VOLUME 3 NUMBER 2 JULY/AUGUST 1984

ADVANCED COMPUTING™

FORMERLY TWO/SIXTEEN

The journal for business, professional, and scientific members of the TRS-80 community

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VOL. 3 NO. 2 JULY/AUGUST 1984

ADVANCED™ COMPUTING

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New RS Products of Interest

On June 11 Don Stanfield of Tandy's New Products/Merchandising in Ft. Worth advised us that a few pre-release test copies of XENIX ver. 01.03.02 are out, and the product that will be released for sale to users is in production and should be in the Computer Centers by July 1.

Ver. 01.03.02's claim to fame is its ability to support remote printing from the DT-1. But don't get too excited; it's still not perfect. XENIX 01.03.02 will permit local printing of MULTIPLAN documents from the terminal; however, it will only print a "dumb document" (e.g., a document with no special print control characters, such as underlining or bold-face) from SCRIPSIT.

DT-1s older than 90 days will have to be retrofitted with the latest EPROM (electronically programmable ROM) in order to make use of remote printing. Any DT-1 shipped from Ft. Worth in the last 90 days has already been equipped with the most recent version of ROM.

(For those who don't want to wait for 01.03.02, XPD from Telexpress, Inc. (Box 217, Willingboro, NJ 08046 609/877-4900) is available now and will support local printing from the DT-1 without any ROM changes. But before you get out your checkbook, be advised that it does not solve the SCRIPSIT problem. XPD also supports local printing from the Models II, 12, 16, and 2000, as long as they are running Teleterm, a TRSDOS communications package, also from Telexpress. Incidentally, Advanced Computing will feature reviews of these two products in our next issue.)

Ver. 01.03.02 also comes with some "bug fixes," including the ability for XENIX to support modems other than Radio Shack modems, and a device driver for the screen.

RS has announced the release of RM/FORTRAN 77. When used with TRS-XENIX, the program is a complete implementation of the most recent ANSI Fortran Standard, known as Fortran 77.

RM/FORTRAN 77 (cat. no. 26-6451) for the Model 16B costs $699.

RS has introduced the DMP-110, a new, high-performance, triple mode, dot matrix printer, featuring letter quality word processing, data processing, and high resolution bit image graphics.

The DMP-110 (cat. no. 26-1271) costs $399.95.

Equipment Exchange

Within this column in months past, we initiated a "machine exchange" service for subscribers who wished to buy and/or sell used II/12/16 equipment. Response has been good and trading brisk.

Present inventory indicates that we have more people interested in buying than selling. If you have any Shack or non-Shack machines or peripherals to sell, this is your opportunity. Give Mark Ingoglia a call, and he'll try to match you up with one of the potential buyers on file.

We're attempting to keep the "equipment for sale" file current so buyers don't have to be phoning around the country needlessly. Would those of you who registered equipment for sale with us and subsequently sold it let Mark know so your names can be removed from the active file.

Hard drive woes

Recently we've noticed the emergence of a disturbing trend. In the past several weeks we've received no less than six phone calls from subscribers complaining about the failure of their RS 15 meg hard disk drives. The attitude of the local RS CCs involved seems to be, "these things happen." But need they happen with such alarming regularity to the same equipment?

One small clue to the drives' erratic behavior has come to light. A subscriber who called to discuss with us his hard drive failure said his CC manager told him the RS 15 meg hard drive is especially susceptible to voltage fluctuations and that if his computer is located in a building known to have power variations, he could expect to see more of the same.

Should others of you be experiencing similar problems, we'd like to know about them. Mail us a description of your hard drive problems, and we'll compile the results and present the evidence to Fort Worth. We'll also publish an article on recovery operations should the response indicate the need.

Advanced Computing on CompuServe

The Jan/Feb issue of Advanced Computing was the last we put online with NewsNet, the online specialized newsletter database out of Bryn Mawr, Pa. We were online with them for a year, and the response from their subscribers to our publication was disappointing and did not warrant our continuing with them.

We did miss our electronic mailbox, though, so we've subscribed to CompuServe to continue sending and receiving electronic mail. Write us at 70035,1667.

Thanks to Dr. Paul Naitoh, a subscriber and contributor to Advanced Computing and an avid electronic communicator (see his article on page 12 in this issue on using Bulletin Board Systems), we now have a method for receiving articles via CIS. Since E-mail restricts textual transmission to 4,000 characters (most articles average 10,000 characters), an alternate method had to be developed. His method involves using the contributor's Personal File Management area and the Public File Access System.

It works! If you would like more details concerning how to send us articles via CIS, contact Barbara Albert at Advanced Computing (717/397-3364). Or send E-Mail!

Model II TRSDOS owners

Many Model II TRSDOS users have written, expressing frustration and anger because they feel we have abandoned them in favor of XENIX users. The following letter is representative of the type of letter we've been receiving, and we're including it here, together with our response, with the hope that those of you who are experiencing the same concerns may receive some reassurance from this dialogue.

"I see by my mail that it is now time to renew my subscription to Advanced Computing. I have decided to continue but it has been a very difficult decision. The hesitancy is a result of the change which the publication has undergone since its conception a few years ago.

"When I became aware of the magazine, my reaction was that here is just the publication I want because every article in other magazines for some reason does not apply to the TRS-80 Model II, or it's for the Model III or I, or for some other reason does not interest me.

"I became aware that, as a BASIC user and experimenter, I was not aware of about one half of the capabilities of my machine. The articles by Kloosterman, Conant, and many others about SVCs, machine language, and so many other useful and interesting topics made me count the days until I received each issue.

"Articles about Unix, XENIX, and CP/M do not interest me. In fact, the last article which I was able to relate to was the one on the recovery of SCRIPSIT files. That was three issues back. I seem to have gone the full circle from publications which missed me completely back around to where I started.

"But I am optimistic that things might change. I hope to continue to subscribe for some time, and I hope our interests drift closer together so I will want to continue."

Our response to this subscriber is as follows:

"I was distressed by your feelings that we have somehow abandoned our Model II users; this simply is not true.

"I'm sorry that articles about XENIX don't interest you, but I think you can understand that as a business computer publication, we have many businessmen who subscribe to the magazine to whom XENIX represents an area of intense interest. You also say that CP/M doesn't interest you, yet one of the beauties of our powerful Radio Shack computers is their ability to run an operating system other than its own TRSDOS.

"I'm not going to tell you we are going to stop publishing articles about XENIX and CP/M because that wouldn't be true. But I don't think we have stopped publishing articles of interest to TRSDOS users, or BASIC programmers, or anyone else still using a Model II. We use our Model II every day of the week, all day long; it's the most fabulous work horse imaginable.

"If and when we ever get the revenues from subscribers and advertisers to allow us to expand the size of the magazine, then perhaps we'll be able to include more articles of interest for Model II TRSDOS users exclusively."

New version of BASTOC

JMI Software Consultants, Inc. have announced the July availability of version 1.5 of BASTOC, the BASIC to C translator. This new version of BASTOC will support the complete CBASIC compiler dialect, in addition to the currently supported MicroSoft Disk BASIC.

For more information, contact: JMI Software Consultants, Inc., P.O. Box 481, Spring House, PA 19477 (215/628-0840).

Computer Clubs

A computer club has been formed on Hellenikon Air Base in Greece. Contact Paul A. Mullens, c/o Olympian Computer Club, Box 4277, APO NY, NY 09223

Robert C. Stockler has started a Model II/12/16 users group in Louisville, KY. Find out more from him at Gates, Stockler & Lenz, Inc., 4014-C Dutchman's Lane, Louisville, KY 40207.

II/12/16 users in the Puget Sound area of Washington may be interested in the users group there. Contact Frank G. Higgins, 9510 18th Avenue, N.W., Seattle, WA 98117.

