCD

**Model 100 port addresses are not fully decoded. For example, all ports A0 through AF respond identically to A8.*

to I/O port addresses and not to memory (RAM or ROM) addresses. The connection of address bit 7 causes M16 to respond only when bit 7 is on. In other words it responds only to port addresses above 127 (80H to FFH).

> Read-only memory, as its name suggests, cannot be written to.

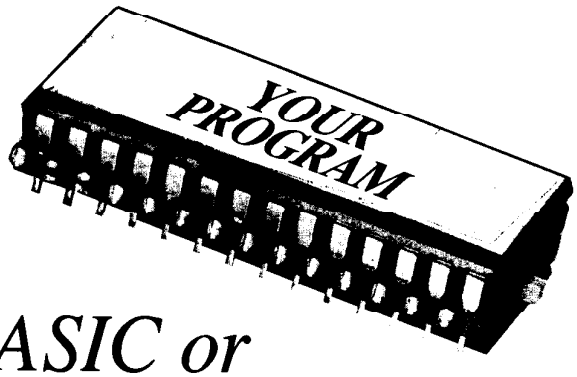
The connection of bits 4, 5 and 6 causes one of the eight outputs to be selected (pulled low) in response to the bit pattern. The chip-select signal Y0 is activated for any port address in the range of 80 to 8F. Y1 is activated for any address in the range of 90 to 9F, and so on up to Y7, which corresponds to F0 to FF.

The integrated circuits to which the Y signals are attached are listed in Table 2, which shows the input devices, and Table 3, which shows the output devices.

What about port address lines 0, 1, 2 and 3? M16 pays no attention to them. It has no way of knowing whether the CPU has requested a port input from 80, 81, 82 or any other value up to 8F. It activates Y0 for any of these addresses. This makes for a certain arbitrariness when you are writing a program. If the task is to get a byte of data from the UART, the result is the same whether you input from C0 or CF, or any value in between. This is because the UART itself ignores address bits 0 to 3. Throughout the ROM, the value C8 is used.

A few of the devices selected by M16 do pay attention to bits 0 to 3. For example, the PIO chip, selected by Y3, looks at bits 0 to 2 and responds differ-

Your own Program on a ROM



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ently, depending on which bit is on. B8, B9, BA, BB, BC and BD are distinct port addresses in the Model 100. Taking into account the various ways port address lines are connected in the Model 100, you can develop a map of "port space" somewhat like the address space, as shown in Figure 1. This is depicted as a diagram in Figure 2 and Table 4.

> Communication between the CPU and the rest of the world is via the I/O ports.

THE PORTS

No circuitry has been supplied to handle ports 00 to 6F, and nothing in the ROM suggests expansion in that area.

Ports 70 through 8F, though only partially implemented through the Y0 signal, appear to be for loading parallel data to and from some mass storage device plugged into the expansion bus connector M10. Perhaps these are part of the optional I/O control unit or RAM file unit referred to on pages four through twelve in the service manual.

Ports 90 through 9F, which correspond to port-select siganl Y1, are not connected to anything. This is described in the service manual as an optional telephone answering unit.

Port A8 controls discrete functions. Bit 0 disconnects the telephone instrument and bit one enables modem carrier transmission. Usually you want to change only one of the bits. You can find the present contents of the port in RAM at FAAE, change bits using AND and OR operations and write out to the port and to RAM.

Output port B8 programs the 81C55 PIO. The 81C55 PIO (Programmable Input Output) chip is a forty pin integrated circuit that does much of the I/O work of the Model 100. As it comes from the factory, it contains 256 bytes of RAM that never get used in the Model 100. It also contains three ports (A, B and C) that are capable of being programmed as input or output ports, but the wiring of the Model 100 is such that port A and B are always used for output (and their interrupt capability

Circle 30 on Reader Service Card

is never used), and C is always used for input. See Table 5 which shows how the PIO discrete input and outputs are wired. The table also shows other PIO connections.

Of the eight bits that can be output to port B8, six never change, as they would make the PIO do things the Model 100 wiring does not let it do. If you do inadvertently send the wrong values for these bits, no harm is done to the hardware.

> The number of distinct addresses is two to the sixteenth power, or 65536.

Only two of the bits ever vary, bits 6 and 7. They control a so-called timer, which as used in the Model 100, would be better termed as a divider. The divider-control bits 6 and 7 should be 11 (binary) to start the divider, and 10 to stop it.

Port B9 is the general-purpose parallel output, accomplished through PIO port A. It is used for the printer, LCD and keyboard. In addition, it is used to send serial data to the clock/calendar chip. Current contents of the port are obtained by reading from the port.

Port BA, like A8, controls discrete functions. Unlike A8, it is accomplished through the PIO chip (port B), so that current contents of the port are obtained by reading from the port. Bit 0 scans the keyboard modifier keys such as the shift and control keys. Bits 0 and 1 address the LCD. Bits 2 and 5 control the beeper. Bit 3 switches from RS-232 to modem mode. Bit 4 removes power to the computer. Bits 6 and 7 assert DTR and RTS when in RS-232 mode. Bit 7 hangs up the phone when in modem mode. This is shown in Table 6.

Port BB is PIO input port C, used for sensing discrete signals. Bit 0 is clock/-calendar data. Bits 1 and 2 are printer status. Bit 3 is bar-code reader input. Bit 4 is CTS or ANS/ORIG, and bit 5 is DSR or DIR/ACP. These input signals are shown in Table 7.

Ports BC and BD load and low the high bytes, respectively, of the divider used by the PIO to produce the baud rate and beep frequency.

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Table 5. Signals originating or terminating at PIO

Pin	PIO Name	Signal	Function
1	PC3	BCR	Bar-code reader input
2	PC4	CTS	Clear-to-send
5	PC5	DSR	Data-set ready
6	TO	RRC	UART receiver clock
6	TO	TRC	UART transmitter clock
8	CE	Y3	Ports 176-191 se lect
32	PB3	RS232C	RS232/modem select
33	PB4	PCS	power control signal
35	PB6	DTRR	Data terminal ready
36	PB7	RTS	Request-to-send/off hook
37	PC0	DATAOUT	Clock/calendar serial out
38	PC1	BUSYNOT	Line printer selected
39	PC2	BUSY	Line printer busy

Table 6. Output signals (output port BA)

Bit	Function
0	LCD control; keyboard scan e.g. SHIFT, NUM, CAPS
1	LCD control
2	Disconnect beeper from PIO divider
3	Switches from RS232 to modem
4	Power-contol signal
5	Direct beeper control
6	DTR (0 yields + at RS-232 pin 20)
7	In RS-232 mode: RTS (0 yields + at RS-232 pin 4) in modem mode: phone line on-hook

Circle 55 on Reader Service Card

Table 7. Input signals (input port BB)

Bit	Function
0	Clock/calendar data to CPU
1	LPT not busy (PRINTER pin 25)
2	LPT busy (PRINTER pin 21)
3	BCR input (1 = ground at pin 2)
4	In RS232 mode (CTS; + at RS-232 pin 5 yields logic 0) in modem mode (1 = ANS, 0 = ORIG)
5	In RS232 mode (DSR; + at RS-232 pin 6 yields logic 0) in modem mode (1 = ACP, 0 = DIR)
6,7	Not used (always 1)

Table 8. Output signals (output port E8; contents at FF45)

Bit	Function
0	STROM (1 = select option ROM M11)
1	STROBE (1 = ground at PRINTER pin 1)
2	STB (1 = clock/calendar strobe)
3	REMOTE (1 = CASSETTE pins 1 and 3 shorted)
4-7	Not used

The UART sends and receives data through port C8. Port D8, like port BB, provides discrete inputs to the CPU. Bit 0 is the carrier-detect signal. Bits 1, 2 and 3 indicate UART overrun, framing and parity errors. Bit 4 is the UART transmitter buffer register empty signal. Bit 5 is the phone jack RP signal, and bit 7 is the low-power signal.

The UART parameters (parity, word length and so on) are programmed through output port D8.

Output port E8 controls a number of discrete functions. Bit 0 selects the option ROM. Bit 1 strobes the printer. Bit 2 strobes the clock/calendar chip and bit 3 controls the cassette motor. You can find the present contents of the port in RAM at FAAE. These signals are shown in Table 8.

Input port E8 provides parallel input — the results of a keyboard scan. Input and output ports FE and FF are used for the liquid crystal display.□

This article was adapted from Mr. Oppedahl's new book, "Inside The TRS-80 Model 100," published by Weber Systems, Inc., Cleveland, Ohio.

FAST CASSETTE STORAGE

for Model 100 Text Files

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*Load text more than TWICE as fast

WHAT IS "FAST"?

FAST™ is a revolutionary concept in the way the Model 100 handles the storage and retrieval of text (.DO) files. FAST saves or loads text in one continuous stream of data — the same way BASIC programs are saved and loaded. The package (compatible with M/L programs) consists of two easy-to-load programs:

The **SAVER-BACKUP** program occupies approximately 900 bytes of RAM — small enough to always carry along, whether at home or on the road.

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The Facts: The recording time to save a 5K file is now only 39 sec (vs 106 sec). A 10K file takes 11 min (vs 3.4 min). But there's more...

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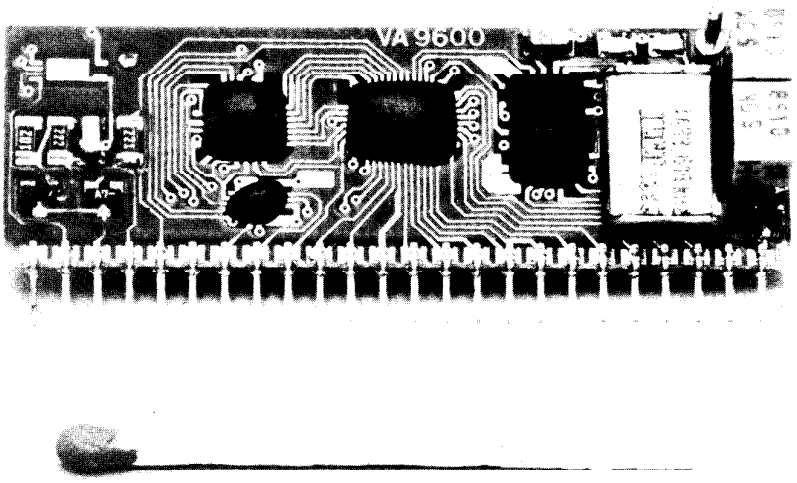


If you asked them, most portable users would say a built-in 1200 baud modem would be the most significant improvement that could be made to a laptop. The increased speed would save time and, as every online aficionado knows, thereby save money.

Valtronic, Inc. has introduced two products using their SMT/COB (chip-on board) technology: miniaturized modem modules. The VSA-Multi models are high performance and CCITT V21, V23, BELL 103/113/108 and BELL 202 compatible.

The modems, which measure approximately 2.5 by .75 inches, come in two speeds, 300 or 1200 bps and either half or full duplex. They are assembled on regular G-10 boards. Ring detection is included.

For more information and price quotes, contact Valtronic ,Inc., 2200 South Main Street, Suite 304, Lombard, IL 60148, (312) 953-0077.

Circle No. 81

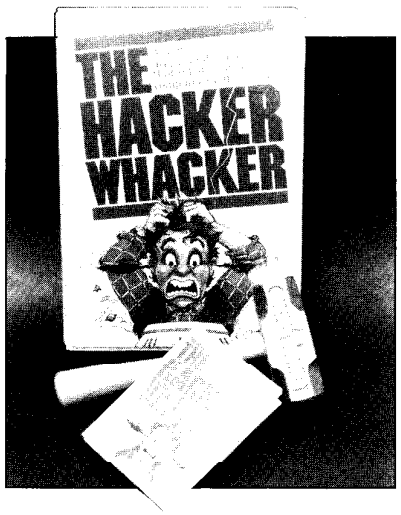
A Solution To Computer Breakdowns

A sure-fire repair tool for computer malfunctions is being offered by Compucure Corporation. Called the Hacker Whacker, the product is designed to ease the frustrations of those suffering from computer breakdowns.

The Hacker Whacker, which according to its designers resembles a sledge hammer only by coincidence, consists of a four inch maple handle and a three inch aluminum head. It's compact enough to fit on a desk.

It is user-friendly and requires no special training to operate. Background as a carpenter (or prison inmate) may be helpful, however.

The Hacker Whacker comes in a multi-colored, foam-filled case. It also has an illustrated owner's manual which describes various repairing techniques ranging from controlled (gentle



tapes) to uncontrolled mode (works best with full backswing).

The Hacker Whacker sells for $9.95. Contact Compucure Corporation, P.O. Box 1005, Hilton Head Island, SC 29925, (803) 681-9460.

Circle No. 83

For Freelance Programmers

Writer's Digest, well known for books that aid the freelance writer, has released the *1986 Programmer's Market* for freelance programmers.

The 344 page book gives you advice on how and where to sell your programs. Included are chapters on breaking into contract programming, designing an adventure game and where to turn to if you need technical help. There's also interviews with freelance programmers and industry executives who offer advice on how to sell your work.

In addition there are more than 700 listings of software publishers, book publishers and computer magazines who buy freelance computer programs. Find out what they need, how to sell to them and how much they pay. It also contains five indexes, a glossary of terms and a new section of software agent listings and advice.

The *1986 Programmer's Market* sells for

$16.95. It's available in bookstores or contact Writer's Digest, 9933 Alliance Road, Cincinnati, OH 45242 (513) 984-0717.

Circle No. 86

Speedy Cassette Programs

Has the slowness of cassette storage and retrieval got you down? Minsof, Inc. has introduced a new product that may help you out.

Called Fast, this cassette based software allows you to save files to tape three times faster and load them twice as fast as is possible with the Model 100's built-in system. It's done by treating the text as if it were a BASIC or machine language program.

Fast consists of two programs, Fast-Saver and Fast-Loader. Fast-Saver, which takes up less than 1K of RAM, saves files individually or all at once. Files are verifiable and require less than one-third the tape than usual.

Fast-Loader scans files and as each is located displays name and length on the Model 100 screen. A checksum method insures detection of loading errors. Fast-Loader also allows recovery of text data following a cold-start.

Contact Minsof, Inc., Box 1153, Minneapolis, MN 55440.

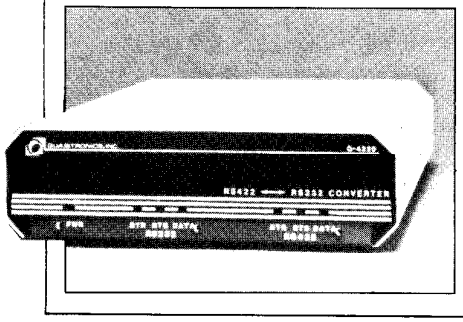
Circle No. 85

Converting Protocol

Quasitronics has begun shipping the Q-4220 RS-232/RS-422 Converter.

The RS-232/RS 422 Converter provides bi-directional synchronous and asynchronous conversion of all commonly used RS-232 and RS-422 signals.

Each port is jumper configurable for DTE or DCE operation. The unit is designed to be configured with one port set as DTE and the other as DCE.



The unit costs $219.00 and expected delivery is two to four weeks.

Contact Quasitronics, Inc., 211 Vandale Drive, Houston, PA 15342, (800) 245-4192 or (412) 745-2663.

Circle No. 82

New Printer Family

To mark its debut in the North American printer market, Hattori Seiko Computer Peripherals has introduced the SP-100 Series of dot matrix printers.

The new SP-100 Series features standard items such as bi-directional printing and logic seeking, adjustable tractor and friction feed as well as a variety of print character sets. Automatic paper loading and right/left margin set functions are also among its many features.

Hattori Seiko's SP-100 Series printers are specifically designed for popular computers. The SP-1000AS offers a standard RS-232C serial interface; SP-1000VC is compatible with the Commodore/VIC computers; SP-1000AP with the Apple IIC and Macintosh computers; SP-1000A, with its non-computer-specific character set, is compatible with a variety of computers; and the SP-1000I is an IBM PC-compatible printer.

The SP-1000 Series printers are initially being marketed under the Seikosha brand name. They come with a two-year warranty.

Contact Hattori Seiko Computer Peripherals, Division of Hattori Corporation of America, 1111 Macarthur Boulevard, Mahwah, NJ 07430, (201) 529-5730.

Circle No. 84 □

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By ALAN L. ZEICHICK

```
10 F[R A = 1 T 10
20 PR&INt A
30 NEX...T A
```

No, the battery on your Model 100 or Tandy 200's not gone flat. The program above was telecommunicated via modem, but noise and distortion on the phone line garbled the transmission.

The example above is made-up, but telecom errors occur frequently in real life. During a standard terminal session, it's not too bad: Usually meaning can be construed from context, despite numerous missing or extra characters. If the remote computer during telecommunications is a mainframe computer, it might merely say *Invalid Command: Retype.* Annoying, but that's life.

Line noise is more of a problem during file or program transfer. The receiving computer's just storing data — it's not checking to see if it's composed of meaningful commands. So, if garbage appears sporatically, it might not be detected until much later — like when the .CO program causes a cold start instead of clearing the screen.

At 300 bits per second (bps), the speed of the Model 100 and Tandy 200 built-in modem, line noise is often minor — but always present. At higher speeds, it takes less noise to confuse a modem, so garbage or dropouts occur more and more frequently.

CLEANING UP THE ACT

The line-noise problem prompted the invention of better ways of transferring data file, called "data-packet protocols." The most common protocol used by small computers today is XMODEM. An XMODEM program, in brief, breaks a file down into small pieces, and transmits each one separately followed by a unique description of that piece, called the *checksum.* The receiving XMODEM program calculated the checksum of what it receives, with the sender's checksum. If they match, then the data was sent without any errors. If not, that piece is retransmitted.

For more information about the XMODEM file-transfer protocol, see *Error-Free Breakdown* in the October *Portable 100/200,* page 58.

The Model 100 and Tandy 200 computers, in their native TELCOM mode, don't understand XMODEM protocol. So, owners have learned to take their chances when transferring files between laptops or downloading from online services such as GEnie. The Tandy 600, on the other hand, has XMODEM built-in, and most telecommunications packages for desktop computers support XMODEM.

SIGEA SYSTEMS

One of the software companies that makes XMODEM software for IBM PC compatibles has launched itself into the Model 100/Tandy 200 telecom market.

Sigea Systems, the producers of the Telecommuter line of MS-DOS software, have introduced X-TEL, a supplement to TELCOM which adds XMODEM file transfer, on-line access to TEXT and the directory and optional transmission of line feeds after carriage returns (see *Checking The Menu* on page 12 of this issue).

X-TEL looks like a replacement to TELCOM — but it's actually only a modification that uses most of the original TELCOM program. To use those features during telecommunications, simply execute the X-TEL.BA program instead of TELCOM from the main menu.

Once a telecommunications session is started, X-TEL assumes the guise of six extra function keys — F6, F7, Code-F6, Code-F7, Shift-Code-F6 and Shift-Code-F7.

The first two are the XMODEM file transfer commands, *X-Dn* and *X-Up.* A unique feature of X-TEL: the XMODEM program will transfer *any* file, be it .BA, .DO, .CO or .XX.

X-TEL's XMODEM worked perfectly between a Model 100 and Tandy 200, when connected to a Tandy 1000 running the Lync communications package and during uploads and downloads from CompuServe. XMODEM may be used with the built-in modem, with a high-speed modem connected via the RS-232 port or with the computers connected directly with a null-modem cable.

ENHANCEMENTS

Pressing the Code key reveals two new meanings for F6 and F7: *File* and *Kill.* The former is similar to the BASIC FILES command, except that along with displaying the names of all RAM files, it also displays their lengths in bytes. That makes the verification of a file download easy by checking the file's size.

The Kill command is also similar to its BASIC equivalent. It results in the prompt *Delete file;* if the RAM file exists it is removed from memory, leaving more room for downloaded files.

Shift-Code-F6 envokes the Model 100 or Tandy 200 text editor. This feature alone justifies X-TEL's purchase for anyone who uses an electronic mail (E-mail) service. The ability to use TEXT to quickly create a message or reply, rather than using a mainframe's cumbersome E-mail editor, could result in using less connect time and creating better-written letters.

When using TEXT form TELCOM, the F8 key label reads *Term* instead of *Menu* — a reminder that a terminal session is in progress. And, while in TEXT, X-TEL transmits an X-OFF signal to remote computer to request that it

Text continues on page 46

USE YOUR DESKTOP COMPUTER AS A DISK DRIVE FOR YOUR M-100.

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IBM, MS-DOS version works over the phone!

Disk+

on Snap-In™ ROM

NOW AVAILABLE ON M-200

Try *Disk*+ for 30 days. If you aren't as excited as we are, return it for a full refund.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

That's why we sell *Disk*+ on a thirty-day trial. If you aren't completely satisfied, return it within thirty days for a full refund. Priced at $149.95 on Snap-in ROM. MasterCard, Visa or COD.

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PORTABLE COMPUTER SUPPORT GROUP

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PCSG provides hotline software support for the Model 100. Call us at 1-214-351-0564

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A Simple Self-Charger for the 100

BY JOHN L. MENKE AND SUSAN M. MENKE

The Model 100 is easy to use, powerful and lightweight. It also eats batteries.

If you're tired of hand-feeding it every few hours, you can modify its dietary habits to self-charge. All you need are a resistor, a power line adapter (current retail cost $5.95) and a quartet of rechargeable batteries.

After you've owned your machine for 90 days, its warranty expires and this modification won't affect it. If your warranty is still in force, we point out that Radio Shack does not recommend what we're about to describe. However, we've had no problems with our two machines over several years of use.

RECHARGEABLE BATTERIES

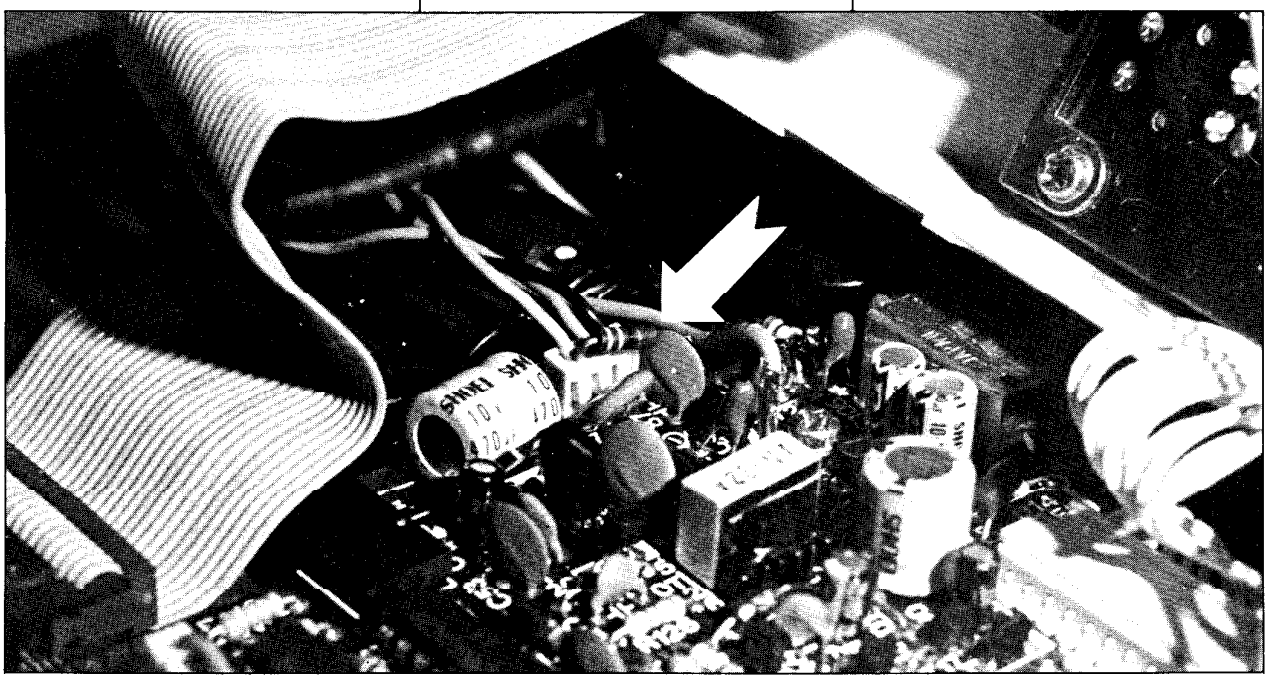
Rechargeable nickel-cadmuim (nicad) batteries have a nominal voltage of 1.2 volts (V). This remains virtually constant as the cell discharges, then drops quickly to near zero. Four such batteries give the Model 100 a combined voltage of 4.8 volts, which is lower than the recommended 6.0V. The 100 will shut itself off if voltage drops slightly below 4.8V. In spite of this relatively narrow voltage band, we have never experienced problems from low power shutdown.

We have tried several brands of nicads. All give about 8-10 hours of use when fully charged. Makers recommend occasionally letting the cells run all the way down before recharging. Our experience is that repeated partial discharge (or extensive use of trickle charging) will reduce charge life to 4-5 hours. One or two cycles of full discharge/recharge restores the 8-10 hour useful life.

We have used the same nicads for hundreds of cycles over two years without evident degradation. Aside from the relatively limited life of each recharge, the only noticeable effect is a very short warning time after the low-battery light comes on, before the 100 shuts itself off.

Different brands of nicads have slightly different dimensions. The positive tips of Radio Shack nicads are somewhat shorter than those of other makers such as Dynacharge, so use of the Radio Shack cell can lead to poor positive contact and intermittent operation. If you experience this, the best solution is to switch to a different brand of nicad. However, it's possible to use needlenose pliers and partially

Text continues on page 44



The arrow points to the location of your 47 ohm resistor. Trim the resistor's two wire leads down to about ½ inch and insert into recesses along with the orange and red wires.

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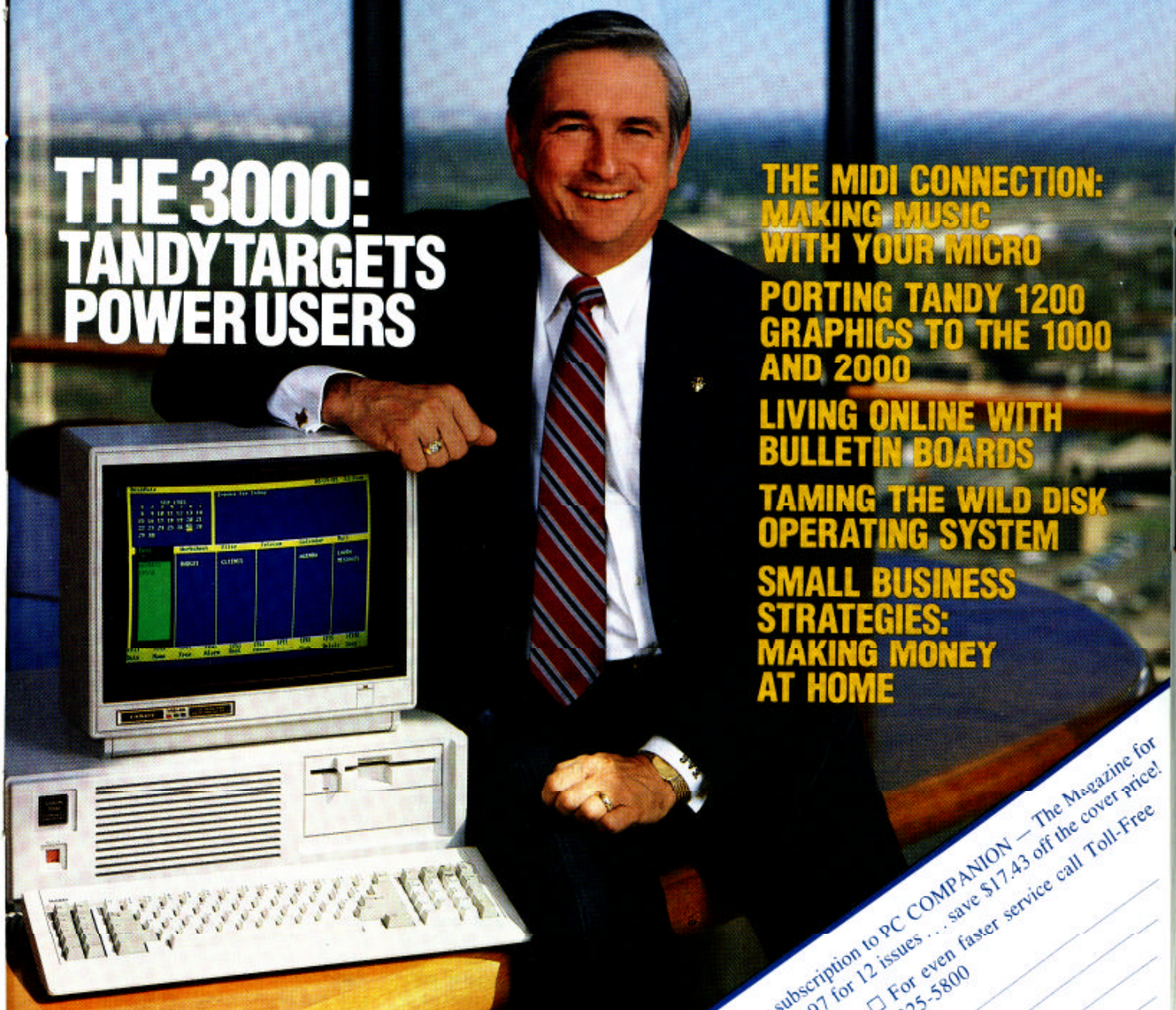

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Use your portable as an onboard computer. Dr. Preble's NavComp and Eagle Air Services' NavEasy: a comparison review.

Taking to the Skies

Now that Federal Aviation Agency (FAA) researchers and the Radio Technical Commission for Aeronautics have pronounced computers safe for use on airplanes, the "lap computer" may have come into its own as an airborne aid to pilots. If so, at least two commercial software packages are already available to meet some of those specialized needs.

One, Dr. Preble's NavComp, is a sort of poor man's RNAV (Area Navigation) system, for the accordingly modest price of $34.95. The other, Eagle Aviation's NavEasy, also performs RNAV functions, but at a cost of up to $2000 (depending on geographic coverage) it should — and does — do quite a bit more.

PREPARE FOR TAKEOFF

To evaluate the accuracy and usefulness of these two packages, this airline pilot/writer used *two* TRS-80 Model 100's; a Hewlett-Packard HP-41C programmable calculator; some custom aviation software for the Model 100; and a major airline's computer-generated flight plan — all to test NavComp and NavEasy not only against each other, but also against the already-proven systems.

NavComp is two programs of some 8,500 bytes each, and they'll likely need to be loaded and run separately on anything smaller than a 32K machine. The first program, NAVPLN, normally used during preflight planning, enters data pertinent to a particular flight or flights. These include routings, distances, forecast winds and temperatures aloft and aircraft performance. After making certain calculations, NAVPLN produces a "Flight Log" file (of around 1600 bytes) that can be sent to any "device" supported by the Model 100 (RAM, COM, cassette, printer, etc.). A RAM (.DO) file is most convenient, however, because a printed copy of the log is quite useful for the flight itself; *and* the second program, NAVAID, makes repeated use of the file during flight. A completed log is shown in Table 1.

Prior to departure, NavComp's NAVAID program is loaded and run, at which time it asks for total fuel on board (in gallons), and the actual departure time. The latter can be automatically entered from the computer's own clock by pressing ENTER at the moment of brake release.

The NavComp system then "flies" the trip — up to 12 "legs," including one for level-off point and one for beginning of descent — according to the flight plan previously stored with NAVPLN. Continuously updated position and time, relative to the next navigation fix and to an auxiliary VOR or NDB station, can be displayed on moving horizontal bar graphs during each leg. (This display, one of two main ones in the NavComp programming, also has a vertical bar graph representing beginning fuel versus remaining and reserve fuel. A series of ever more urgent beeps sounds as reserve fuel is burned.)

Since *actual* passage of a fix will occur slightly sooner or later than programmed, a press of the F1 key exactly at passage notifies the computer, causing ground speed and all other related trip variables to be updated. Actual position can likewise be updated in "real-time," using data obtained from en-route primary or auxiliary VOR's or NDB's. As the trip progresses, the computer should become ever more "in

tune" with actual events, and predicted trip completion on the Model 100 should very nearly coincide with the real thing.

Although there are a few "nice-to-have" features missing from NavComp, the system still provides a lot of sophisticated programming for the money. Only one apparent "bug" reared its head: On flight logs that incorporate NavComp's climb and descent adjustment features, upon reaching LEVEL OFF the computer seems to think it has already arrived at the *final* destination, thus terminating the program abruptly and prematurely. Two telephone messages left at Dr. Preble's went unanswered, but then how much personal support can one really expect for $35? To the company's credit, all customers who bought Version 2.2 of NavComp are being sent Version 2.3 at no charge; and documentation is more than adequate to operate the system.

At the opposite end of the price spectrum is the expensive and feature-rich NavEasy, by Eagle Aviation, claimed by its maker to be thoroughly supported after the sale. In conjunction with an appropriate "chart" — a machine-readable representation of approximately one World Aeronautical Chart (WAC) — NavEasy also references a 100-point DATA section within its RAM program. This comes standard with selected airport and VOR location data, and optionally contains NDB's and "DF-able" radio stations. (A version of NavEasy also runs on the NEC 8201A.)