Tandygraph for XENIX

David Ray has developed a software package that converts the TRSDOS Tandygraph program into a program that runs under XENIX. After installation, the Tandygraph program functions as under TRSDOS, except that all output is spooled to the plotter, enabling the plotter to be supported in a multiuser environment.

Since the basic Tandygraph program bears the Houston Instruments copyright, the purchaser must already have the TRSDOS Tandygraph program.

Cost of this program is $250. For more details, contact David Ray, CPA, 1301 Northwest Highway, Suite 210, Garland, TX 75041.

RS Promotions

A recent News Release from Radio Shack Publicity announces that Van Chandler has been appointed Director of Merchandising, Business Computer Products. His responsibilities in this position include supervision of the full line of TRS-80 business computers, including the Tandy 2000, the Model 16B, and the Model 12, plus printers and software product planning.

Mr. Chandler was appointed to this position after Ed Juge was promoted to Director of Market Planning.

Tandy 2000

And speaking of Ed Juge, we received a letter from him concerning the relative abilities of the Tandy 2000. He writes:

"Creative Solutions, Inc. of Ann Arbor, MI specializes in CPA Client Write-Up software. In their March/April newsletter, "The Balance Sheet," they publish benchmark comparisons for the IBM-XT and the Tandy 2000. Their tests were unique in that they were based not on test algorythms, but on printing of actual transaction reports, general ledgers, and financial statements. In all 9 tests, the 2000 was fastest. Our closest race was Tandy 2:09 vs. IBM 2:22. Best was 3:04 vs. 6:44, clocked from main menu choice to return to main menu. Print output was routed to a hardware spooler so printer choice would not affect timing.

"Our software people recently set up identical 3x200 Lotus 1-2-3 spreadsheets on the PC and 2000 and found the PC took 9.5 seconds vs. only 3 on the 2000. Sorting of 172 database items on 1-2-3 timed at 5 seconds vs. 2.

"You might also like to know that over 100 software products are under consideration for the 2000 through our Express Order Software program. Already available are Word Perfect, Data Ace, WordStar, MultiMate, and Accounting Partner. Others are coming very soon. All in all, it promises to be a very exciting summer for the Tandy 2000."

Farewell, TRS-80 Microcomputer News

If you subscribe to TRS-80 Microcomputer News, you've already seen its final issue (June 1984). Their reason for going out of business is that the other eight publications devoted exclusively to covering the TRS-80 computers do such good jobs that TRS-80 Microcomputer News "became redundant" (their words).

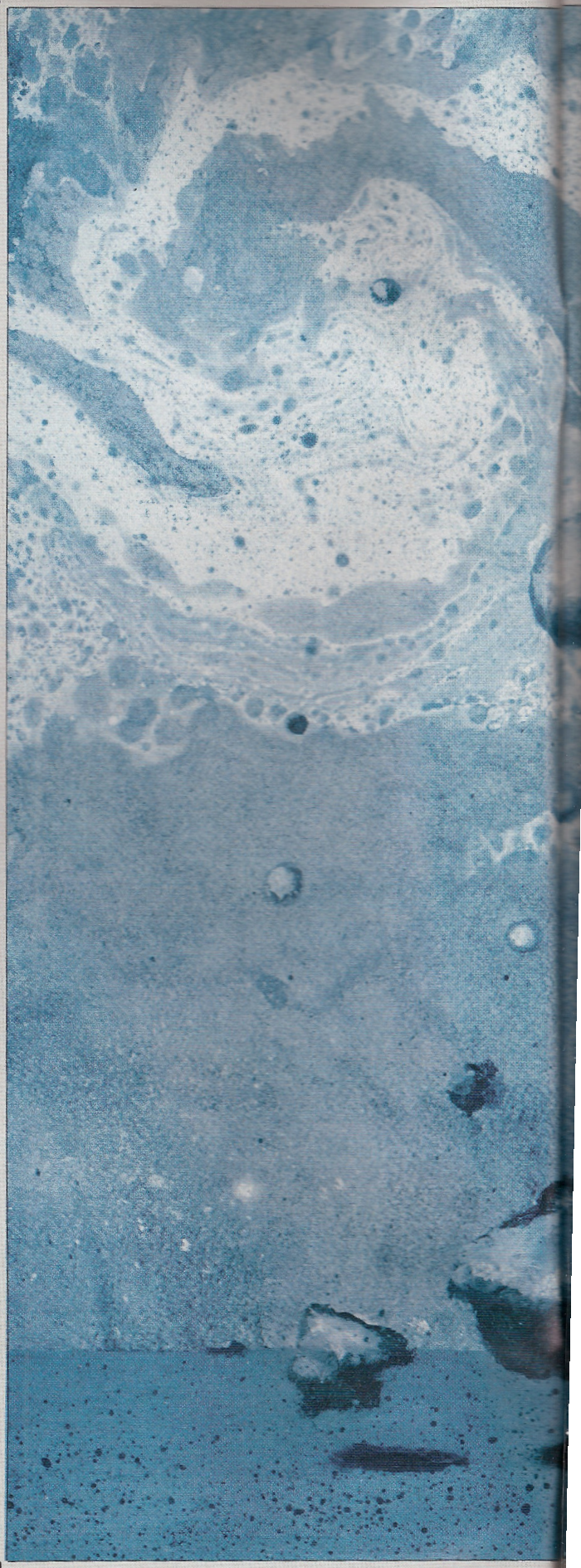
Subscribers to TRS-80 Microcomputer News will have their unexpired subscriptions fulfilled by any one of eight TRS-80 support magazines (Advanced Computing, Color Computer, Computer User, Hot CoCo, 80 Micro, Portable 100, PCM, and The Rainbow); the choice is left to the subscriber.

Tandy's support for the surviving magazines is to increase their advertising volume and to retain the existing TRS-80 Microcomputer News staff so that information available from within Tandy Towers will continue to be available through the magazines. We're compiling a "wish list" of articles we want to receive from former Microcomputer News staffers; drop us a line if you have any suggestions you'd like to add.

We're hoping to see a substantial increase in the number of subscribers to our magazine within the next several months. Subscribers to TRS-80 Microcomputer News must return a card indicating to which magazine they choose to have their subscription transferred, and these cards must be returned to Ft. Worth by July 31. We should begin to receive returns on these cards during July, and by the end of August (about the time our next issue comes out), we should have the whole picture.

Although Tandy does not have specific figures concerning how many subscribers to their publication are Model II/12/16 owners, their conservative estimate is 30,000. We'll keep you advised.

THE VERITAS 8 MHz DPO



In the January 1984 issue of *Advanced Computing* (Vol. 2, No. 4, p. 42) Robert VanNatta gave a preliminary report on the standard 5 MHz DPO (Dual Processor Option) board from Veritas Technology, Inc., using only a poor BASIC (Personal BASIC from Digital Research). I feel that this product is deserving of much greater testing, utilizing software at its top of the line.

I purchased an 8 MHz 256K DPO from Veritas in February and have been putting it through its paces with a variety of commercial software on my own Model 16a, as well as discussing it with the folks at Veritas.

For those who don't care to read long discursive reviews, here's the summary of my findings at the start in a short and sweet paragraph:

The hardware is incredible and powerful and free of problems; the supplied (and up to now, the only) DOS is detestable. This is a great product being sabotaged by its own designers.

The fact is, the Veritas board in its fast and large RAM configuration essentially turns a Model II or 16a into a Compupro 8/16, and that's high praise indeed. If I buy another computer, it will be that one from Compupro, but if the problems with Veritas can be solved (and I think they can), I may not need to.