NavEasy's base price of $399.95 includes one "chart," plus the 100-point regional data base, of customer choice. Additional charts are $69.95, bringing the cost of complete 24-chart coverage of the continental U.S. to $2008.80. The entire set of programs and charts is also priced as a package for $1500, or $2160 *including* a 32K Model 100, AC adapter and tape recorder with cable. (Note: If one wishes to economize, the main

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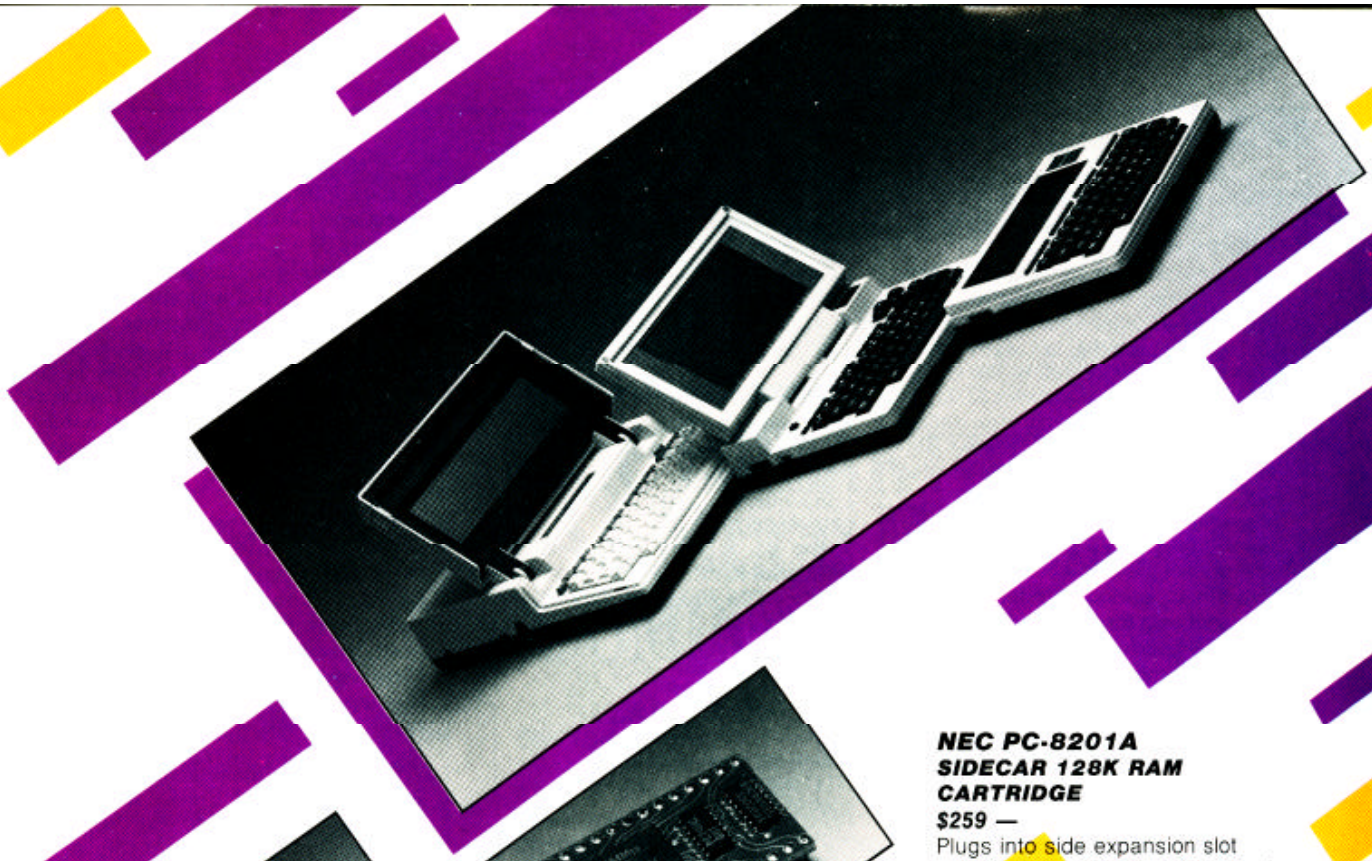

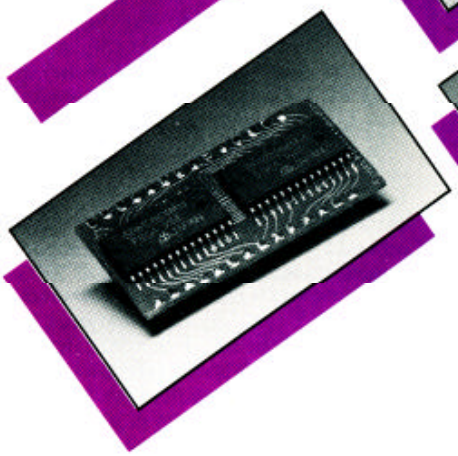

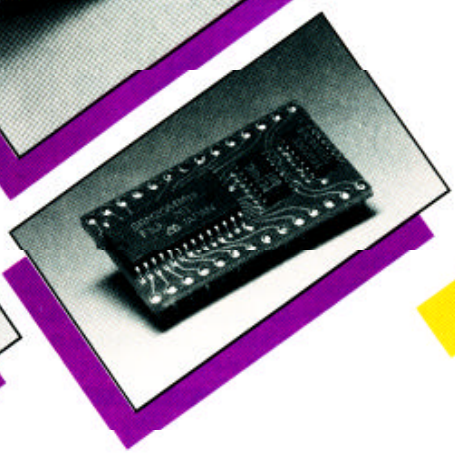

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program can be run independent of all charts, which will eliminate only the CHART screen.)

Further-customized "ribbon" data bases, covering 60 nautical miles either side of a particular course centerline, can be sorted from Eagle's master computer files and delivered to the customer by modem or cassette for $2.00 per point. Since NavEasy can use an unlimited number of interchangeable 100-point data bases, the user can also create his own custom files.

Like the Jeppesen Company's paper "Avigation" charts, Eagle's computer versions are also subject to revision. Accordingly, periodic updates will be made by Eagle for $25 per data base.

NavEasy performs most functions of the NavComp programs described above, including pre-trip production of a log of up to nine legs. (It too can be printed, but no mention is made in the instruction manual of *how* it is done, and the novice computer user may be at a loss; more on documentation in a moment.) In addition, it very accurately calculates Great Circle courses and distances using latitude-longitude coordinates.

NavEasy's most dazzling performances take place during flight. Tracking fuel burn from the start, NavEasy allows — *requires*, really — the entry of actual VOR crossing radials, for an update of affected variables. These include a computation of true airspeed, from real-time inputs of indicated airspeed, outside air temperature and pressure altitude; followed by the display of direction and velocity of *actual* wind aloft. (It does seem a shame that this elaborate and expensive program has no provision for calculation of Mach number, TAS and static air temperature, from the inputs of total air temperature, IAS and PA. This also applies to NavComp.)

If the pilot scrupulously keeps the computer informed of his whereabouts relative to navigation stations along the way, it is possible for him to fly a straight-line course direct to the final destination using off-airway "waypoints," instead of having to pass directly over a series of fixes only roughly aligned with the desired course. The computer tells him the headings required to stay (or get back) on the intended path.

This is very similar to how RNAV works, except that with NavEasy *the pilot* does the repetitive computer updating that occurs automatically with most RNAVs; and direct IFR routings can be filed only in areas with ATC radar coverage. Thus, when using NavEasy alone, a pilot can make no mention of RNAV equipment ("slash-Romeo") in his IFR flight plan.

If the pilot becomes unsure of his location (lost), or just wants to fly the most direct routing between his present position and a given destination already in the computer data base, he has only to take a 2-VOR cross-fix and NavEasy displays the required magnetic course and distance. If the destination is not already in the computer, its latitude-longitude coordinates can be entered at the appropriate prompt, yielding the same results. (NavEasy and NavComp suffer a common deficiency: The inability to locate the airplane by reference to a *single* VOR, using bearing *and* DME distance.)

Along the way, the CHART mode can display aircraft position as it moves on a graphic "map" showing state boundaries and large bodies of water, possibly useful for answering the perennial passenger question, "Where are we?". A SCOPE mode displays current aircraft position relative to the nearest airports. Both of these screens reflect some elegant, virtuoso programming.

All of this information is available *if* the user already has the knowledge, aptitude and perseverance to creditably run the Model 100. Otherwise, he may be frustrated. Despite sales claims to the contrary, NavEasy is a bit of a challenge to learn. The documentation is decidedly meager, and by its omissions asks much more than should reasonably be expected of the most likely *sales prospect* for this software — the average pilot. Although simple enough for the experienced computer "hacker" to decipher, NavEasy, in the absence of a comprehensive user manual, is *not* the best way of introducing the computer to a neophyte. Unfortunately, most pilots fall into the latter category.

NavComp (Version 2.3)
Dr. Preble's Programs
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Minimum RAM: 16K
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Fullerton, California 92631
(714) 998-5016
$399.95 **
Minimum RAM: 32K
Also for NEC 8201A
Circle No. 142

*** $999.95 including 32K TRS-80 Model 100. Prices include one "chart" of user's choice; additional charts $69.95, 24 required to cover entire continental U.S. See text for additional pricing information.*

CONCLUSIONS

NavComp and NavEasy both do a good job of producing certain flight information that is essential, other that is "nice-to-know." Both seem accurate, and one is reasonably priced. Aside from considerations of cost, however, there remains a central question about the very use of the Model 100 during flight: Is it really *practical* enough to be worthwhile?

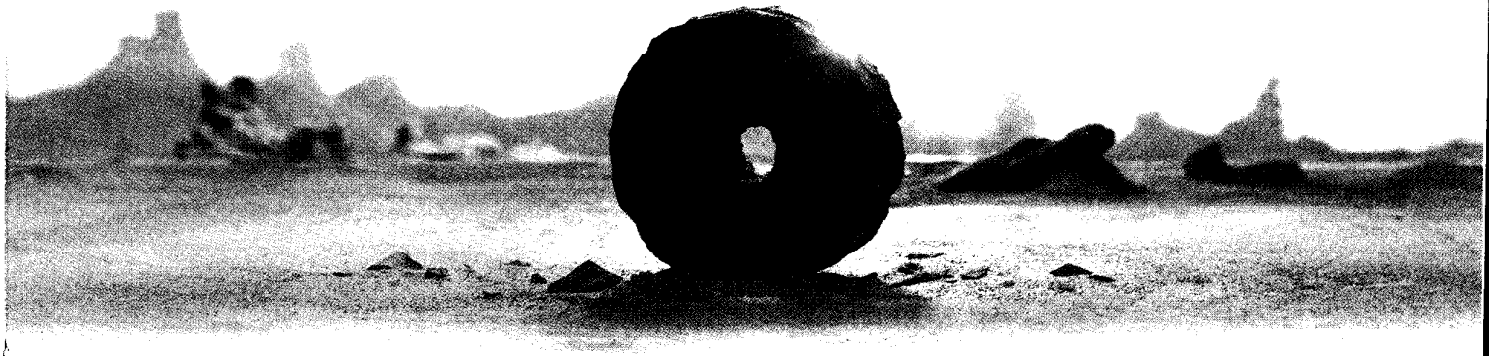
One aircraft manufacturer's experience with the HP-41C, mentioned above as being used to test these two navigation packages, might shed some light on this subject. The Beechcraft King Air 200 jetprop is a stunning success by any measure, with over 1200 sold to date at nearly $1.5 million per copy. Also offered with the airplane was a $2200 computer option that included the hand-held HP-41C, a printer and a plug-in ROM module custom-programmed for the King Air 200's operating and performance parameters. It also did Great Circle navigation, and aircraft weight-and-balance calculations. This option is no longer available.

With the 1200 airplanes, only *fourteen* computers were sold. Of those 14, one went to a customer/pilot who now is also a Model 100 owner. Although he has occasionally used the HP-41C in flight, he doesn't use the Model 100 *at all.* It is simply too bulky — and of too limited utility — for him to consider it worth the bother. To even *suggest* that he also use a Model 100 tape drive, and its associated tangle of wires, in the cockpit, is absolute anathema.

Yet that is exactly what one would have to do to make more than regional use of NavEasy. Requiring a 32K Model 100, the 19,000-byte program also needs an *additional* 7000 bytes of free memory to run properly, plus some 1200 bytes per chart file. Thus the user faces the inconvenience of having to "kill" virtually all other files and programs to run NavEasy, and to then reverse the procedure for use of the computer in other applications.

A NavEasy demonstration program

Text continues on page 45



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Circle 28 on Reader Service Card

My 100 TT/AO/PA/KK/SS (Talks)

BY HERBERT L. BRESNICK

Speech processors have finally come down in price. For a mere $12.50 (1985 catalog), you can purchase the necessary processor chip from Radio Shack — and for about $10 more (depending on the size of your junkbox) you can have your model 100 talking.

The SP0256-AI2 Narrator (TM) speech processor chip is a single chip MOS LSI device that can be instructed to use its stored program to create speech sounds. By means of a single cable connected to the 100's printer port, your portable computer can easily be programmed to join together sounds to form words.

BUILDING A VOICE

Figure 1 is a schematic drawing (partially provided with the chip), that shows modifications to adapt it to the Model 100. The major parts you'll need are the SP0256 processor chip (make sure you get the single chip package), an LM386 audio amplifier, a 7400 TTL IC, and a 5-volt regulator chip. A handful of capacitors and resistors, a small speaker and a crystal make up the rest of the list. All of these parts are stocked at Radio Shack, although a few stores may have to order the crystal for you.

I wired my circuit on a small predrilled circuit board. The mounting method is not critical, but try to keep the parts close to the board so that the whole thing can be mounted to a small case. I used a remote intercom case with speaker already mounted, but almost any small box will do. The power source is a 9-volt transistor battery that feeds a 3-terminal voltage regulator (effectively dropping the power to 5 volts). If you prefer not to use batteries, a 9-volt battery eliminator can be used (about 100 milliamps rating).

The unit is connected to the Model 100 printer port with a 3-foot length of ribbon cable, to which a 26-pin female header is attached to mate with the printer plug. I had some difficulty locat-

Table 1: An allophone directory. Determine the correct sequence of allophones and find the corresponding printer codes to make your 100 talk

ALLAPHONE DICTIONARY

ALLAPHONE		WORD	CODE	COMMENTS
A	AE	hat	Z	Low vowel — can be doubled
	EY	a	T	
	AO	aught	W	Back vowel — can be doubled
	AR	hat	;	
B	BB1*	rib	RT.ARROW	
	BB2	business	?	
C	CH	church	r	
D	DD2	do	a	
	DD1*	could	U	
E	EH	end	G	can be doubled
	IY	see	S	Front vowel
	ER1	letter	s	
	ER2	bird	t	
F	FF	food	h	Double for initial position
G	GG1	got	d	Before high front vowel
	GG2	green	=	Before high back vowel
	GG3	wig	b	Before low vowels
H	HH1	he	[	
	HH2	hoe	y	
I	IH	sit	L	Front vowel; can be doubled
J	JH*	dodge	J	
K	KK1	cute	j	Before front vowels
	KK2	speak	i	Final position
	KK3	comb	H	Before back vowels
L	LL	lake	m	
	EL	saddle	>	
M	MM	milk	P	
N	NN2	no	x	Before back vowels
	NG	anger	l	
	NN1	thin	K	
O	UW1	computer	V	Back vowel
	UW2	food	UNDERLINE	
	OY	boy	E	Back vowel
	UH	book	^	Can be doubled
	AW	out	SPACE	
	AA	hot	X	
	OW	beau	u	Back vowel
	OR	store	z	Back vowel
P	PP	pow, trip	l	
Q	KK3	quiche	H	
R	RR1	rural	N	
	RR2	brain	g	
	XR	repair	o	

ing the header but finally found one in a well-stocked electronic supply store. I haven't tried it, but an alternative might be to buy a 28-pin header at Radio Shack and cut off the last row of pins.

After wiring, check all the connections carefully and connect the plug to the Model 100 parallel printer jack at the rear of the case. Test the unit by going into BASIC and entering:

LPPRINT "[GmOu@"

This should result in the word "hello."

SOUNDS LIKE

The little booklet that comes with the SP0256 chip has an excellent description of allophone speech synthesis, and gives numerous examples and rules for creating words. It also provides a small dictionary which includes numbers, days of the week and letters of the alphabet. See the examples below of how to write a small speech program.