By Jack Chalker

ILLUSTRATION BY JOHN DE VLIEGER

Problems with Models 12/16b

First, a caveat: the DPO doesn't work very well with the Model 12 nor with any but the initial batch of 16bs. Radio Shack changed the entire electrical configuration of the mother board for the 12 and 16b and has released no schematics or technical details and has so far refused to supply this information to anyone, particularly third party board suppliers like Veritas. There is a harried programmer named Dwayne Hendricks at Veritas who is growing very old and very frustrated trying to crack the secret of that new board.

However, in my Model 16a and in all Model IIs, the board installs in from thirty seconds to three minutes; it just snapps into the first unoccupied slot in the internal card cage, and works just fine.

Two DPO Versions

The DPO comes in two versions, the 5 and 8 MHz, either available in a 128K or 256K model. The 5 MHz version also offers an optional 8087 coprocessor; the 8087 simply won't run any faster. There is very little software available for the 8087, and I suspect it's not worth the bother; if you really need that kind of number crunching capability, there are better ways to go than the 8087 anyway.

I selected the 8 MHz model with full memory. I find no advantage to a 5 MHz board, since its differential in speed with the 4 MHz Z-80 is not enough to notice and the software available for it is essentially identical. Since the primary attraction of the board to me was speed, it made no sense to get a fast clock and not give it enough memory to really use that speed to best advantage.

The board works amazingly well, as if made by Tandy for the machines. It uses the Z-80 as a slave I/O manager, but beyond that is a totally self-contained computer. It is completely turned off unless activated by software and is transparent when using any other than its own operating system.

Supplied CP/M-86

The initial board comes with CP/M-86 and nothing else, and the version supplied looks customized and pretty but is actually an extremely basic version, so basic, in fact, that it will not run any commercially available software without bad, and in some cases dangerous, glitches -- it if runs it at all.

As an early purchaser I understood I was something of a paying guinea pig, but I expected bugs, not really an incomplete operating system that is useful only for programming from WordStar in the non-document mode.

The two major users of 8" CP/M-86, DEC and Compupro, offer complete versions only, and all commercial software is angled to them. Indeed, Veritas chose to emulate the DEC VT-52 with their DOS because virtually all commercially available CP/M-86 has that as an installation option. The very few that do not are customized easily using Veritas' supplied codes.

The DPO board is twice the computer of an IBM PC and is, in fact, more like the Tandy 2000 in speed, yet you don't have to learn a new keyboard or even buy any other peripherals.

The supplied version of CP/M-86 was thrown in free when I bought the board. I feel as if I was overcharged. Not that it looks incomplete -- booting the DOS disk, you first get a complete IBM-style diagnostic test which some folks dislike but I find reassuring. After ten seconds or so, up comes a really nice looking graphic logo and the usual copyrights, along with a status report on the system. For example, if you have an 8087 installed, it'll tell you if it's on or offline. Then you get to the familiar A> prompt, and as long as you remember that .COM is now .CMD when PIPping or whatever, there is no difference to the user between, say, P&T and Veritas CP/M-86. If you know one, you know the other.

The usual utilities are here as well, although Veritas chose to do a few things differently. The format is the standard IBM 8" 1024 byte sectors, and supports single and double density and single and double sided disks. In addition, this version will read and write P&T 2.2 disks, but the originally supplied version read only single sided P&T. The new Beta test DOS I received does, however, read double sided P&T, so this has obviously been fixed and is a welcome debug.

SETUP allows you to set the system options, from drive step rates to the I/O parameters, and also allows an Autoexec line written as a specific Submit file, but you should ignore it because the DPO does. The Autoexec just doesn't work, and Submit is intermittent. Cursor control is good, and drive set allows us 16a owners to take full advantage of the 3 MS-capable thinline drives we have. There is also a hard disk utility that's quite nice, treating each disk as a separate drive and theoretically allowing DOSes to mix so long as you remember which is which, although it supports only the Radio Shack 8 and 12 meg drives in the supplied version. The newer revision might handle 15 meg drives; I have no way of telling since I don't have one. Both XON/XOFF and EXC/ACK are supported, although both my Anderson Jacobson and a friend's NEC Spinwriter prefer the latter.

CP/M-86, as supplied, has no provision for changing the I/O byte. LST is set up for the parallel port, and if you have a serial printer, you must manually key in STAT LST:=UL1 every time you cold boot. Neither Setup's freeze command, not Autoexec, nor Submit will free you from this.

All of the CP/M usuals are here, along with an automatic side and density matching ability and a bit copy program. SYSGEN and MOVCPM are not separate, but their functions are called from the COPYDISK menu.

Thanks particularly to DEC, virtually all the top-selling CP/M 80 programs are available in CP/M-86 at about the same price, as are a number of newer programs. There is no shortage of software, or even old friends. This is a real plus in stepping up, particularly since CP/M 80 and 86 are data compatible so you can upgrade your old files without having to rekey all that data. You can keep using your P&T data disks as before.

Testing the DPO

To test out the board, I picked FinalWord from Mark of the Uni-

corn, whose CP/M-86 version looks identical but is optimized for virtual memory and maximum speed; Power from Computing!; Supercalc2 from Sorcim; Smartkey II from Heritage (to make it easy to key in the STAT and other such things); The Word Plus from Oasis; and Condor3, as well as a CP/M-86 version of Micro-Prolog.

All but Condor came with a VT-52 setup option, and Condor was customized in five minutes using the supplied codes. I also borrowed, only for comparison purposes, a copy of WordStar 3.0, and found a local computer mavin with a Compupro 8/16 who was willing to allow me to check out the original software on his machine when glitches developed to make certain it was a DOS and not a software bug that was causing it.

The software above might not be your choice, but it matched the software I had in CP/M 80, and so I didn't have to learn anything new to run them and, by transferring data to SS/DD P&T formatted disks, I was able to run the same programs under P&T and Veritas using the same data disks for comparison purposes.

And then the fun began. I can report to you right now that Heritage's Smartkey II works well with Veritas, as does Oasis' The Word Plus, primarily because both were customized to CP/M-86 using the basic, unadorned Digital package and thus don't expect much of anything from DOS.

Not a single one of the other programs worked flawlessly, and some exhibited major flaws that make the DOS as supplied unsuitable for most applications and all business ones.

FinalWord is a downsized EMACS, and, as such, has edit, format, and print as separate programs. Like almost all complex programs, it relies on chaining within Edit to get things done. Veritas CP/M-86 as supplied simply does not chain at all. Additionally, the Veritas occasionally and randomly sends invisible garbage signals to the editor which cause the keyboard to lock up with an "unknown command" message which must be cleared by a <CTRL> Z in order to continue. I write novels for a living, so you can imagine what this does to the concentration and typing speed.

WordStar has the same problem to a lesser extent. Whenever it must chain to a separate program to do something (such as print) you find yourself automatically exited to DOS instead. WordStar works well otherwise in the non-document mode. As for calling up an outboard utility -- an integrated speller, say -- from WordStar, forget it. You are exited to DOS with the document not saved.

The other popular word processor for CP/M-86, Sorcim's Superwriter, is also related to EMACS and has an integrated spell checker. The same will happen without doubt.

Power, a useful set of utilities for CP/M-86, won't work at all, since its entire operation depends on chaining to DOS and onboard programs. Try anything other than DIR under Power, and you're out to DOS.

Condor3 is more serious, in that you can undo all your work. It will not chain from section to section, although you can call up each module separately from the Condor shell and use it -- just don't try anything involving chaining or you'll be out quickly and your data lost. But if you wish to print a specific data screen or report format for reference, you're out of luck. The Condor shell simply freaks out when told to do so, *rendering your entire database unusable and inaccessible!*

I picked Condor over dBase II for CP/M-86 mostly because the 8088 versions of dBase really don't make use of the extra memory. However, there is no question in my mind that the exact same thing will happen in dBase, which is even more dependent on chaining than Condor.

SuperCalc2 works and works rather well, although its maximum speed is 6MHz. That is, it works so long as you wish to print from specific cell to specific cell (i.e., A - AY by 1 to 2325). However, if you use the print "All" command, it exits to DOS and *your unsaved conditional spreadsheet is lost forever*. Others, such as VisiCalc, that are even more dependent on chaining, should be even worse.

In other words, use of the Veritas DPO board and its supplied CP/M-86 for any serious business application is not only full of traps, it is downright dangerous and unsafe.

Veritas' Intentions

Chief programmer Hendricks tells me that the DOS was sent out in a "spartan" condition in order to get something up and running quickly; Veritas' intent was to perfect it with patches in subsequent months. It didn't work out that way, however. Most of Veritas' prospective customers demanded MS-DOS for their boards, and then the Model 12 and 16b problems surfaced.

Veritas is a very small company with few personnel, and with the total lack of enthusiasm for CP/M-86, they simply dropped it there and went off to solve the 12/16b problem and get an 8" MS-DOS up and running, a project more practical now that DEC has a machine running MS-DOS and the software is now commercially available for it. Needless to say, the Veritas MS-DOS will be DEC compatible in format.

Mr. Hendricks has, however, sent me an upgraded DOS for CP/M-86 which just arrived and about which more later. He then casually mentioned that he had Concurrent DOS up and running on the board with no problems at all, a statement which floored me. I immediately wanted to know why this wasn't available, and the answer was that 256K chips were still very expensive and in short supply, and he didn't feel Concurrent DOS worked well with only 256K.

He's probably right, but I have had twenty years in direct marketing and sales, and I know a lot of computer end-users. Concurrent DOS will, in fact, run any CP/M-86 programs; it will also work concurrently with a few programs even with only 256K, most notably a word processor and most of its outboard utilities. You can't run a spreadsheet and database with only 256K, but I bet I could find lots of uses for it.

Why Review The DPO Now?

Why, if this product was released and sold about six months before it should have been, do I review it now? Simply because they did sell several hundred boards, and there is a lot of interest out there, not to mention some frustration and even a little anger from early purchasers who laid out a bundle and got something they couldn't use.

Most of all, though, it's because their hardware is simply too good, too innovative, to be killed off because of an early marketing mistake.

With a DOS that works well with commercial software and the 8 MHz 256K board, your Model II or 16a becomes, in effect, a Compupro 8/16 and works every bit as well. An 8/16 system, though, costs about six grand for the basics. The DPO is about a quarter of that and you don't have to replace or reformat any disks, and, by the end of this year with MS-DOS availability, you'll be able to run every single micro operating system available (on the 16a or upgraded II). The fact is, chaining exists on every machine-specific CP/M-86 except Veritas', and there's no reason why it shouldn't work here.

Positive Aspects of DPO

OK, up to now we've been negative. Let's switch and see why I think a true upgrade and debug of CP/M-86 from Veritas is essential to them and to us, and why, if that's done and supplied, this is worth your support.

First and foremost, Veritas is accessible and responsive to its customers. It talks to you and tries, if

WORD PROCESSING BENCHMARKS

Save 4000 word file to disk: (Note: This is NOT a misprint):	P&T: 33 seconds DPO: 05 seconds
Format this article under FinalWord:	P&T: 71 seconds DPO: 27 seconds
Format 50K file under FinalWord:	P&T: 5 min. 24 seconds DPO: 2 min. 04 seconds
Spell check this article (Word Plus):	P&T: 81 seconds DPO: 40 seconds

SPREADSHEET
(SuperCalc2)

Routine SC2 Sort:	P&T: 31 seconds DPO: 07 seconds

DATABASE
(Condor 3)

Alpha sort 1000 names and addresses	P&T: 126 seconds DPO: 54 seconds

possible, to solve your problems. That is pretty rare in this business, and they are nice folks.

But the real shock is in the benchmark tests I have now run using P&T SS/DD data disks and Veritas CP/M-86 DOS. These are not lab bench marks. I find lab bench marks absolutely meaningless and ridiculous, unless they are really doing something.

Here, then, are real job benchmark comparisons between P&T and Veritas' DPO using identical data disks and the same programs in the two DOSes.

Absolutely no function (except printing, of course) used under Veritas CP/M-86 by any program that works even minimally with its DOS took more than half the time 2.2 required to do the same thing. Twice as fast you expect, but when you discover that many programs, like FinalWord, have been reconfigured to use all the memory available for their functions, you get some figures that are nothing short of astonishing. With large spreadsheets, the speed is a welcome relief; with huge data bases, one never need go out for dinner and a show while waiting for a re-sort to finish again.

So, what do you do? Although I want Veritas to succeed, I would not -- at the moment -- recommend the purchase of this board for anyone unless you want a very expensive toy. However, if Veritas can upgrade their DOS so that it works with most commercial software (particularly by resolving the chaining problem and, hopefully, the I/O byte redirection as well), I would not hesitate to recommend the purchase of this board to anyone who needs the speed and versatility it provides.

The DPO Is For...

The Veritas DPO is for anyone who feels locked in and left behind by 64K and 4 MHz and owns a Model II or 16a now. This board is twice the computer of an IBM PC and is, in fact, more like the Tandy 2000 in speed, yet you don't have to learn a new keyboard or even buy any other peripherals. It gives you the capability to run TRSDOS 2.0 and 4.2, UNIX (in the 16a), XENIX (ditto), CP/M-86, and by the end of the year, Concurrent DOS 3.1 and MS-DOS 2.0, as

well as CP/M 2.2 and even Turbo-DOS.

It makes your machine new again, with the irony that it works best only in the obsolete Radio Shack models, making that fast-depreciating old friend on your desk into the most versatile computer on the market. Remember, you lose nothing except one slot and can still boot any DOS you already have, as well as easily transferring your present P&T CP/M 2.2m files directly over to Veritas.

While the Radio Shack computers are not well suited for graphics (the Veritas software is capable of accessing the graphics board but no utility for it is provided), your computer CAN handle complex graphics programs and print them out to printers and plotters.

You need to learn nothing new if you can use CP/M now. To the user, CP/M 80 and 86 work identically.

In other words, your obsolete computer can become a computer capable of running the next generation, as well as all previous generations, of software. With a good DOS, the DPO makes even a Model II, in effect, a Compupro 8/16 at about a quarter of the price.

The DPO Is Not For...

The Veritas DPO is not for anyone who absolutely needs color and brilliant screen graphics. For them, I'd recommend the Tandy 2000 or a similar computer and pay the $4500 or whatever it takes.

It's not for anyone who can't afford to buy yet another set of software, plus the board.

It's not for multi-user applications, although Concurrent will support a limited multi-user capability with sufficient memory. I'd use UNIX in one of its incarnations for that.

It's not for Model 12 or 16b owners --at least not for a while.

Conclusions

Veritas Technology has produced an amazing and nearly magical piece of hardware and then proceeded to foul it up by releasing it six months too soon (shades of the Model 16 itself!) with software that was simply not ready to be used, and they seem disinclined to make it right. I hope I'm wrong, but my indication is that they are unlikely to go beyond what they offer now for CP/M-86, since they are concentrating almost entirely on MS-DOS.

The folks at Veritas are a talented and possibly brilliant bunch, some of the last of the really bright computer little guys. They are capable of great things on their own and even greater if they get somebody to handle their marketing and customer relations. With a finished CP/M-86 and the release of a finished Concurrent DOS (memory or not) and an 8" MS-DOS, they offer a product that simply has no peer in the Radio Shack market place, and they will show you what you got your computer for in the first place, making your old and obsolete Model II into the state of the art in speed, efficiency, and capacity.