The addendum at the back of the booklet lists an allophone address table (allaphones are speech sounds, which when strung together form words). There are 59 allophones including 5 pause commands used to create time

	YR	clear	<	Front vowel
S	SH	ship	e	
	SS	vest	w	Double for initial position
T	TT2	to, test	M	
	DH1	they	R	
	TH	thin	)	Double for initial position
	DH2	they	v	
	TT1	parts	Q	Final before SS
U	AX	succeed	O	Can be doubled
V	VV	vest	c	
W	WW	wool	n	
	WH	white	p	
X				
Y	AY	sky	F	
	YY2	yes	Y	
	YY1	beauty	q	
Z	ZH	azure	f	
	ZZ	zoo	k	
DELAY	PA1	PAUSE 10ms.	@	Before BB1, DD1, GG1, JH
	PA2	30ms.	A	Before BB1, DD1, GG1, JH
	PA3	50ms.	B	Before PP, TT1, KK1, CH and between words.
	PA4	100ms.	C	...Between clauses
	PA5	200ms.	D	and sentences

*** Requires time delay @ or A before these letters**

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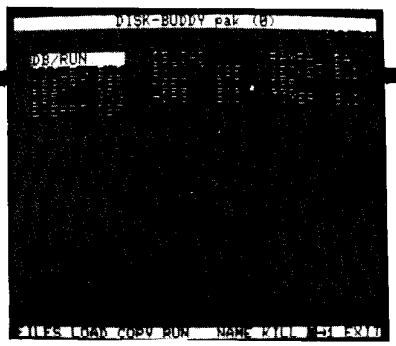

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PCM Magazine (March, '85) said: *"... an excellent buy"... "manual is extremely well written"... "will substantially increase the speed and ease of operation of the M-100 with the D/VI."*

That was the idea in the first place.

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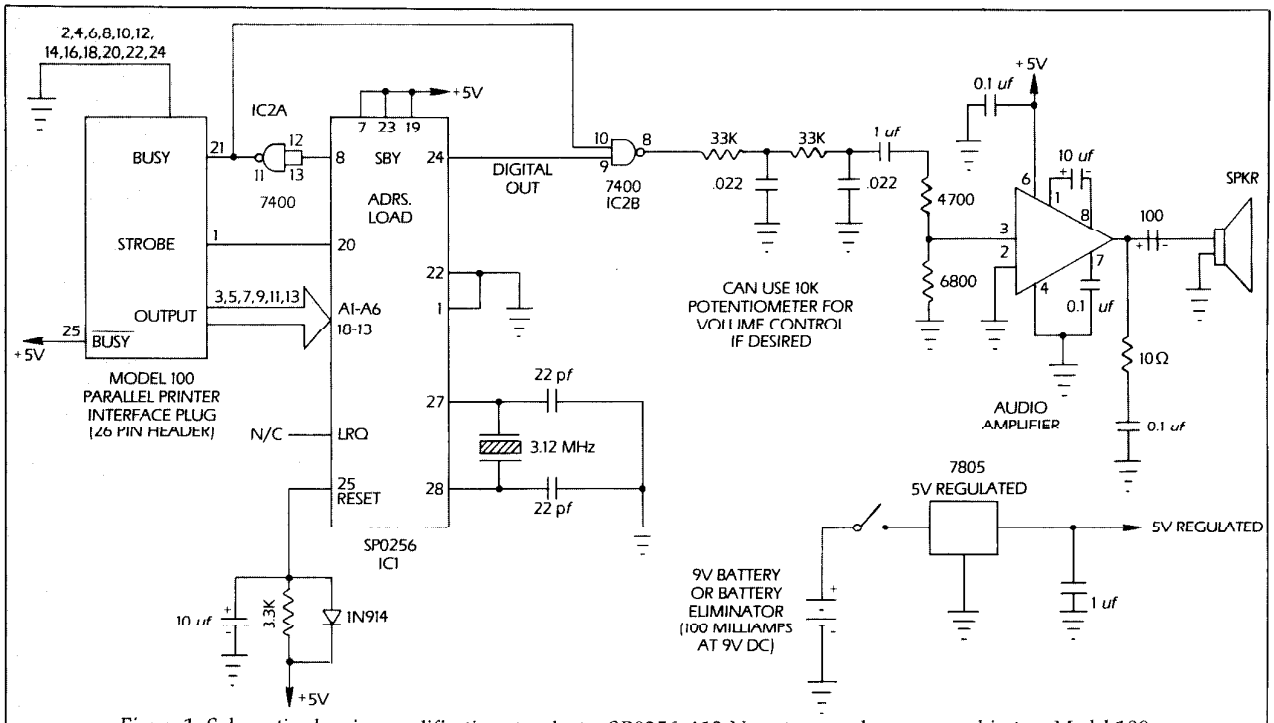

Figure 1. Schematic showing modifications to adapt a SP0256-A12 Narrator speech processor chip to a Model 100.

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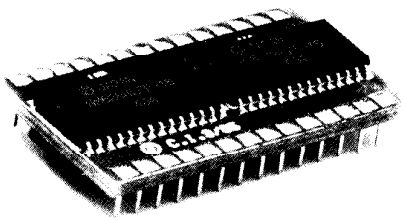

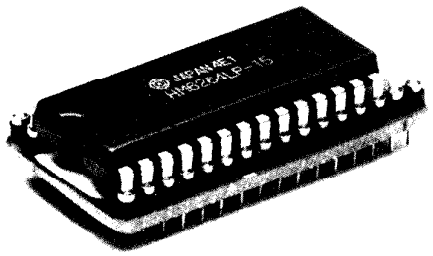

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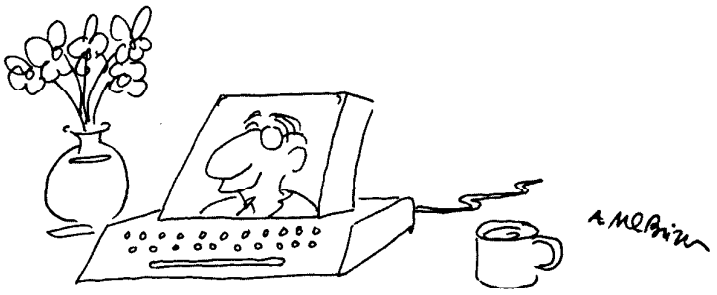
delays, making a total of 64 address positions. When correlated to the decimal address codes of the Model 100 printer, the allophones can be quickly addressed by using the table below. The allophones have been rearranged in alphabetical order, and the Model 100 codes have been added. Simply look up the allophone desired to find the printer code. For example, the word "seven" uses allophones "SS SS EH EH VV IH NN1." Using the table below, these translate into the printer codes "wwGGccLK." To speak the word "seven" type (in BASIC):
LPPRINT "wwGGccLK"

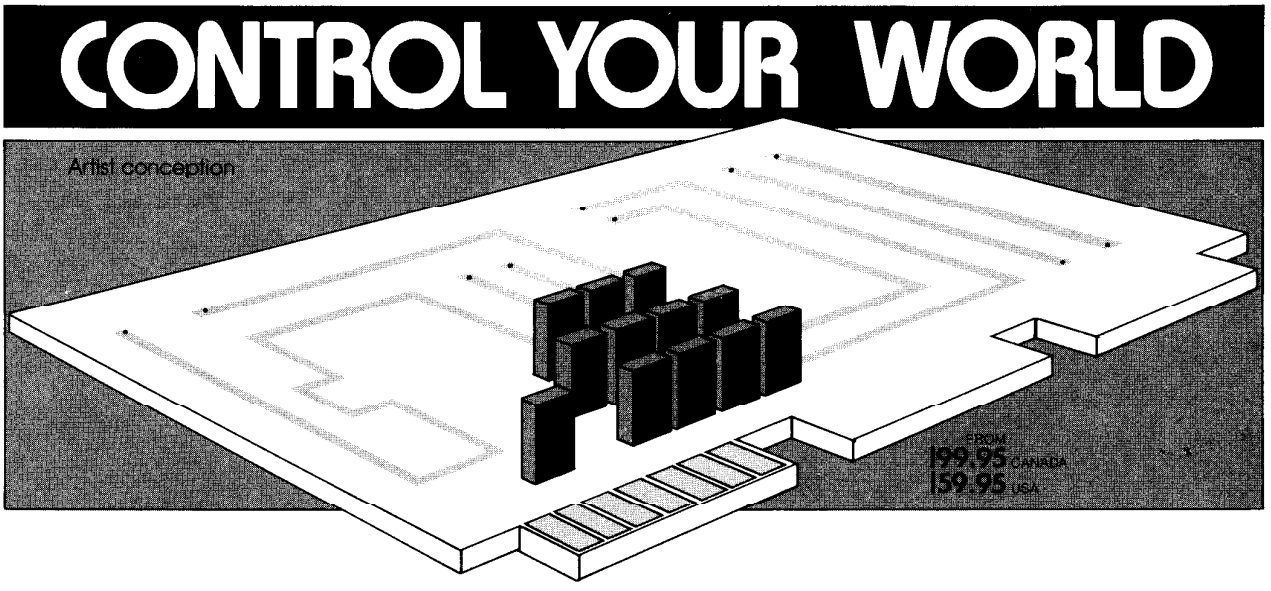
To create sentences, translate each word from its allophone to its printer code. In BASIC, simply string the words together with delay codes between them.

This is a fun project that can be completed in a weekend, and will enhance your use of the Model 100 as well as educate you in the current state of the art of speech processing. It's also a lot of fun adding speech to your favorite programs. Other uses (answering your front door, or even your telephone) will probably be found if we use a little imagination.□



Listing 1: A short program that demonstrates how to string words together to create sentences.

```
100 CLS
110 PRINT "    Speech Sample for the Model 100"
120 PRINT "            By Herb Bresnick"
130 PRINT
140 PRINT "GOOD MORNING, HOW ARE YOU TODAY?"
150 LPRINT "d^UBPzKLIC sq_BM_aGTDD";
160 PRINT "I am your computer"
170 LPRINT "DXFBZZPCYzBjOPIqVMsD";
180 PRINT "At your command"
190 LPRINT "DZMBYzBjOPZZKAU"
200 MENU
```

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others.

Several months ago, Radio Shack stores started to close out the 8K Model 100 for $299. I bought one and immediately realized what a fantastic computer it is. I passed the word on to a few friends. Before long there were seven of us. It soon became obvious that we'd need more memory to make the little machines truly useful. We purchased some 8K chips for $27 each and expanded our computers to the 32K maximum. This meant our 32K 100s cost us about $380 each.

Next we needed software to supplement the ROM-based programs that came with the machines. Most wanted a spreadsheet and a print formatter. I was anxious to try out an outline processor. Since we wanted to carry the bargain theme to the limit, I decided to visit the public domain library on Compuserve's Model 100 SIG. My experience with public domain software for my CP/M computer made me hopeful.

From the SIG, I came up with SPREAD.WM3, a fine little spreadsheet and THINK.IT, a smooth and powerful outline processor. Both work great on the Model 100 and were obtained for only the cost of the connect time. I wrote a small print formatter myself, complete with pixel-mapped document preview.

Now we all have powerful little portables, complete with built-in modems, communications software, text editing, spreadsheets and outline processing. All for a total cost of less than $400 (not counting cables). It would be hard to think of a way to get more computing power for the money.

My real reason for writing, however, is to thank the writers and editors of *Portable 100*. Without your guidance and inspiration, we could never have put it all together.

Phil Swango
Reston, VA

WE STAND CORRECTED

I have two points concerning articles in the November 1985 issue.

First, in the article "Conserving Precious Memory," it's stated that .CO progams are stored between .DO files and the PASTE buffer. However, I am quite sure that in the Model 100 and NEC PC-8201A, .CO files are stored between the PASTE buffer and numeric variables (specifically the simple variables, as opposed to the array variables). As proof, examine the two byte pointers located at these addresses in the Model 100: F9A5h points to the PSTE buffer; FBB0h points to the start of .CO files; and FBB2h points to the start of simple variables (F87Ch, FAE3h and FAE5h are the equivalent NEC PC-8201A addresses).

Second, the review of the Tandy Disk Drive (PDD), page 46, states that a disadvantage of the drive is that it connects to the RS-232 connector. However, this is a boon for the NEC (and Olivetti M10) owners. The NEC is capable of doing everything the Model 100 can, in terms of the RS-232 port (after all isn't RS-232 a standard protocol?). Thus, the PDD can be connected to non-Tandy machines. It is my sincere hope that when you publish your new and improved operating system for the PDD, it will be sufficiently documented and commented so it's easily converted to the NEC. Also, it would be nice if the PDD can be made to accept and output signals at TTL levels so it can be connected to one of the NEC's two SIO ports.

William N. Kumai
Bay Area NEC/100 User's Group

Text continues on page 47

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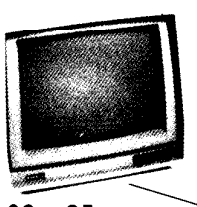

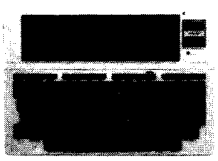

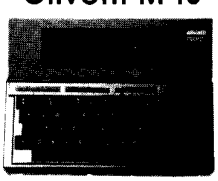

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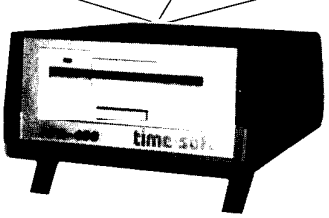

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NICAD from page 30

uncoil the 100's positive spring terminals for better contact.

HOW TO ADD THE SELF-CHARGER RESISTOR

You probably wonder, as we do, why all portable computers don't have built-in rechargeable power supplies. Radio Shack has been consistently guilty of this fault, and even compounds it with new battery-powered products that lack automatic shutoff.

However, if you have ten minutes and twenty cents, you can wire in a resistor (without soldering) that will recharge your 100 overnight from a power line adapter.

We repeat: This change may invalidate your 90-day warranty if still in effect. But there is virtually no risk from adding a resistor, nor will it make troubleshooting difficult if your machine should ever need repair. Simply removing the resistor before sending the 100 for service will avoid any issue being raised.

The resistor you need for self-charging is a 47 ohm, ¼ watt resistor which you can find at any electronics or TV repair store. A resistor twenty percent above or below those values will still work.

With the 100 turned off, place it face-down on a smooth surface to avoid scratching the screen. The screen should be facing away from you. Using a Phillips screwdriver, fully loosen the four recessed corner screws. Then turn the computer over to the left. As you do so, the screws will fall out — don't loose them. Clips holding the front and back together can be loosened with your fingernail. Now lift the left side of the front and fold it part way over to the right. Look at all the neat parts inside, but don't touch!

With the accompanying photograph as a guide, find the plug location for insertion of your 47 ohm resistor. Using cutting pliers or scissors, trim the two wire leads of the resistor down to about ½ inch. Now bend the wire leads into a U-shape with needlenose pliers, and insert the leads into the recesses along with the orange and red wires as shown. (Yes, we are cheating by using the existing terminals without asking you to solder in new ones.) Make sure the resistor is firmly mounted and will not touch or interfere with other parts.

Now fold the 100's front into place, make sure it seats all around, insert the screws and tighten them snugly in the recessed holes.

That's all there is to it.

USE AND PRECAUTIONS

When you first put in your rechargeable nicads, it will take overnight to charge them fully. The 100 can be in use or not while charging. With a little practice, you will learn how often your batteries need a charge. In an emergency, you can always replace them with regular batteries. But don't use the power line adapter with regular batteries except in dire emergency, because they don't charge properly.

IMPORTANT: Don't leave the power line adapter plugged into the computer without power at the other end. That will discharge the nicads. However, there's no need to worry about the memory backup battery. This change has no effect on it at all.

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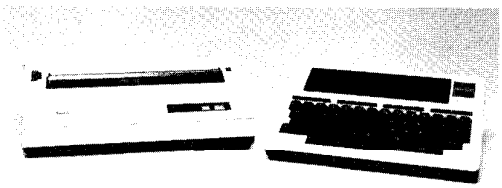

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points out that the Model 100's internal RAM is expandable to 96K, but no mention is made of the extra $400-plus that it takes to do it. Though anyone who can afford the initial cost of NavEasy should also be able to buy the extra 64K of RAM, even then space could be tight: The number of 100-point data bases necessary to cover the whole U.S. can run to more than 70, there being a total of over 6000 airports and 1000 VOR's. Because each 100 points uses some 3100 bytes, pilots will still have to be judicious in their se lections.

This writer, although a dedicated Model 100 user, nonetheless finds even the spacious cockpit of a Boeing airliner, with its 115V AC power receptacle, too confined for more than occasional airborne use of the Model 100. Those few airline pilots who *do* routinely use computers aloft seem to prefer those (like the Radio Shack PC-3) that are small enough to be clipped, in a special holder, to the aircraft control wheel, and later tucked unobtrusively into a flight bag.

Pilots of small airplanes likely have an even stronger preference for compactness in a computer. (Flyers of wide-body airliners, on longer route segments, may have both the space *and* the funds for a 96K Model 100 with NavEasy.

> One question remains about using the Model 100 in flight: Is it really practical enough to be worthwhile?

Regardless of size considerations, however, a responsible pilot cannot permit himself to become overly preoccupied with ancillary activities, especially at the expense of proper attention to his airplane and to keeping a traffic watch. The computer may, in fact, provide only a distracting and very involved way of performing otherwise simple tasks.

In any event, NavComp is cheap enough — and, for that matter, quite good enough — to try for the novelty of it, while NavEasy is so pricey as to appeal only to a select group of users. Airborne fire or fish spotters, search and rescue crews and others who routinely need to pinpoint ground locations in terms of VOR radials, and translate those data into latitude-longitude coordinates, may find NavEasy just the ticket. Affluent pilots, likewise, might find it convenient to carry the system whenever they fly modestly-equipped rental aircraft. In either case, it may be wise to test NavComp first, before committing to a larger investment that may end up being left at home.

Those who can afford the price of NavEasy may do just as well to await nationwide coverage of Loran C, possibly as little as 18 months away, and put a similar amount of money into a Loran set. The rest of us will just have to make do: Either with NavComp, our own navigation programs — or with less glamorous, but still quite functional, "standard" airborne navigation techniques.□

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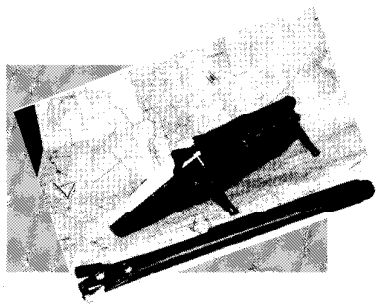

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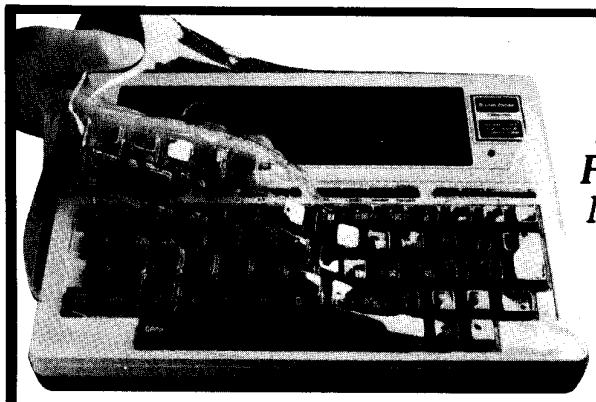

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Circle 27 on Reader Service Card

REVIEWS from page 28

pause transmission.

The final enhancement is automatic line feed insertion. Pressing Shift-Code-F7 toggles that from *NoLF* (the default condition — no line feeds after carriage return) to *UpLF* (send a line feed after each carriage return).

BRINGING IT IN

X-TEL is sold in two versions, for the Model 100 and the Tandy 200. With each version there's an option: Should the program be stored on cassette tape or on MS-DOS 5.25-inch disk? For those who have an IBM PC or compatible, such as the Tandy 1000, as well as telecommunications software and a null modem, the MS-DOS disk is the easier medium.

The cassette or disk contains one file, X-TEL.DO. Loading and running this file creates two programs: X-TEL.BA and X-TEL.CO. To do that operation, the Model 100 or Tandy 200 must have at least 8,000 bytes of free RAM. The resulting files are quite small: On a Model 100, X-TEL.BA is 189 bytes long, and X-TEL.CO occupies 2,632 bytes.

> Line noise is often minor — but always present.

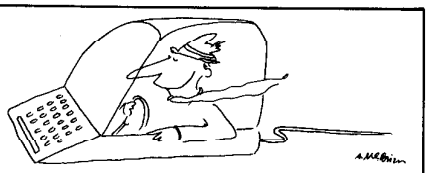
The 16-page X-TEL manual, although concise, explains each of X-TEL's features clearly. After an advertisement for Sigea System's Telecommuter program, the manual spends two pages on each method of loading the program, from disk or cassette. It then moves step-by-step through XMODEM file transfer and the other TELCOM enhancements.

THE BOTTOM LINE

For frequent telecommunicators, especially those who enjoy downloading and uploading files from the GEnie or CompuServe special-interest groups, X-TEL is a life-saver. The ability to transfer files without the fear of line noise saves frustration, along with connect time — no more need to keep downloading over and over until the file comes through intact.

At $50, it won't take too much saved connect time to justify the expense of X-TEL.□

GIGO from page 43



DISK DRIVE SUGGESTION

Tandy really blew it with their new portable disk drive. I just bought one. It's a nice, compact unit for the price, but...

I've tried it now with Interactive Solutions, Scriptsit 100 and Executive Calendar. If I run any of these, FLOPPY .CO does not work. I have to go back to the IPL.BA load program, move the dip switches around, etc. to get the disk file management system back (FLOPPY .CO).

What I would like to see is a nice ROM-chip word processor that also does the file management of the disk drive. Let's see if Tandy can do it before Portable Computer Support Group this time.

Ralph R. Hall
Morristown, NJ

ONE FOR OUR SIDE

Just a short note to let you know how much we enjoy your magazine.

However, some of the letters addressed to GIGO leave a little bit to be desired. Looks like some of your readers are cry babies — especially the ones that complained about your advertisers. Just consider the source and keep up the good work.

John Mohr
Pacifica, CA

GETTING OUR BEARINGS STRAIGHT

Your article "Navigating on Your 100" compels me to draw attention to the fact that latitudes bearing the nomenclature east or west simply do not exist. However, northerly and southerly latitudes are as real as the Greenwich Observatory which, to the best of my knowledge, has not yet met its demise.

Your statement that the United States lies to the east of the prime meridian prompts me to add that although it can be reached by traveling in an easterly direction from the prime meridian, it's much shorter to head west.

R.J. Major
Houston, TX

Oops! Thanks for the geography lesson.□

Get Organized

The writing is on the electronic wall! If you've watched CompuServe's bulletin board for Model 100 users, you've seen these comments about TMPC, a program to manage "The Most Precious Commodity:"

"I was shocked to find such a fine, professionally produced, well written manual accompanying a $50 product."

— Bob Willard

"TMPC does indeed help me manage a **very** complicated schedule as a free-lance writer.... With my future spread out before me, it's hard **not** to plan."

— Greg Sandow

"To my mind, the best thought out program for the Model 100."

— Alex Jacobs

"TMPC is a unique approach to scheduling appointments and to-do's ... it is a superior product... I have come to rely on it heavily ... and recommend it to anyone who really wants to use the M100 as a time management tool."

— Frank Rytell

"The silly thing actually improved my life! ... Deadlines used to be a real weakness of mine."

— Tim Peters

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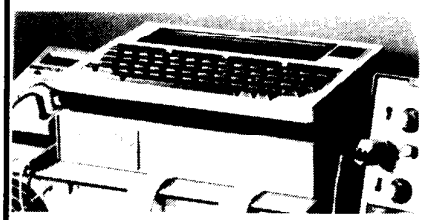

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Making Ends Meet

Reprinted from "Financial Decision Making With Your TRS-80 Model 100 Including 13 Programs" by Leslie Sparks (Book No. 1799), with permission of the publisher, Tab Books, Inc., Blue Ridge Summit, PA 17214.

In many business situations expenditures can be divided into two parts —fixed costs and variable costs. *Fixed costs,* items such as leases, rents, real estate taxes, etc., are constant regardless of the level of business activity. Variable costs, on the other hand, depend on the level of business activity. Generally the variable costs of selling two units of product are twice those involved in selling one unit.

Variable costs are expenses such as direct labor and parts. The higher the level of business activity, the greater the variable costs. In some situations these costs change as the number of units of product sold increases. In these cases, variables costs are said to follow a *learning curve.* Generally these costs decrease as the number of units sold increase.

THE COST OF WINNING

In many situations it's desirable to know how many units must be sold to break even. In other words, how many units must be sold to cover all the fixed costs plus all the variable costs of the units sold. The firm neither makes nor loses money at the breakeven point. If the actual number of units sold is less than the breakeven point, the firm has a loss; if the actual number exceeds the breakeven point, the firm has a profit.

This situation for a constant variable cost line is shown graphically in Figure 1. The shaded area represents the area of sales that produces a profit. When variable costs follow a learning curve, the fixed cost line is a curve. Such a situation is shown in Figure 2. Again the shaded area represents the area where the firm has a profit.

Breakeven analysis is extremely useful because it quantifies the level of sales necessary to cover all costs. If the potential level of sales is less than the breakeven point, there's no hope of making a profit. Thus any investment that promises business activity less than the breakeven point should be avoided. Breakeven analysis can also be used to show where cost cutting can be most beneficial. For example, suppose you can cut fixed costs by 10 percent or variable costs by one percent per unit. Which should you do? Breakeven analysis can help you find out.

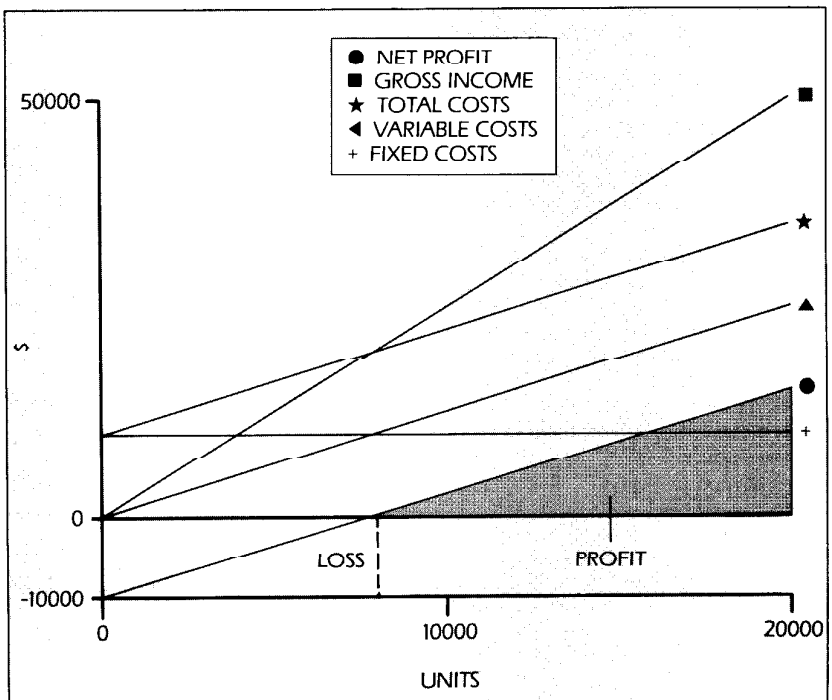


Figure 1. Linear variable cost line.

FUTURE GAINS

Quite often it's useful to conduct a breakeven analysis to determine the impact of the product on cash flow as well as profits. In an analysis based on profits, some costs (such as depreciation), that are not direct out-of-pocket expenses are included in the fixed costs. A breakeven analysis based on cash flow eliminates these costs from consideration and is only concerned with the cash flow generated by the product. The cash flow breakeven point is *always* less than the profit breakeven point.

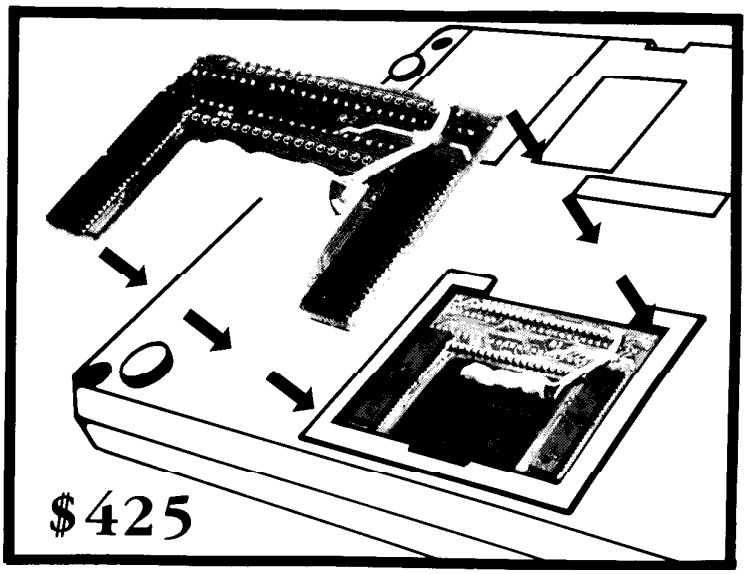
The program listed here, BRKEVEN .BA, does all the math involved in breakeven analysis. The program allows you to do the analysis for either a constant variable cost curve or for a learning curve. The learning curve assumes that the costs increase or decrease at a constant rate. You must enter the rate, which may be positive or negative. If it's positive, then variable costs will increase with increased production. If it's negative, variable costs will decrease with increased production.

The program also allows you to specify either a constant selling price or one that changes along with the number of

Give your Model 100

128K RAM

Installs as easily as plugging in a socket



Software included, transfers from bank to bank. Works like main menu! Includes powerful RAM Basic that lets any program regard the 128K as one continuous bank.

PCSG says: Satisfaction guaranteed or your money back within 30 days

As amazing as it seems you can upgrade your Model 100 to 128K of RAM in just 60 seconds.

It comes to you right out of the box looking just like the picture. You just open the little compartment on the back of your Model 100 with a quarter and it just pushes right into place. You can then put the cover back in its place.

You then have 4 banks of RAM of 32K each. The additional three banks also work just like your Main Menu.

You push a function key and you are in the second bank. Push again and you are in third, again, then fourth. Press it once again for your original bank.

It has its own built-in NiCad battery that recharges right from the Model 100 and its guaranteed for a full year.

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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units produced. The rate that the selling price changes by is called the *erosion rate.* It may be either positive or negative. A negative erosion rate means that the selling price decreases as the number of units sold increases, while a positive erosion rate means that the selling price increases as the number of units sold increases.

The program runs very fast and can provide you with a good picture of the project. You should take full advantage of the speed of the program and use it to run a sensitivity analysis for the project. Try various combinations of costs and selling price to the effects of changes in the business climate and effects of inaccurate estimates.

The program also plots the results of the analysis on the display. The plot is automatically scaled. The breakeven point is indicated with a tick mark.

So now there's no excuse. If you can calculate your fixed and variable costs, you can determine your breakeven point. And if you know that, you'll have a better handle on where your business is headed and its prospects for the future.□

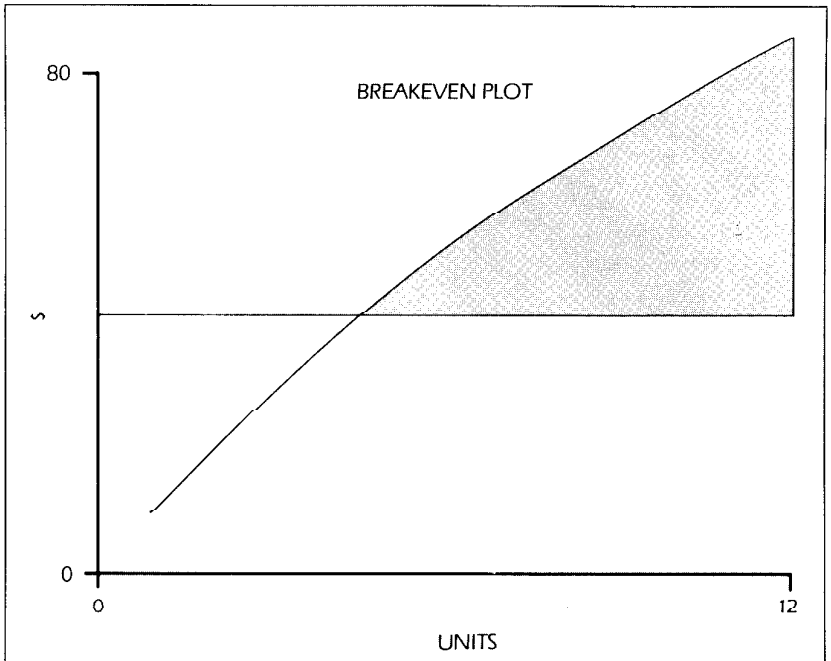

Figure 2. Costs as a learning curve.