If that's for you, call them about once a month (408/263-0646) and ask them if they now have a DOS capable of running all off-the-shelf software. They won't lie to you. When they tell you they do, buy it fast and don't skimp; the 8 MHZ and the 256K are more than worth it.

Last Minute Update

The Beta CP/M-86 enhanced arrived, and I've had a chance to play around with it. Some things are much better, and it doesn't seem as prone to sending garbage signals and the like, and the utilities are very much enhanced and work quite a bit better.

Alas, the two terrible flaws that keep it from being really useful remain. The I/O byte still cannot be redirected permanently -- STATE DEV: still resists all changes -- and there is still no chaining, which is a fatal flaw indeed. Without chaining, almost all commercial software is simply useless. I can only hope and pray that Veritas takes the time to at least fix the two basic fatal flaws -- I/O byte redirections and chaining -- no matter what their manpower problems and their MS-DOS urgency. Get the basics working, and then you'll have a user base for the big enhancements to come.

Veritas Technology, Inc.
2375 Zanker Road
San Jose, CA 95131
408/263-0646

SEEING MORE RED

By Robert P. VanNatta

In my article last issue titled "Red and Vedit" (May/June 1984, Vol. 3, No. 1, page 18), I noted the text editor RED is interesting because it is available in source for the C language, and is the only editor I have found for CP/M-68K. Its author, Ed Ream, called me in response to that article and chewed on my ear, more than a little. His opinion of RED is higher than mine; however, I was reasonably happy with what I saw.

I have since learned a few things worth passing on. RED documentation advises you to choose the set of editing commands you want prior to compiling RED, which allows 8-bit users to fit their programs in an 8-bit computer, a limitation irrelevant to CP/M-68K. If you don't mind hacking in the source code, you can implement both sets of edit commands at the same time.

The other item Ed Ream and I disagreed on, WordStar, is quite apart from his product. I, and about a million others, happen to like the command structure of WordStar. Ream doesn't. Consequently, we fail to agree on editor command structure expectations.

I resolved this problem by following my own advice. I took RED and the C compiler and crawled into a hole for about three days. I had never programmed in C before, but quickly learned C is easy for even a novice to use. My earlier feelings that RED's source code is well structured were also confirmed.

With a modest amount of hacking, I revised the user interface to make RED look like a cross between WordStar and WordMaster. I am happier, although the argument has not been resolved. An editor easily molded to fit the user's personality tics is worthwhile. ■

CLASSIFIED

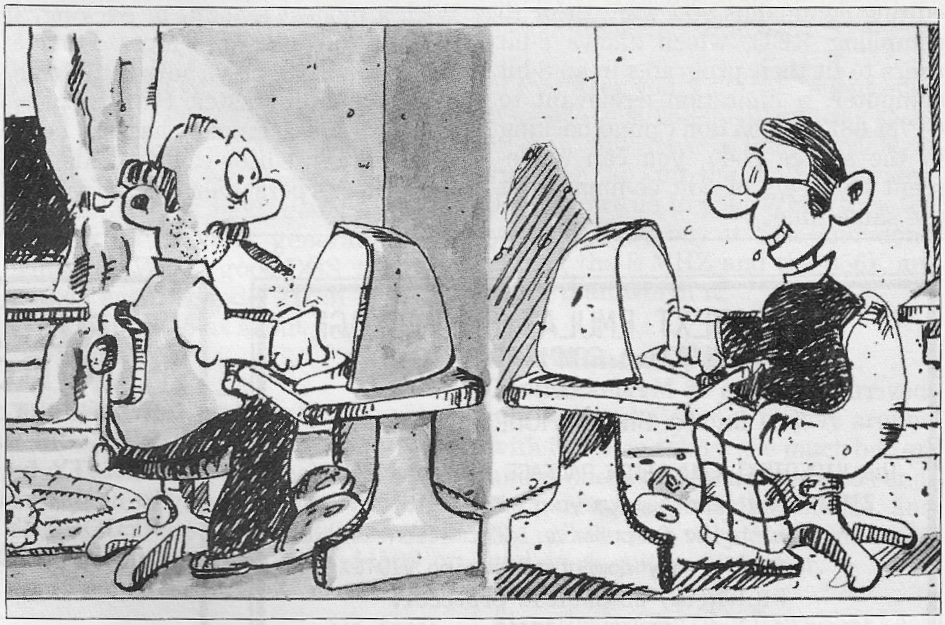
FOR SALE: Must sell. One Model II Single Expansion Drive only, with three (3) indicator light. Like new. Original carton and manuals. Asking $450/o.b.o. Call Rob Steinbach. 805/969-4775 (8-5 PDT) 805/684-4355 (6-11 PDT)

Produce professional bar and line graphs using menu-driven software. All programs priced under $200. Write to: JAF Computing, Box 7657, Nashua, NH 03060.

By Paul Naitoh

HELLO, BBS?

Using your Model II, the TRSDOS TERMINAL program, and a RS modem to go BBSing is easily accomplished following Dr. Naitoh's directions.



Perhaps you have read about receiving free BASIC programs by placing a telephone call with your computer and a modem to the CompuServe Information Service (CIS), the Source, or one of the many Bulletin Board Services (BBS). Or, you might want to chat with a computer wizard in a distant city in an attempt to resolve a knotty problem via a CIS, SOURCE, or other computer network conference call. How do you go about this?

The communications software package, TERMINAL, which comes with TRSDOS on your Model II, can be used very conveniently to send and receive messages through a modem. But even after reading the modem and TERMINAL instructions, you will probably have only a foggy notion about how to call CIS, the Source, or any of the many BBS available. Reading books such as *The Complete Handbook of Personal Computer Communications* by A. Glossbrenner (St. Martin's Press, 1983) and *The Computer Phone Book* by Mike Cane (New American Library, 1983) will be helpful. However, the information in these books is general, and you need specific instructions concerning how to use the power of your computer to telecommunicate with others.

Not everyone will benefit from and enjoy telecommunicating, especially Model II/12/16 owners, whose chances of finding a BBS with a decent number of Model II compatible programs for immediate downloading are very small.

Businessmen and lawyers who own the Tandy business computers may not benefit from the nightly melee on the CB simulator in CompuServe, but, then again, they may benefit if they have a problem they need resolved in a short time. They can call up the CB to get together, and cloister themselves in a "corner" to discuss the issue. CompuServe and other commercial networks offer conveniences such as conferences.

If you are considering telecommunication solely to save money downloading free programs, this probably won't happen because of heavy phone usage and the fees involved to access the database.

A real motive for BBSing, and computer networking in general, is the satisfaction of sharing with others your computer-related interests, experiences, frustrations, and even anxieties.

What You Need To Know

TERMINAL works fine if you only want to talk to a BBS and other networks. However, if you want to down-load (receive software from a BBS to your disk), TERMINAL is not an ideal program because it does not work well with SCRIPSIT. (TERMINAL is designed for transmission and reception of ASCII text.) A word processor is needed to remove the garbage messages usually accompanying BBS programs. VIDTEX 2.0, CompuServe's communications software package that is capable of handling up to 300 baud, works well when combined with SCRIPSIT.

To work with a CP/M-based bulletin board (Remote CP/M or RCPM), you

need different software to receive the messages. You do not need a new modem for RCPM, but you do need CP/M communications software, such as LYNC, COMMX, MITE, or a public domain terminal program (Modem2 and TRSEXEC for a Model II).

Many modems are available. Transmission speed is increasing for even microcomputer-based modems, from 300 baud to 1200 baud. Eventually, we will see modems capable of transmitting at rates between 4800 and 9600 baud. 300 baud is the fastest speed that inexpensive RS modems I and II can handle, and, for now, a modem with a 300 baud rate, or one with two speeds, 300 and 1200, will suffice. Serious users should consider purchasing a modem with a 1200 baud rate to cut expensive telephone time by one quarter.