Listing 1. Breakeven analysis program BRKEVN.BA.

```
10 REM breakeven analysis
20 DIM X(10),Y(10)
30 CLS
51 A$="1234567890.+-"
52 AZ$=CHR$(31)+CHR$(30)+"*"+"@"
53 J1=0:
   J2 = 4
54 JS=2
55 J9=1
60 GOSUB10000
62 GOSUB 12000
70 CLS:
   GOSUB9000
5000 Z$="":
    CLS:
   XI=X(4)/5:
   XM=10*X(4):
   PRINT"X MAX - ",XM.
   INPUT"ENTER YOUR VALUE OR PRESS
   ENTER ";Z$
5002 IFZ$=""THEN5003 ELSE XM-VAL(Z$)
5003 :
   YI=X(2)*XI-X(1)*XI-X(0):
   YM=X(2)*XM-X(1)*XM-X(0)
5120 DX=XM-XI:
   DY=YM-YI:
   SX=180/DX:
   SY=54/DY
5125 X2=.1*DX:
   X0=XI-X2
5140 REM scale
5145 CLS
5150 PRINT@284,XI;:
   L$=STR$(XM):
   L=LEN(L$):
   PRINT@(319-1-L),L$;
5238 PRINT@293,"UNITS";
5240 PRINT@240,;:
   PRINTUSING"#####";YI;:
   PRINT@0,;:
   PRINTUSING"#####";YM;
5245 LINE(34,54)-(214,54):
   LINE (214,54)-(214,56):
   LINE(34,54)-(34,56)
5246 LINE (34,54)-(34,0)
5247 X0=X0+X2:
   XP=X0-XI:
   XP=34+XP*SX:
```

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AutoBase (2K) $29.50 - Database management for limited RAM. Design input forms using up to 16 fields. Use up to 9 keyword or relational field criteria to select records for display or printing. Print forms or specific fields in a list or label format.

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☐ Please charge $99.95 to my
☐ MasterCard ☐ VISA

Account # _____

Exp. Date _____

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BREAKEVEN

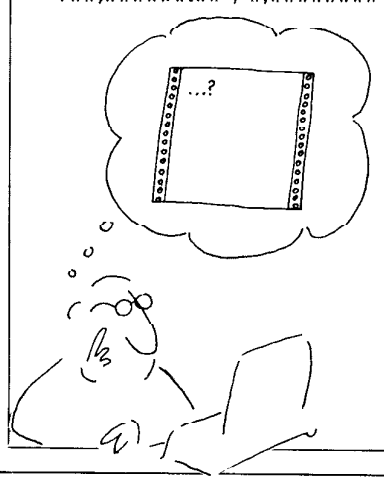
```
   Y0=X0*X(2)-X(1)*X0-X(0):
   YP=Y0-YI:
   YP=YP*SY:
   YP=54-YP:

5248 X1=X0+X2:
   XX=X1-XI:
   XX=34+XX*SX:
   Y1=X1*X(2)-X(1)*X1-X(0):
   YY=Y1-YI:
   YY=YY*SY:
   YY=54-YY
5249 LINE(XP,YP)-(XX,YY)
5250 IFX1<XMTHEN5247
5255 REM
5260 X=34:
   LINE(X,54)-(X,56):
   X=X(4)-XI:
   X=34+X*SX:
   LINE(X,54)-(X,50)
5261 Y=0:
   Y=Y-YI:
   Y=SY*Y:
   Y=54-Y:
   LINE (34,Y)-(214,Y)
5270 PRINT@80,"PROFIT$";
5280 Y$=INKEY$:
   IFY$=""THEN5280
5290 RETURN
9000 REM DATA INPUT
9010 CLS:
   PRINT"BREAKEVEN ANALYSIS."
9020 PRINT STRING$(39,"=")
9022 IFJ1<0THENJ1=0:
   J2=4
9040 FOR J=J1TOJ2
9050  PRINTX$(J);TAB(16);:
   PRINTUSINGF$(J);X(J)
9060 NEXT J
9070 PRINT @(JS*40)+14,">";
9075 PRINT@280,"ARROW KEY
   MOVE> * CALCULATES P PLOT";
9080 Y$=INKEY$:
   IFY$=""THEN 9080
9085 IFY$="P"ORY$="p"THENGO
   SUB5000:
   GOTO9000
9090 IFINSTR(A$,Y$)<>0 THEN 9500
9100 JZ=INSTR(AZ$,Y$):
   IFJZ=0THEN9080
9110 ONJZGOTO9120,9140,9200,
   9300
9120 PRINT@(JS*40)+14," ";
9122 JS=JS+1:
   IFJS>6THEN JS=2:

9124 PRINT@(JS*40)+14,">";
9130 GOTO 9080
9140 PRINT@(40*JS)+14," ";
9150 JS =JS-1:
   IFJS<2 THEN JS=6
```

BREAKEVEN

```
9152 PRINT@(40*JS)+14,">";:
   GOTO9080
9200 REM CALCULATE
9210 X(4)=INT(X(0)/(X(2)-X(1))):
   X(3)=X(0)+X(4)*X(1)
9230 GOTO 9000
9300 END
9500 PRINT @(40*JS)+14," ";
9505 PRINT@280,"ENTER REST OF
   DATA PRESSENTER
   WHEN DONE";
9510 V$=Y$
9530 PRINT@(40*JS)+15,V$;
   CHR$(95);" ";
9540 Y$=INKEY$:
   IF Y$ =""THEN 9540
9550 IF Y$=CHR$(13) THEN 9700
9560 IF Y$<>CHR$(29) THEN 9600
9570 IF LEN (V$)=0 THEN 9530
9580 V$=LEFT$(V$,LEN(V$)-1):
9590 Y$="":
   GOTO 9530
9600 IF INSTR(A$,Y$)=0 THEN 9530
9610 V$ = V$ + Y$
9620 GOTO 9530
9700 X(J1+JS-2)=VAL(V$)
9710 JS=JS+1:
   IFJS>6THENJS=2
9730 GOTO 9010
10000 J=-1
10010 J=J+1:
   READX$:
   IFX$="END"THENJN=J-1:
   RETURN
10020 X$(J)=X$:
   GOTO10010
10030 DATA FIXED CST,VARICST,
   UNITPRICE,TOTCST,
   BREAKEVEN,END
12000 FORJ=0TO4:
   READF$(J):
   NEXTJ:
   RETURN
12010 DATA"$##,#####.##",
   "$##,##.##","$#,###.##",
   "$##,#######.##","#,#########"
```



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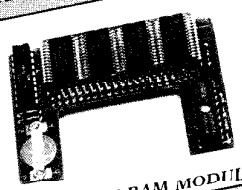
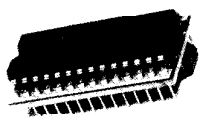
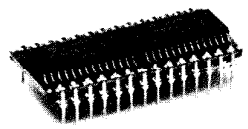
PG Design RAM modules have become the number one choice for Model 100, Tandy 200 users, not just because more people are using **PG Design** RAMs than any other brand—But because our name has become synonomous with *PREMIUM QUALITY, RELIABILITY,* and *IMMEDIATE CUSTOMER SERVICE.*



MODEL 100 64K RAM MODULE



MODEL 100 8K RAM MODULE



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Circle 32 on Reader Service Card

Circle 32 on Reader Service Card

The SENTRY.CO program works immediately and automatically each time the machine is powered up, regardless of whether it was turned off in BASIC, Text or at the main menu. It provides login and password protection for your files.

```
1Ø 'SENTRY.BA  Copyright 1985 by M.J.
   Nugent, Jr.
2Ø CLS
3Ø '--- search ---
4Ø CLEAR 256,HIMEM: DEFINT A-Z: DEFSNG
   H,O,T,V
5Ø READ HOOK, OLDVEC, SIZE
6Ø VCTR=HOOK+1: TP=PEEK(VCTR)+256 *
   PEEK(VCTR+1)-3
7Ø HDR$="": FOR I=Ø TO 2: HDR$=HDR$
   +CHR$(PEEK(TP+I)): NEXT
8Ø FOUND-Ø
9Ø IF HDR$<>"MJN" THEN PRINT "SENTRY.CO not
   installed": GOTO 12Ø
1ØØ FOUND=1: PRINT "SENTRY.CO installed
   at"TP
11Ø '--- menu ---
12Ø PRINT "<R>emove <I>nstall <E>nd ";
13Ø ON INT((INSTR("RrIiEe",INPUT$(1))+1)/2)
   GOTO 17Ø, 22Ø, 15Ø
14Ø GOTO 13Ø
15Ø MENU
16Ø '--- remove ---
17Ø PRINT: IF FOUND=Ø THEN PRINT "Already
   gone!": GOTO 12Ø
18Ø POKE HOOK,2Ø1: FOR I=2 TO Ø STEP-1: POKE
   HOOK+I,PEEK(TP+OLDVEC+I):NEXT
19Ø C=-SIZE*(TP=HIMEM): PRINT "SENTRY.CO
   removed:"C"bytes freed"
2ØØ PRINT "HIMEM = "HIMEM+C: CLEAR 256,
   HIMEM+C: GOTO 4Ø
21Ø '--- install ---
22Ø PRINT: IF FOUND THEN PRINT "Must remove
   existing SENTRY first!":GOTO 12Ø
23Ø POKE 63Ø56,128
24Ø CLEAR 256,HIMEM-SIZE
25Ø DEFINT A-Z: DEFSNG H,O,T,V,R,P
26Ø READ HOOK, OLDVEC, SIZE
27Ø VCTR=HOOK+1: TP=HIMEM
28Ø '--- create ---
29Ø CLS: SCREEN Ø,Ø: POKE 64173,Ø
3ØØ B9=185: BA=186: E8=232: FE=254: FF=255
31Ø FOR I=Ø TO 7: SW(I)=FF XOR 2^I: NEXT
32Ø 'Type the following exactly as shown
33Ø FORI=ØTO8:M(I)=FF:NEXT:FLAG=2
34Ø PRINT@4Ø,"Press desired key
   pattern....";:CALL3Ø3ØØ:GOTO36Ø
35Ø FLAG-Ø
36Ø OUTB9,FF:OUTBA,INP(BA)ANDFE:COL=INP(E8):
   IFCOL<FFTHENFLAG=1
37Ø M(8)=M(8)ANDCOL:OUTBA,INP(BA)OR1
38Ø FORI=7TOØSTEP-1:OUTB9,SW(I):COL=INP(E8):
   IFCOL<FFTHENFLAG=1
39Ø M(I)=M(I)ANDCOL:NEXT:ONFLAGGOTO35Ø,36Ø
4ØØ 'Okay, the pressure's off.  Spaces are
   allowed from here on.
41Ø CLS: BEEP: PRINT @12Ø, "Key pattern
   recorded."
42Ø PRINT "New HIMEM ="HIMEM: PRINT
   "Working...."
43Ø '------------------
44Ø FOR I=Ø TO SIZE-1Ø
45Ø PTR=TP+I: READ A: IF A=>Ø THEN 48Ø
46Ø READ A,B: REL=A+256*B: FX!=REL+TP:
   B=INT(FX!/256): A=FX!-B*256
47Ø POKE PTR+1,B: I=I+1
48Ø POKE PTR,A
49Ø NEXT
495 PTR=PTR+1
5ØØ FOR I-Ø TO 8: POKE PTR+I,(NOTM(I)) AND
   FF: NEXT  'note: complemented!
51Ø '--------------------
52Ø FOR I=Ø TO 2: POKE TP+OLDVEC+I,
   PEEK(HOOK+I): NEXT
53Ø TXFR=TP+3: B=INT(TXFR/256): A=TXFR-B*256
54Ø POKE HOOK,2Ø1: POKE VCTR,A: POKE
   VCTR+1,B: POKE HOOK,195
55Ø POKE 63Ø56,Ø: POKE 64173,1: CLS
56Ø GOTO 4Ø
57Ø 'DATA for SENTRY
6ØØ DATA 62966, 1Ø7
61Ø DATA 146
62Ø DATA 77, 74, 78, 243, 245, 229, 213, 197
63Ø DATA 33, Ø, Ø, 34, -1, 135, Ø, 33
64Ø DATA 145, 255, 17, 146, 255, 6, 9, 175
65Ø DATA 119, 2Ø5, 66, 37, 6, 255, 195, -1
66Ø DATA 34, Ø, 6, Ø, 33, 153, 255, 62
67Ø DATA 255, 211, 185, 219,186,23Ø,254, 211
68Ø DATA 186, 2Ø5, -1, 11Ø, Ø, 219, 186, 246
69Ø DATA 1, 211, 186, 62, 127, 14, 8, 43
7ØØ DATA 95, 211, 185, 2Ø5, -1, 11Ø, Ø, 123
71Ø DATA 15, 13, 194, -1, 6Ø, Ø, 2Ø5, -1
72Ø DATA 122, Ø, 12Ø, 183, 25Ø, -1, 34, Ø
73Ø DATA 194, -1, 32, Ø, 33, 154, 255, 17
74Ø DATA -1, 146, Ø, 14, 9, 43, 27, 26
75Ø DATA 174, 194, -1, 14, Ø, 13, 194, -1
76Ø DATA 92, Ø, 193, 2Ø9, 225, 241, 2Ø1, Ø
77Ø DATA Ø, 219, 232, 47, 183, 2Ø2, -1, 119
78Ø DATA Ø, 6, 1, 182, 119, 2Ø1, 42, -1
79Ø DATA 135, Ø, 43, 34, -1, 135, Ø, 124
8ØØ DATA 181, 192, 2Ø5, 36, Ø, Ø, Ø, Ø
81Ø DATA Ø, Ø, Ø, Ø, Ø, Ø, Ø, Ø
```

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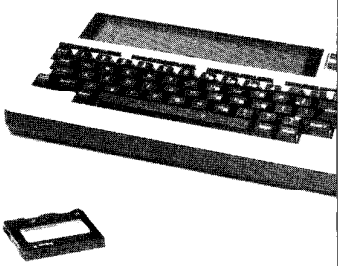

INTERESTED . . .

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.

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Manufacturer's Specifications

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A&J Micro Drive
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Sunnyvale, CA 94086
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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
Longths: 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

SENTRY from page 8

menu returns, reporting that SENTRY is indeed installed.

Now press E to end the program and exit to the Model 100's MENU. You're done; now let's test it. Turn off the machine, and turn it back on. It appears that nothing happens. (Depending on your viewing angle, you may see the LCD screen darken a bit.) SENTRY is waiting for your "abc" key combination to be pressed and released. You have 30 seconds. Press all three keys together and release.

> SENTRY will provide good security for most users.

When you release the keys, the main MENU comes up, and you have full control of the machine. That's all there is to it! Should you "time out," you'll have to switch the power back on and try again. Try it from TEXT, BASIC or anywhere else.

Once SENTRY.CO has been installed, you can remove SENTRY.BA until you decide to change your combination or remove SENTRY.CO altogether. To change your combination, you must first Remove the existing SENTRY.CO and then use Install to create the new combination. Then End the program and you're done.

CAUTION! (You knew this was coming, didn't you?) There are a few very important points to remember. First, SENTRY is unforgiving; that's what makes it so effective. If you forget your combination, tough cookies! Better hope you made backups!

Second, the Install routine in SENTRY.BA is in BASIC, so it takes a bit of time to record your key pattern. Be sure to press only the keys you want, being careful not to press any undesired keys, even momentarily. And make sure you hold the desired keys down for at least ¼ second (longer is fine!) before you release them. Otherwise, SENTRY.BA may record more or less keys than you expected. When in doubt, press R to remove SENTRY.CO and start over again with Install.

Third, since SENTRY.CO resides in high memory, it's very important to keep it protected. Any programs that CLEARxxx,MAXRAM or don't otherwise respect HIMEM can leave SENTRY vulnerable. Should it get overwritten, your next power-up could take

your machine to "Happy New Year, 1900!" Either modify the offending programs to respect HIMEM, or Remove SENTRY before running them.

THE ORDER OF THINGS

A final point; when SENTRY.BA records your combination it begins scanning the keyboard, and once it detects the first key press, it records that key and every other one pressed until all keys have been released. This means that while holding just one key down, you can press and release any others, and they will also be recorded. When you finally release that first key, *all* the keys pressed are part of the combination. Pressing CAPS LOCK would satisfy the requirement that there is always at least one key down. Thus, you could theoretically use an entire sentence (or the Gettysburg Address) as your combination, although you're sure to tire of it quickly!

Also, you can "hopscotch" the keys in your combination. Using "abc" as an example, you can press a, then while holding that down, press b and then release a. Now while b is down, press c. Then release b, then c, or release b and c together. Again, as long as at least one key is down, SENTRY is recording.

Since SENTRY.BA reads the keyboard matrix, pressing a key twice has no effect; "JJJ" is equal to "J""as far as SENTRY is concerned. For the same reason, the order of keys pressed is immaterial — as long as you press them all and don't press any extras, you'll get in. All of these additional notes apply to SENTRY.CO as well.

Keep in mind that SENTRY works each time you power up. So if you're in the middle of TEXT and step out for a coffee, and your machine does its automatic power-off in the meantime, don't panic when you throw the power switch and nothing happens. Just press your combination, and you'll wind up in TEXT again, right where you left off.