Getting Started With TERMINAL

Step 1. Power to the modem should be off. If your modem has auto-dial and auto-answer features, do not use them; set the switches to "Manual" and "Origin."

Step 2. Type SETCOM A=(300,7,E,1)<RETURN> to set the communication protocol so channel A has the following default values: baud rate = 300; word length = 7; parity = even; and stop bits = 1.

Step 3. At TRSDOS Ready, type TERMINAL, which will produce a menu. Possible TERMINAL options include L, P, R, C, Q, M, G, D, V, and T.

L turns ON the L(ine) feed option to display a single-spaced message.

To print all messages with your printer as they come in, turn on the P(rint) option by typing P.

To store a message in RAM, type R(AM). When the R option asks whether you want to clean up RAM space, answer Y(es).

To copy the contents of the RAM buffer to a diskette, type C(opy) and specify the name of the file in which you want to store the messages. If you do not type C and exit to TRSDOS by typing Q(uit), you will lose the messages once kept in RAM.

M(enu) returns you to the TERMINAL Menu display.

G(et) and the filename brings the contents of a TRSDOS file into RAM. Type D(isplay) to review the contents of RAM. The <HOLD> key works as a toggle to stop scrolling.

The V(ideo) option activates the video filter toggle that eliminates data characters capable of causing undesirable results when they are output to the screen.

T(erminal) yields a blank screen.

Step 4. In response to the TERMINAL Menu, type in L, V, R (and Yes), and T.

Step 5. Dial the CompuNet TBBS, 1-517-339-3783, in Haskett, MI; listen for the dial tone.

Step 6. When you hear a continuous high-pitched tone, turn on the modem.

Step 7. Continue listening to the tone. When you hear a change in the tone a few seconds later, gently hang up the phone.

Step 8. The following message will appear:

```
WELCOME TO COMPUNET-TBBS #1
MID-MICHIGAN'S OLDEST BBS
517-339-3367

= = = = = = = = = = = = = = = = = = = =
=  A SUBSCRIBER BBS SERVICE  =
=  LIMITED ACCESS TO OTHERS  =
= = = = = = = = = = = = = = = = = = = =

FIRST NAME?
```

You are now connected to COMPUNET-TBBS #1. If do not get the TBBS message immediately, type <ENTER> because some BBSs use <ENTER> to determine whether you are sending information at 300 or 1200 baud.

When you want to sign off TBBS, type the symbol "&", bringing you to a menu where you are given the chance to thank the SYSOP, the bulletin board system operator.

CompuNet requires a written request and a fee to participate fully in its activities (including up and down loading); most others do not require a screening process and service fee.

Editing Messages

If you only want to read and print messages from the BBS, this is it. If you want to edit unwanted parts of the downloaded messages, place the messages, or BASIC programs, or whatever, into a word processing program to delete message headers, host prompts captured along with the text, and stray characters such as line feeds.

A Model II will faithfully copy and store all signals, ASCII as well as non-ASCII characters, in RAM. However, trouble starts when you want to move a down-loaded message on a TRSDOS disk to SCRIPSIT, by using SCRIPSIT's "Utilities/Convert" option.

Most Model II owners use SCRIPSIT; unfortunately, the combination of TERMINAL and SCRIPSIT is inefficient for editing telecommunication messages because most Bulletin Board Services add non-ASCII characters to the messages and software they send that control your computer's monitor screen.

Specifically, the combination of bytes 1B is interpreted as an ESCAPE command during the conversion process. All characters following 1B are handled as a continuous flow of SCRIPSIT commands. Eventually this flow is interpreted as nonsense by SCRIPSIT, and the conversion process gets aborted.

To convert a TERMINAL-captured TRSDOS file into a SCRIPSIT file, remove all the 1B bytes, one by one, from the TRSDOS file with a disk zap program. Then proceed as usual to convert the TRSDOS file to SCRIPSIT using the "ASCII --> SCRIPSIT" conversion utility.

VIDTEX & VIDEOTEX PLUS

The best way to create a SCRIPSIT file from a telecommunicated message file is to use a communications program other than TERMINAL, such as VIDTEX 3.0 (sold by CompuServe for 300 baud only) or VIDEOTEX PLUS (sold by Radio Shack for 1200 baud and 9600 baud). VIDTEX and VIDEOTEX PLUS edit out all non-ASCII characters so converting a TRSDOS file to SCRIPSIT is completed smoothly. If you download a BASIC program from CompuServe with VIDTEX or VIDEOTEX, you do not need to use a word processor to clean up the text.

With a VIDEOTEX PLUS program, you can program a RS Modem II, or a Hayes 1200 baud Smartmodem to automatically dial and logon. You provide the program with the necessary BBS identification numbers and passwords, and subsequent dialing and logon will be accomplished with two key presses. Exact details of how to program auto-dial and auto-logon differ, depending on the modem and software combination.

Auto-Logon Using TERMINAL

You can program TERMINAL to automatically provide your user ID and password after dialing CompuServe Information Service (CIS).

Step 1. In response to "TRSDOS Ready," type:

TERMINAL <ENTER>

Step 2. Press <D> <ENTER> to display and clear the RAM buffer.

Step 3. Press <B> (Set/Change Break Char key) to set the <BREAK> key to 1B (Hex).

Step 4. Press <W> to Set/Change prompt wait character. Then, press <:>, to make a colon the prompt character. CIS uses a colon when it wants your response.

Step 5. Press <F> (Set/Change the F1 and F2 keys); set <F1> to 13 (Hex) and <F2> to 11 (Hex).

Step 6. Press <A> (Set/Change Auto Sign-on). Enter your ID # (say, 12345,6789) and Password (say, SECRET) by typing 12345,6789, then pressing the down arrow, and typing SECRET <ENTER>.

Step 7. While still at the TERMINAL Menu, set the other TERMINAL options of L, V, and P.

Step 8. Dial CIS, and get yourself connected. You will get the CIS question: User ID:

Step 9. Press <BREAK>, and then type <O> (O is the TERMINAL command to "Enter Terminal mode with auto sign-on"). Your ID # will be shown on the monitor; then CIS will send back the second question, "Password:". Your password will not be shown on the monitor, but you will see the light on your modem flicker and then you'll get the familiar greeting from CIS.

You can now create a personalized version of TERMINAL with all of the options pre-set as above, including the auto-logon phrase. Choose a filename that does not currently appear in your disk directory (for instance, "MYTERM") and press <S> <ENTER> (Perform System Command), and type:

DUMP MYTERM START=3000 END=3FFF <ENTER>

The next time you call CIS, type:

MYTERM <ENTER> <T>

Dial CIS, and in response to the "User ID:" question, press <BREAK> <O>, and you will be logged onto CIS.

Remote CP/M (RCPM)

Accessing RCPM, the CP/M BBS, is quite different for those accustomed to using TERMINAL because a CP/M-based communications package, such as LYNC, COMMX, or MITE, is needed.

If you don't want to buy a CP/M terminal program, good ones, such as Modem2 and TRSEXEC, are available in the public domain, but the catch is that you need a CP/M communications package to down-load these programs! You can break out of this cycle by asking a friend (someone you met through a BBS, maybe?) for a disk copy of the public domain program.

You need a word processing program to edit messages transmitted to you through RCPM; I use WordStar 3.0.

Using LYNC 3.0 with P & T CP/M

Step 1. Determine your communication protocol by typing SETUP <ENTER> in response to A>, and change your Model II parameters to match the host's.

Step 2. Type: LYNC <ENTER>.

Step 3. You want the screen to show that LYNC is in [TERM]inal mode (its terminal emulation mode). The message, "[LYNC]" or "[REMOTE]", means LYNC is in an incorrect mode; press <ESC> to get an echo of @ on the screen (indicating LYNC's command mode); then type "TERM" to enter the terminal mode of LYNC.