SENTRY will provide good, hassle-free security for most users. If some knowledgeable individual is really determined to get your data, there are still ways to do it. Fortunately, there are ways to make SENTRY even more secure, but they are beyond the scope of this article. If you need more protection than SENTRY provides, contact me. The rest of you — enjoy!□

Mike Nugent is a professional musician, a freelance programmer/consultant and, just possibly, a freelance writer as well. He lives in Monroe, Michigan.

Circle 7 on Reader Service Card

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SO SIMPLE

Circle 50 on Reader Service Card

the Model 100 with me everywhere (purchased over one year ago) and plan to continue using it.

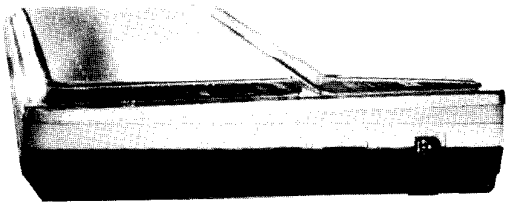
It should be realized that making notes is important and helpful when set to a realistic schedule and as long as they are actually used. Too many notes are a burden and self defeating. But having a selected number of integrated, concise reminders is a tremendous help, especially if your activities include a large number of individual ones: civic group meetings and programs; regular work-related deadlines; professional society functions; consulting activities (a form of moonlighting); and don't forget those birthdays and anniversaries. Ray Mendenhall's

> CALNDR allows the specification of a month in the next century.

Listing 1. The following is the complete CALNDR program by Ray Mendenhall incorporating additions by Wartan Jemian.

```
1000 ' CALNDR
1010 ' Original program by R. E. Mendenhall
1030 ' Editing functions by W. A. Jemian
1060 CLS
    :CLEAR
1070 DIM M$(12)
1080 DATA TU, WD, TH, , FR, SA, , SU, MO
1090 DATA JAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP,OCT,NOV,DEC
1100 DATA SU, MO, TU, WD, TH, FR, SA
1110 FOR N = 0 TO 8
    :READ DA$(N)
    :NEXT
1120 FOR N = 1 TO 12
    :READ M$(N)
    :NEXT
1130 FOR N = 1 TO 7
    :READ DB$(N)
    :NEXT
1140 M(1) = VAL(LEFT$(DATE$, 2))
1150 Y(1) = VAL(RIGHT$(DATE$, 2)) + 1900
1160 CD = VAL(MID$(DATE$, 4, 2))
1170 CLS
    :M(2) = M(1) + 1
    :Y(2) = Y(1)
1180 FOR N = 1 TO 2
1190 IF M(N) > 2 THEN 1210
```


THIS HARD COVER



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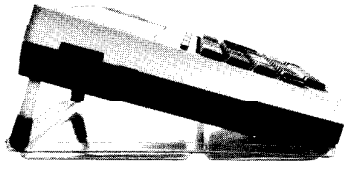

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Circle 62 on Reader Service Card

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PROMPTEXT eliminates the tedium of typing headings or field labels over and over again in TEXT mode and the possibility of forgetting something. The program supplies prompts you have previously created. Each time you enter your response, both the prompt and the response are stored in the destination file. The stored prompts provide convenient "handles" for data retrieval and data processing.

A single keystroke then takes you directly into TEXT mode so you can add comments or make changes. Three keystrokes take you back to PROMPTEXT to continue. Other single keystrokes give you such handy information as the time and the amount of memory left. And one keystroke takes you into TELCOM to upload your file to another computer.

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Circle 16 on Reader Service Card

```
1200 A = 0
    :B = Y(N) - 1
    :GOTO 1220
1210 A = INT(.4 * M(N) + 2.3)
    :B = Y(N)
1220 T(N) = 365 * Y(N) + 31 * (M(N) - 1) + 1 + INT(B/4)-A
1230 NEXT N
1240 T = T(2) - T(1)
    :T(1) = T(1) - 694341
1250 T(1) = INT((T(1) / 7 - INT(T(1) / 7)) * 10)
1260 FOR N = 1 TO 7
1270 IF DA$(T(1)) = DB$(N) THEN 1290
1280 NEXT N
1290 D = 1
    :D1 = N
1300 PRINT "     ";M$(M(1));"  ";Y(1)
1310 FOR N = 1 TO 7
    :PRINT DB$(N);" ";
    :NEXT
1320 PRINT
1330 FOR N = 1 TO 7
1340 IF Z > 0 OR N >= D1 THEN 1360
1350 PRINT "   ";
    :GOTO 1440
1360 IF D <> CD THEN 1420
1370 PRINT CHR$(27)"p";
1380 PRINT USING "##";D;
1390 PRINT CHR$(27)"q";
1400 PRINT " ";
```

CALNDR.BA program, with these additions, does a terrific job.

EXTRA MENUS MAKE IT EASY

Program CALNDR was extended to include editing functions for the reference file, NOTE.DO. The program listed in the original article was modified by the addition of line 555: PRINT@262, "KEY F7: UPDATE", then changing the GOSUB list in line 580 (580 ON KEY GOSUB 600, 630, 660, 780, 720, 2300, 1020) and by inserting new lines 1020 through 2300 in place of line 1020.

Two new menus are provided while maintaining the original calendar and menu. The second menu is reached by function key 7, which toggles control between the two menus. Function key 6 serves the same function of stopping program execution from both menus. The third menu is displayed as part of the REVIEW operation which is selected from the second menu.

Lines 1020 through 1120 control the second menu. Except for F6 and F7, the function keys all have new operations.

ADD is a simple routine to allow the addition of new items to file NOTE.DO. Lines 1130-1200 complete this opera-

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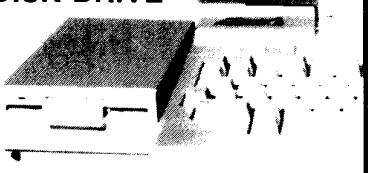

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Circle 20 on Reader Service Card

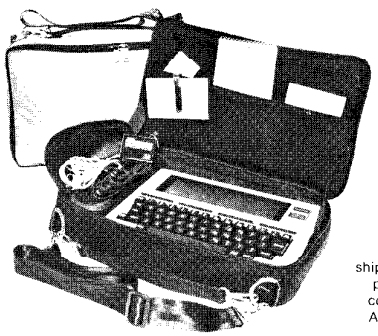
tion. A feature of this and other routines is that the MO/DA/YRc date string includes position 9 to designate the century. This was added since Mendenhall's original formula provides for the years 1901-2099. The only limitation is in the "today's appointments" facility of the original section of the program. As an example, 3 August 1985 is represented by "08/03/85" or "08/03/850" and 3 August 2085 by "08/03/851." These strings are used in formulating serial numbers for operations described later.

CLEAR is listed in lines 1210-1400. The serial number is computed from the current date and compared with a similar serial number computed for the date of each item in NOTE.DO. The serial is not a Julian calendar date. If the serial of the item is equal to or greater than the current date serial, the item is stored in a new file NOAT.DO. If this file already exists the contents will be included since the file is opened for appending.

This affords the opportunity to save the contents but is a possible source of confusion. NOAT.DO is effectively a reserved file name. When all items have been considered, the files are

```
141Ø GOTO 143Ø
142Ø PRINT USING "## ";D;
143Ø D = D + 1
    :IF D > T THEN 146Ø
144Ø NEXT N
145Ø PRINT
    :Z = 1
    :GOTO 133Ø
146Ø PRINT @ 22, "KEY F1
    :NEXT MONTH"
147Ø PRINT @ 62, "KEY F2
    :PREV MONTH"
148Ø PRINT @ 1Ø2, "KEY F3
    :NEW MO / YR "
149Ø PRINT @ 142, "KEY F4
    :APPS TO DAY"
15ØØ PRINT @ 182, "KEY F5
    :APPS OTHER"
151Ø PRINT @ 222, "KEY F6
    :STOP PRGRM"
152Ø PRINT @ 262, "KEY F7
    :UPDATE"
153Ø LINE(125, Ø) - (126, 63), 1, BF
154Ø KEY ON
    :Z = Ø
155Ø ON KEYGOSUB6ØØ, 63Ø, 66Ø, 78Ø, 72Ø, 23ØØ, 1Ø2Ø
156Ø IF INKEY$ = "" THEN 156Ø
157Ø IF M(1) + 1 > 12 THEN 159Ø
158Ø M(1) = M(1) + 1
```


PORTABILITY



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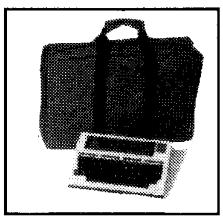
Circle 21 on Reader Service Card



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Circle 12 on Reader Service Card

```
    :GOTO 1170
1590 M(1) = 1
    :Y(1) = Y(1) + 1
    :GOTO 1170
1600 IF M(1) - 1 = 0 THEN 1620
1610 M(1) = M(1) - 1
    :GOTO 1170
1620 M(1) - 12
    :Y(1) = Y(1) - 1
    :GOTO 1170
1630 CLS
    :PRINT
    :PRINT
1640 INPUT "ENTER MONTH (1 - 12)";M(1)
1650 IF M(1) < 1 OR M(1) > 12 THEN 1630
1660 INPUT "ENTER YEAR (1901 - 2099)";Y(1)
1670 IF Y(1) < 1901 OR Y(1) > 2099 THEN 1660
1680 GOTO 1170
1690 PRINT @ 302, "                    ";
1700 PRINT @ 262, "                    ";
1710 PRINT CHR$(27)"p";
1720 PRINT @ 262, "ENTER DATE";
1730 INPUTCD
1740 PRINT CHR$(27)"q";
1750 OPEN "NOTE.DO" FOR INPUT AS 1
1760 PRINT @ 302, "                    ";
1770 INPUT #1, A$
1780 M2 = VAL(MID$(A$, 1, 2))
1790 D2 = VAL(MID$(A$, 4, 2))
```

closed, NOTE.DO is killed and NOAT.DO is renamed as NOTE.DO. All items relating to dates prior to "today" will then have been removed. There is one further opportunity to eliminate items under the REVIEW facility that is described next. Note that the original file is not deleted until the replacement file is completely formed.

> Making notes is important and helpful when set to a schedule.

REVIEW, which is listed in lines 1410-1650, allows the performance of a number of operations on items in NOTE.DO in a month that is specified by a routine similar to that used in selecting a NEW MO/YR from the first menu. The month is entered with one or two digits and the year with a string of four digits. This allows the specification of a month in the next century.

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Circle 18 on Reader Service Card

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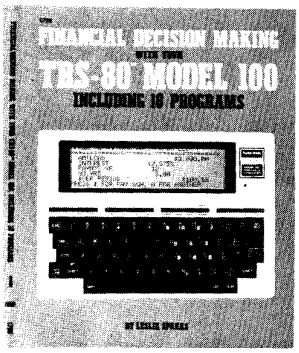

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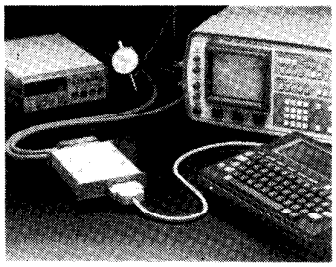
Circle 66 on Reader Service Card

Circle 29 on Reader Service Card

GPIB



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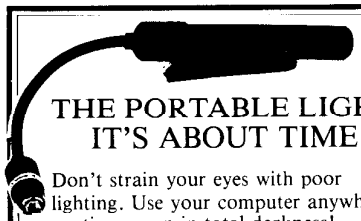

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Circle 17 on Reader Service Card

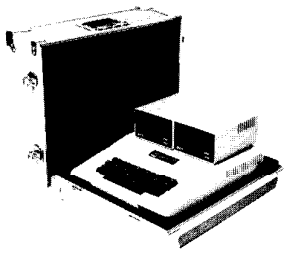
DATEBOOK

```
18ØØ IF M2 = M(1)ANDD2 = CD THEN 182Ø
181Ø GOTO 188Ø
182Ø IF H = 1 THEN 184Ø
183Ø CLS
184Ø PRINT A$
185Ø PRINT "       PRESS ENTER TO CONTINUE"
186Ø H = 1
187Ø IF INKEY$ = "" THEN 187Ø
188Ø IF EOF(1) THEN 19ØØ
189Ø GOTO 177Ø
19ØØ IF H = 1 THEN 195Ø
191Ø PRINT CHR$(27)"p";
192Ø PRINT @ 3Ø2, "NO APMNTS";M(1);CD;
193Ø PRINT CHR$(27)"q";
194Ø CLOSE
    :GOTO 154Ø
195Ø PRINT "NO FURTHER APPOINTMENTS - PRESS ENTER"
196Ø H = Ø
197Ø IF INKEY$ = "" THEN 197Ø
198Ø CLOSE
    :GOTO 117Ø
199Ø PRINT @ 22, "KEY F1
    :ADD       "
2ØØØ PRINT @ 62, "KEY F2
    :CLEAR     "
2Ø1Ø PRINT @ 1Ø2, "KEY F3
    :REVIEW    "
2Ø2Ø PRINT @ 142, "KEY F4
    :SORT      "
2Ø3Ø PRINT @ 182, "KEY F5
    :SEARCH    "
2Ø4Ø PRINT @ 222, "KEY F6
    :STOP      "
2Ø5Ø PRINT @ 262, "KEY F7
    :RETURN"
2Ø6Ø LINE (125, Ø) - (126, 63), 1, BF
2Ø7Ø KEY ON
2Ø8Ø ON KEY GOSUB 21ØØ, 218Ø, 238Ø, 263Ø, 3Ø7Ø, 327Ø, 146Ø
2Ø9Ø IF INKEY$ = "" THEN 2Ø9Ø
21ØØ CLS
211Ø OPEN "NOTE.DO" FOR APPEND AS 1
212Ø INPUT "WRITE 'MO / DA / YR' & NEW LISTING"; LT$
    :LT$ = LT$ + ","
213Ø PRINT #1, LT$
214Ø Y$ = ""
    :INPUT "ENTER 'Y' TO ADD MORE LISTINGS"; Y$
215Ø IF Y$ = "Y" OR Y$ = "y" THEN GOTO 212Ø
216Ø CLOSE
217Ø GOTO 117Ø
218Ø OPEN "NOTE.DO" FOR INPUT AS 1
219Ø OPEN "NOAT.DO" FOR APPEND AS 2
22ØØ MT = VAL(LEFT$(DATE$, 2))
221Ø YT = VAL(RIGHT$(DATE$, 2))
222Ø CT = VAL(MID$(DATE$, 4, 2))
223Ø DE = CT + (MT - 1) * 32 + YT * 1ØØØ
224Ø PRINT CHR$(27) "p";
225Ø PRINT @ 3Ø2, " CLEARING ";
226Ø PRINT CHR$(27) "q";
227Ø INPUT #1, A$, X$
    :A$ = A$ + ","
228Ø IF EOF(1) THEN 236Ø
229Ø MT = VAL(LEFT$(A$, 2))
23ØØ YT = VAL(MID$(A$, 7, 2))
231Ø CT = VAL(MID$(A$, 4, 2))
232Ø CE = VAL(MID$(A$, 9, 1))
233Ø DS = CT + (MT - 1) * 32 + YT * 1ØØØ
```

```
2340 IF DS >= DE THEN PRINT #2, A$
2350 GOTO 2270
2360 CLOSE
    :KILL "NOTE.DO"
    :NAME "RAM
    :NOAT.DO" AS "RAM
    :NOTE.DO"
2370 GOTO 1170
2380 OPEN "NOTE.DO" FOR INPUT AS 1
2390 OPEN "NOAT.DO" FOR APPEND AS 2
2400 CLS
    :PRINT
    :PRINT
    :INPUT "ENTER MONTH (1 - 12)"; MT
    :IF MT < 1 OR MT > 12 THEN 2410
2410 INPUT "ENTER YEAR (1901 - 2099)"; YT
2420 IF YT < 1901 OR YT > 2099 THEN 2410
2430 CE = INT(YT / 100)
2440 YT = (YT - CE * 100)
2450 CE = CE - 19
2460 DE = MT + YT * 100 + CE * 10000
2470 INPUT #1, A$, X$
    :A$ = A$ + ","
2480 MT = VAL(LEFT$(A$, 2))
2490 YT = VAL(MID$(A$, 7, 2))
2500 CE = VAL(MID$(A$, 9, 1))
2510 DS = MT + YT * 100 + CE * 10000
2520 CLS
    :IF DS = DE THEN PRINT @ 40, A$ ELSE 2600
2530 PRINT @ 280, " KEEP  REDATE   REWRITE   DELETE  KEEP";
2540 KEY ON
2550 ON KEY GOSUB 2600, 2580, 2580, 2590, 2590,
     2610, 2610, 2600
2560 IF INKEY$ = "" THEN 2560
2570 GOTO 2540
2580 CLS
    :PRINT @ 40, " "
    :INPUT "ENTER NEW MO/DA/YR TO BE ADDED TO ITEM"; MY$
    :MID$(A$, 1) = MY$
    :GOTO 2600
2590 CLS
    :PRINT @ 40, A$
    :INPUT "ENTER COMPLETE STRING"; MY$
    :A$ = MY$ + ","
2600 PRINT #2, A$
2610 IF EOF(1) THEN 2360
2620 GOTO 2470
2630 CLS
2640 PRINT @ 80, "  ENTER S TO RAGE SPACE "
2650 INPUT "  ( TRY 3000 ) "; SZE
2660 CLEAR SZE
2670 OPEN "NOTE.DO" FOR INPUT AS 1
2680 I = 0
2690 INPUT #1, A$, X$
    :I = I + 1
2700 IF EOF(1) THEN 2720
2710 GOTO 2690
2720 CLOSE 1
2730 DIM TP$(I), TP(I)
2740 OPEN "NOTE.DO" FOR INPUT AS 1
2750 MIN = 99999
    :FOR N = 1 TO I
2760 INPUT #1, A$, X$
    :TP$(N) = A$ + ","
2770 MT = VAL(LEFT$(A$, 2))
2780 YT = VAL(MID$(A$, 7, 2))
```

Circle 11 on Reader Service Card

PROTECT YOUR APPLE . . .



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Circle 23 on Reader Service Card

Serial numbers are computed from the specified month and year and from the corresponding values in the MO/DA /YRc string of each item. Serial numbers are different for REVIEW and CLEAR.

The third menu is presented along with each item in the proper period. The item can be read in its entirety. However it is restricted to a length of 256 bytes. The choices are displayed close to the lower border of the screen, similar to one of the standard LABEL displays of the Model 100.

KEEP (lines 1630-1650) is selected by either function key 1 or 8 (to free right- or left-handed persons to use their other hand for other purposes such as following a list). It allows the item to be stored in NOAT.DO, which is opened again for this REVIEW operation. Any item from NOTE.DO that is not in the chosen period is immediately copied into NOAT.DO without display or comment. GOTO 1570 prevents falling into the REDATE sequence if the wrong key (other than a function key) is depressed.

The REDATE (lines 1610-1650) sequence replaces the previous date (and any following blanks) with a new date sequence. It is advisable to follow the

```
2790 CT = VAL(MID$(A$, 4, 2))
2800 CE = VAL(MID$(A$, 9, 1))
2810 TP(N) = CT + (MT - 1) * 32 + YT * 1000 + CE *
     10000
2820 IF TP(N) < MIN THEN MIN = TP(N)
2830 NEXT N
2840 CLOSE
2850 OPEN "NOAT.DO" FOR APPEND AS 2
2860 JI = 0
2870 FOR N = 1 TO I
2880 TEMP = 99999
2890 FOR J = 1 TO I
2900 JJ = J + JI
    :IF JJ > I THEN 3020
2910 IF TP(JJ) < TEMP AND TP(JJ) > MIN THEN TEMP =
     TP(JJ)
2920 IF TP(JJ) <> MIN THEN 3010
2930 PRINT #2, TP$(JJ)
2940 FOR L = 1 TO J - 1
2950 OL = J + JI - L
2960 NU = OL + 1
2970 TP(NU) = TP(OL)
    :TP$(NU) = TP$(OL)
2980 NEXT L
2990 JI = JI + 1
3000 GOTO 2900
3010 NEXT J
3020 MIN = TEMP
    :NEXT N
3030 CLOSE
```


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Circle 9 on Reader Service Card

```
3040 KILL "NOTE.DO"
3050 NAME "NOAT.DO" AS "NOTE.DO"
3060 GOTO 1060
3070 OPEN "NOTE.DO" FOR INPUT AS 1
3080 CLS
    :J = 0
3090 PRINT @ 80, " "
3100 INPUT "  ENTER STRING"; TR$
3110 LH = LEN(TR$)
3120 INPUT #1, A$
3130 IF EOF(1) THEN J = 1
3140 LT = LEN(A$)
3150 FOR N = 1 TO LT - LH + 1
3160 IF MID$(A$, N, LH) = TR$ THEN 3200
3170 NEXT N
3180 IF J = 1 THEN 3240
3190 GOTO 3120
3200 CLS
3210 PRINT @ 80, A$
    :PRINT @ 250, "PRESS ENTER FOR MORE"
3220 IF INKEY$ = "" THEN 3220
3230 GOTO 3120
3240 CLS
    :PRINT @ 82, "STRING "; TR$;" NOT FOUND - PRESS
     ENTER"
3250 IF INKEY$ = "" THEN 3250
3260 CLOSE
    :GOTO 1170
3270 CLS
    :END
```

date string with extra blank spaces for ease in reading the item.

REWRITE (lines 1620-1650) replaces the previous string with one that is entered during this operation. The old item is displayed for reference in the rewrite screen. The new item is stored in NOAT.DO in place of the old.

DELETE simply bypasses the item displayed. The program selects the next item from NOTE.DO unless the file has been closed. The next item selected is either copied into NOAT.DO or displayed with the same options offered with the previous items.

Each operation, REDATE, REWRITE and DELETE, can be selected by depressing either nearby key (an advantage for those with wide fingers or a dilemma for those who cannot make decisions).

At the end of file NOTE.DO the files are closed, NOTE.DO is killed and replaced by NOAT.DO.

HELP ORGANIZE PERMANENT RECORDS

SORT, which is listed in lines 1660-2090, rearranges and lists the items by date. Multiple items on the same date are not reordered for that date. The

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Bon Appetit

procedure involves dimensioning storage space for the necessary strings after they are counted (lines 1710-1760). This requires the allocation of more space and the program asks for this value. Three thousand bytes are suggested, but if this is not sufficient, a larger number can be specified after re-entering this mode by typing F4 followed by F7 and F4 again. NOAT.DO is not opened until after this space has been successfully allocated.

> The solution, was to have those editorial functions available in CALNDR.

This SORTing facility is very handy. It allows the file to be ordered prior to listing or printing. It also can be used to isolate and reorder items by first REDATEing and then SORTing, which extends the application of CALNDR to report writing. The regrouped items can then be copied into another document using the CUT and PASTE utilities in TEXT.

The final operation in SORT is the elimination of NOTE.DO and renaming NOAT.DO. Control is returned through the beginning of the program at line 100. This reallocates space.

SEARCH is the last of the added facilities. This sequence is listed in lines 2100-2290. The user is prompted for the string. Each item that contains the string is displayed. There are no options for editing. Multiple occurrences of the string do not produce multiple displays of the same item.

It should be noted that NOTE.DO requires a strict adherence to a few points of format. The date string should be in the MO/DA/YRc form to correspond with the date string of the Model 100. The "c" digit is only required to be blank or a digit. It is good practice to separate the text and date by a string of spaces. Both commas, "," and carriage returns, " ^M" are delimiters for strings. Therefore do not use either within the item. Also, do not include any extra carriage return symbols after the items in NOTE.DO, since these will cause an EF (Input Past End of File) error. Very simply, use the extended version of CALNDR and these problems will not occur.□

portable 100/200/600

3/86

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

A. In which profession do you use your computer?
1. ☐ Education 2. ☐ Journalism 3. ☐ Law 4. ☐ Medicine
5. ☐ Business 6. ☐ Other _____

B. Do you use your computer to communicate with other computers?
1. ☐ Every day 2. ☐ Once a week 3. ☐ Not at all

C. Which on-line service do you use? 1. ☐ CompuServe 2. ☐ MCI 3. ☐ NewsNet 4. ☐ The Source 5. ☐ Dow Jones 6. ☐ Other _____

D. How much do you use these services each week?
1. ☐ Less than one hour 2. ☐ 1-5 hours 3. ☐ 6-10 hours
4. ☐ More than 10 hours

E. Do you plan to purchase items based on an ad in this issue of Portable 100? 1. ☐ Yes 2. ☐ No 3. ☐ Don't know

F. What software/hardware will you purchase in the next 6 months?
1. ☐ word processing 2. ☐ telecommunications
3. ☐ financial planning 4. ☐ printing 5. ☐ memory expansion
6. ☐ Other _____

G. YES! Sign Me Up for 1 Year for: PORTABLE PROGRAM REVIEW newsletter — $29.97 for 12 issues
☐ Check or MO Enclosed
☐ M/C ☐ Visa #_____ Exp. Date: _____

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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portable 100/200/600

3/86

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

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YOU BE THE EDITOR

Every reader has unique needs. Some seek guidance from reviews of software and peripherals. Others look to a magazine to provide tips to increase their programming proficiency. Accounts of innovative applications attract a big audience, as do articles about other users who find creative ways to use their systems.

You can help tailor **Portable 100/200/600** to your unique needs by rating the articles that appeared in this issue. Just circle the numbers indicated below on the Reader Service Card at left. Rate all the articles, some of them or just one. Then detach the card and drop it into the mail — we pay the postage.

The editors will analyze your feedback and respond by commissioning more articles of the most popular types — and fewer of the losers.

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Checking the Menu

Some early computers had a communications problem: The RS-232 serial port wasn't fully adjustable. It was set for a fixed transmission speed, perhaps, or locked into one protocol, such as seven data bits, one stop bit, mark parity.

Enter the UART: Universal Asynchronous Receiver/Transmitter. Appearing in the early 1970's, the UART allowed software selection of speed and protocol.

The Model 100 and Tandy 200 TELCOM programs program the UART through the STATUS field. A Model 100 status of 87I1E locks the communications port on 9,600 bits per second (bps) at seven data bits, one stop bit, ignoring parity.

Through TELCOM, several other features can be defined:

•The last "E" on the status above tells the Model 100 to use XON/XOFF transfer protocol. With this standard, when one computer receives more data than it can handle, it transmits XOFF (*CHR$(19)*) which tells the sending computer to pause. When it's ready for more data, it sends XON (*CHR$(17)*), allowing the sender that all's clear. It's important that both computers recognize XON/XOFF, otherwise data can be lost during the transmit. If XON/XOFF isn't to be used, the final status character is set to "D".

•Several automatic-dialing and modem connection options are available. Both the Model 100 and Tandy 200 can dial telephone numbers using two pulse speeds — 10 pulses per second or 20 pps. This configuration is set at the end of the TELCOM status field. And, when using the built-in 300-bps modem, a physical switch on the 100 and a status field on the 200 determine whether the modem is to send originating or answering audible tones.

•The F4 key toggles a communications session between full or half-duplex mode. Actually, the Tandy laptops use the duplex setting to control *local echo*. Full-duplex tells the 100 or 200 not to display what is being typed on the keyboard, because the remote computer will echo each character back.

```
100 ' TELCOM.BA by Alan L. Zeichick
110 '
120 ' Memory locations used:
130 '   63066 -- If = 0, then no LF
140 '            If = 1, then LF
150 '   20806 -- Starts TELCOM
160 '
170 KEY 8, "Menu"+CHR$(13)
180 '
190 ' screen display
200 '
210 CLS
220 PRINT @ 10, "TELCOM Pre-execution Menu"
230 PRINT @ 50, "Automatic line feed is ";
240 IF PEEK(63066) THEN PRINT "Off" ELSE PRINT "On "
250 PRINT @ 130, "Esc -- Toggle LF
260 PRINT @ 170, "Enter -- Telcom"
270 PRINT @ 210, "F8 -- Main Menu"
280 '
290 ' Input handling
300 '
310 A$ = INKEY$
320 IF A$ = "" THEN 310
330 IF A$ = "M" OR A$ = "m" THEN MENU
340 IF A$ = CHR$(13) THEN CLS
   :CALL 20806
350 IF A$ <> CHR$(27) THEN 310
360 '
370 PEEK(63033) = 0 THEN POKE 63033, 0 ELSE POKE 63033, 1
380 GOTO 230
```

In half-duplex, the laptop will display what's being typed. So, if double characters — or no characters — appear during a terminal session, try toggling the F4 key.

•A printed transcript of a session is handy, whether for a written log of electronic mail (E-mail) or because the remote computer's tranmsmitting too much data to be stored in RAM. Print echo is toggled by F5 — but be careful only to select print echo if there's a working printer attached to the Model 100 or Tandy 200.

NOT AVAILABLE

One setting that's present in the Tandy 200 status field, but missing from the Model 100, is the ability to toggle the sending of a line feed (*CHR$(10)*) automatically after each carriage return (*CHR$(13)*). Some computers require that the line feed be transmitted; others, like the Tandy laptops, would rather not see the line feed.

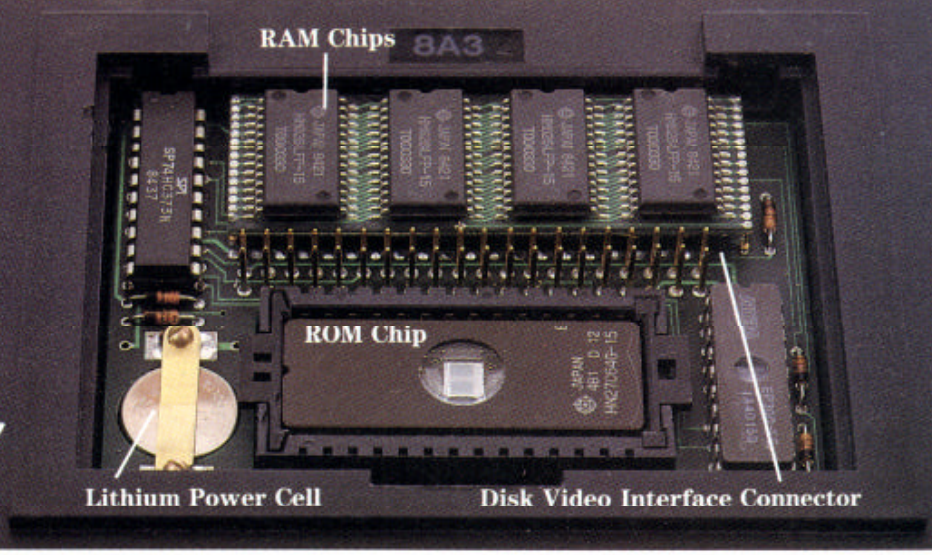
If the line feed is transmitted unnecessarily, an blank line will appear at the remote computer between each line sent. If the line feed is needed but not sent, the remote computer might string all the lines together, overwrite each line — or overflow its buffer and lose data.

That toggle isn't really missing from the 100 — it's just unavailable from the TELCOM status field. By using BASIC's POKE and PEEK commands, the status can be examined and changed.

To make the process easier, use the program TELCOM.BA, which supplies that missing status information.

Running TELCOM.BA displays the status of the line feed transmission flag. Pressing Enter tells the 100 to go directly to TELCOM, the Escape key toggles the linefeed status and F8 returns to the main menu.□

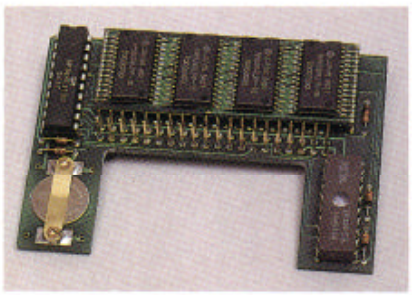
State of The Art RAM Technology



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

64K RAM module — **$375**
32K RAM module — **$250**
If you want only a 32K version of the RAM module, you may upgrade later for only **$150.** The 32K version is constructed exactly as the 64K module.

Data Transfer Program — call

Call us at 313/727-2744, or write. We accept Visa and MasterCard, as well as check or money orders. We ship within five days of receiving your order.

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$199.95

The four best programs for the Model 100 all on one ROM. 32K of power without using any RAM for program storage. This is the PCSG Snap-In ROM that just presses easily into the little ROM socket in the compartment on the back. You access the four right from the main menu like built-ins.

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.

Database: This is a relational data base like no other. You can do everything from mailing lists to invoices. No complicated pseudo-coding, you create input screens as simply as typing into TEXT. You are not limited by size; you can have as large an input screen as you wish. Prints out reports or forms, getting information from as many files as you like. Complete math between fields. Total interface with Lucid worksheets.

Outliner: Does everything that Thinktank does on a PC but a whole lot better. Includes a Sort for your headlines. Lets you have headlines of up to 240 characters. Has cloning, hoisting and sideways scroll up to 250 characters. Like Lucid, this one sets a new standard for outliners. This is the way to plan and organize your projects.

Present Lucid and Write ROM owners can upgrade for $100. If you have both it's $75.

As usual PCSG sells the Super ROM on a thirty day guarantee. If for any reason you are not satisfied, simply return it for a full refund.

We are excited about this product. Super ROM gives the Model 100 the true power of a desktop. No other multi-program ROM has software that compares. But don't take our word for it. We invite you to make that comparison yourself. Priced at $199.95 on Snap-In ROM.

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