Step 4. Press <ESC> again to get a @, meaning you are in LYNC's Terminal Command mode.

Step 5. Place the phone call.

Step 6. Listen to the dial tone; if you hear a continuous tone, turn on the modem.

Step 7. Continue listening, and when you hear a change in the tone's pitch, gently hang up the phone.

Step 8. Press <BREAK>

Step 9. You are now on RCPM. You will be asked the question, "How many nulls do you need (0-9)?" Type in 0.

(The "nulls" question refers to printer-based systems. It's a signal the BBS computer can add after sending each carriage return to allow a pause designed to give your printer time to get back to the far left before printing another line. If in doubt about how to answer this question, consult your printer manual.)

This particular RCPM requires user-verification; you must send a postcard or letter with your name, address, personal log-on password, and a nominal fee.

Once in RCPM, you must know how to navigate. Unlike other BBS, RCPM offers minimal guidance, and you will find it tough going at the beginning.

Inside the RCPM, you will see A0>, A> or 0A>, meaning you are in the user/disk drive area A0. Usually, upon logging onto RCPM, you will be automatically logged in User area 0 of the disk drive A.

Type "DIR" in response to the A0> prompt to see the names of files on disk drive 1, user area 0. You will see, for example, RBBS.COM, XMODEM.COM, TYPESQ.OBJ, SQ.OBJ, SQ.OBJ, SQUEEZER.DOC, CHAT.COM, HOWTO.USE, WHATNEW.DOC, etc. You can look at any file with extensions .TXT, .DOC, .USE (user's guide), .MSG (message), or .LTR (letter), and read them on your screen. To view the files, type:

TYPE filename.ext.

You must use the command "TYPESQ" to type those files with a "Q" in the middle of the extension, such as "TQT" (instead of ".TXT"), "DQC", and "UQE." Files with Q are compressed or squeezed to shorten transmission time. A program to unsqueeze is needed before you can print normally.

If you want to see another directory, type:

A0> DIR B:<ENTER> or A0>USER 1<ENTER>

Telephone Numbers

For a complete list of BBS telephone numbers, consult Mike Cane's book, *The Computer Phone Book*, from the New American Library (1983).

PODE (300/1200 baud) (213)926-9553. A very busy BBS that has been set up for subscribers of *Computer User/Interface Age.* You need to sign up before signing on, and there's a $10 fee, if you are not a subscriber to one of the above magazines. This BBS has good downloadable programs for TRS-80 Models I, III, 4, 100. A Model II/12/16 board exists in this BBS, but it's not too active so far. SYSOP: Charles White and Gary Bellasamo.

TBBS (300/1200 baud; Word length=8; Stop bits=1; Parity=None) in Tyler, Texas (214)566-1374. A detailed explanation of The Bread Board System (TBBS) is provided. TBBS used to have a Model II section, but it was taken out because it was accessed only a dozen times in a whole year period! Good TRS-80 and CP/M downloadable programs. SYSOP: Perri Whisenhunt

CompuNet TBBS (300/1200 baud/8/1/N) (517)339-3783. A subscription costs $55, and subscriber status is required before you can download programs. Many downloadable programs for TRS-80 Models I, III, 4, 100, CoCo, and also for CP/M. To subscribe, send your name, address, phone number, and the names of your computer and modem to the SYSOP: Gordon Willimas, CompuNet #1, 5582 Coral Way, Haslett, MI 48840. Send the SYSOP a subscription fee, if you find CompuNet BBS useful for you during a trial period.

MicroServe TBBS (300/1200 baud/8/1/N) (214)769-3036. This TBBS has 102 BASIC programs for the TRS-80 Models I and III available for downloading, plus many other programs for the Models 4, 100 and CoCo. You may find the "For Sale" message center of interest, as it offers some real bargains on computer hardware. For example, someone called in and offered a two month old Hayes Smartmodem 1200 in the original box, priced at $350.

Hollywood RCPM (300/1200 baud/8/1/N) (213)653-6398. Requires that you send in a postcard or letter with your name, location, and your personal log-on password (16 characters maximum) to SYSOP: Kim Levitt, MBBS Headquarters RCPM, 8033 Sunset Blvd., Suit 975, Los Angeles, CA 90046. This RCPM collects and updates the international list of all RCPM systems.

CompuServe Information Service (CIS) has several high quality Special Interest Groups (SIGs) for Model II/12/16 owners, such as MICRONET-80 (PCS-54), TRS-80 Professional Forum (PCS-21), Telecommunications (PCS-52), Whole Earth Software (PCS-24) and Powersoft SIG. ■

BOOK REVIEW

By Barbara S. Albert

Alfred Glossbrenner's book, *The Complete Handbook of Personal Computer Communications: Everything You Need to Go Online with the World*, is an indispensable tutorial and reference guide for the computer user who is ready to venture into the telecommunications arena.

That is not to say that the more experienced user will find nothing of value. On the contrary. Unless he's been online for years, he's bound to discover something new and useful within the 300+ pages of this 1983 paperback release from St. Martin's Press in New York.

The chapters are logically and neatly divided into categories that lead the reader from an Introduction and Overview of "The Universe at your Fingertips" progressively deeper into the intricacies of online encyclopedic databases, bulletin boards, computerized banking, tele-conferencing, etc.

Approximately 50 pages are devoted to each The Source and CompuServe, the two most popular online information utilities and the ones about which people want to learn more. In these two chapters you'll find out what you need to know to get the most for your connect-time dollar.

Mr. Glossbrenner also dedicates a chapter each to The Dow Jones News/Retrieval Service; DIALOG, BRS, and ORBIT; The Information Bank and NewsNet; computerized conferencing via EIES and PARTICIPATE; electronic shopping, banking, and bartering; and "telecommuting, the home/office interface."

Although the book is not intended to be a technical dissertation on the inner workings of computers, modems,

and telephone cables, the essential, "have-to-know" facts are included. Several appendices contain information for the person who wants to go beyond the level of discussion contained in the individual chapters. There's even a glossary of telecommuncation terms.

Incidentally, there are no computer- or modem- or communciations software-specific instructions or discussions; all computer/modem references are general and applicable to all users.

Perhaps the most exciting feature of this useful, practical, imminently readable book is the "Online Tips." These boxed-in goodies contain suggestions and ideas that are relevant, but not necessarily essential, to the topic at hand. For example, one "Online Tip" says: "Take advantage of the online documentation offered by CIS (CompuServe Information Service) to create your own customized user's guide. ... In some cases, the documentation you can buy from CIS is nothing more than a printout of these same online instructions."

Here's another "Online tip" worthy of sharing. It is possible to call a number in California, log onto a system maintained there, and obtain a listing of hundreds of computerized bulletin board services throughout the United States and Canada classified by area code. All it costs is the price of the phone call.

Set up your system parameters for full duplex, 300 baud, 7 bit word length, even parity, 1 stop bit, echo on or "enabled." The telephone number is: 213/881-6880. Hit <ENTER> twice after the system answers; then type CAT in response to the "LOGON PLEASE" message.

You'll receive a greeting from Novation, Inc. in Tarzana, California, manufacturers of Cat modems. This is their system, maintained by them, and accessible to all. In addition to the lists of BBS numbers, games and free programs are also available, together with lots of advertising for Cat modems.

The Complete Handbook of Personal Computer Communications has been in circulation for about a year, so it is, no doubt, obsolete in certain areas (it was probably out of date before it was finished at the printers!). But the great majority of the information it contains is still relevant and valuable for those needing a guided tour through the electronic universe. I would recommend it for anyone who wants to learn more about telecommunicating.

The Complete Handbook of Personal Computer Communications: Everything You Need To Go Online With the World, by Alfred Glossbrenner (NY: St. Martin's Press, 1983), $14.95

To order individual copies of this book, send your order with check to: St. Martin's Press, Attention: Cash Sales, 175 Fifth Avenue, New York, NY 10010. Enclose $14.95 for each copy ordered, plus $1.50 postage and handling for the first book and fifty cents for each additional copy. ■

By John Esak

REVIEW OF ZTERM

XENIX on the Model 16 has been out for about 16 months now, and we should all expect an avalanche of great C programs to roll our way any minute now, right?

The avalanche has not really happened yet, although I still expect it (even more so now with the advent of the SNAPP megabyte).

In the meantime, I will be happy if the few programs we get are of the same quality as ZTERM. It is simply an excellent program. When *Advanced Computing* asked me to review it, I was doubtful that it would be a big addition to cu and uucp, but I was wrong!

With ZTERM, communications under XENIX are a breeze. The most important thing it does is permit something previously impossible on Radio Shack's 1.3 XENIX. It allows you to connect to another non-Unix system and "download at will." By today's "computer society" standards, this ability is an absolute necessity, and machines that don't have it are much like slow-learners in a classroom full of geniuses.

ZTERM comes with very good documentation. I was online with CompuServe in under six minutes from the time I took the disk out of its sleeve to the time I saw the first CIS menu. And this includes the time it took me to backup the disk and boot up my system. The installation and operation are that simple.

I have been through all kinds of changes trying to do the simplest of tasks like download my Email from CompuServe. I did figure out a way to do it, but my method is so clumsy and ineffectual that I am glad I don't have to tell you about it. Instead, let me tell you about ZTERM.

The most important thing ZTERM does is allow you to connect to a non-UNIX system and "download at will." By today's "computer society" standards, this ability is an absolute necessity.

ZTERM

ZTERM lets you connect to any other system, for instance CompuServe. You have a standard connection, and all information sent to you and sent by you is correctly formatted and displayed on either the console or any properly connected terminal. While you are online, you can send any file to this remote system, or download any file from the remote system.

You can even create a shell and do something completely unrelated to the online operations. For example, you can upload a gigantic file while simultaneously preparing another file for transmission. Or you can download everything being sent from the remote system, perhaps a new model 100 program, while simultaneously reading your recently retrieved Email.

This give and take procedure is so easy to operate and control that with just two keystrokes and a new filename you can stop downloading into one file and start downloading into a new one. Two keystrokes give you a shell to do with as you please, and a <CTRL>d brings you back online. You even get to designate the key which makes it all happen, the "meta" character. It defaults to the tilde (~), an excellent choice since this is the character used by cu.

In fact, the entire arrangement and syntax of commands for ZTERM is similar to cu. But ZTERM is better since it does the all important downloading at will, whereas cu requires assistance from the remote system to download. Currently such assistance is not supported on any of the known commercial databases.

ZTERM lets you set the baud rate, pick the dial-out line (port), and if you are using either the Radio Shack Modem II or DC 1200 auto dial modem, it lets you put in a phone number. You enter this information with standard flag syntax, for instance:

```
zterm -s 1200 -n 4327500
```

will dial out of the default port tty01 at 1200 baud to telephone number 432-7500.

ZTRAN

ZTRAN is a file transfer program used between XENIX and systems running a CompuServe VIDTEX executive. When transferring non-text programs between different systems, for instance, between a Model II running VIDTEX and another running XENIX, this program has all the error correction and protocol operations under control. Also, it works between CompuServe and XENIX in the same way that CompuServe's FILTRN program works. For those of you trying to transfer actual programs rather than just text, ZTRAN will work fine.

ZDIAL

ZDIAL is, not surprisingly, an automatic dialer system that runs in conjunction with ZTERM. Put your most frequently called numbers into an easily created "phonebook" file, and ZDIAL creates a menu of these numbers for you. When you wish to make a call, invoke the ZDIAL menu and select the number you want. ZDIAL dials the number and puts you directly into ZTERM, either with defaults or chosen setup parameters. (Remember, ZDIAL can only be used with the Shack's Modem II or DC 1200). If one 20 number menu isn't enough for you, you may have an unlimited number of phonebooks to cover your usual dial-ups.

"Gotchas"

Now for the "gotchas." I would imagine there are lots of people out there with auto dial modems other than Radio Shack's. ZTERM should offer the ZDIAL file with options for different modems, or sell modem specific versions. I have these terrific Hayes Smartmodems and can't make use of their automatic dialing capabilities.

The second "gotcha" is really a generic one and possibly not fixable. I have access to root powers on all of my systems and the systems I maintain, so it didn't occur to me at first that there was a problem. Don Stanfield of Tandy Corporation pointed out to me that you must be in root to enable or disable the tty port.

To dial out of your system, the dial out port must be "disabled" (use the command "disable tty01" for port A or "disable tty02" for port B). To allow someone to dial in to your system, the port must be "enabled" (use the corresponding "enable tty01" and "enable tty02").

ZTERM and the other two Zprograms are placed in /usr/bin with permissions set for anyone on the system to use them; however, the ports must be enabled and disabled by the root. Since this enabling/disabling is probably hard-coded into XENIX, there may not be a way to get around this problem. Thus anyone using ZTERM (or any other communications file for that matter) will have to be on speaking terms with the root of the system or else get used to using the U.S. Mail instead of electronic communications.

The third gotcha is a very small one. The documentation writers at ZAK forgot to put in the syntax for making a call without using ZDIAL, the automatic dialing function. The following illustrates the method I use with my offended HAYES modems. (You should put this into a script called CALL or something, since ZDIAL won't help you here.)

```
zterm -s 1200 -a  /dev/null
-l  /dev/tty01
```

(the -l is a lower case L, not a one.)

This calls up ZTERM, puts you on line at 1200 boud through port A, and waits for a carrier. Now you can dial the number you want. With the Hayes, you must dial

ATDTxxxxxxx <ENTER>

Be sure you use capital letters for the ATDT.

I have my HAYES set up so that it answers calls immediately or lets me dial out immediately. Also, it does not echo locally generated characters or result codes to the screen, since this was giving me problems and hanging up my whole system. (XENIX does some periodic checking of the ports, and unbelievable anomalies happen because of this.)

After hours of fiddling with dip switches, the setting that eliminates most problems and allows dial in and dial out was discovered, and it is:

Switch #:	1	2	3	4	5	6	7	8
Position:	Down	Up	Up	Down	Up	Down	Up	Down

The same settings apply for the Smartmodem 300 except that switch eight is not used and can be either up or down. On the 1200, switch 8 disables command recognition when in the UP position, so leave it down.

Summary

I don't need to say much more than this: if you only buy one program this year for your XENIX system, make it ZTERM.

The Videotext Emulation Package is available from:

Zak Software & Distributing, Inc.
178 Berkeley Street
Rochester, NY 14607
716/244-1060
Cost: $150.00

A CONDENSED SCRIPSIT DIRECTORY

By Gerald Lippey

No characteristic of SCRIPSIT annoyed us more than its document directory. To discover what documents a disk contained, we had to place a SCRIPSIT system disk in drive zero, load a large program, and painstakingly work our way through numerous screen displays.

Eventually, we tired of this and decided to use printed versions of the directories. They were quickly out of date; we found ourselves tying up the printer for long periods and visiting our paper supplier more often. Adding to our misery was the fact that documents were ordered by their birthdays. Who remembers birthdays? We couldn't even remember their names.

In desperation, we resorted to stone-age tactics. Each disk had its scrap of paper on which we kept track of the directory with a pencil. When a new document was created, its name was duly added. Deletions were handled with the other end of the pencil. We opened existing documents by name from the first directory screen. No more flipping through screens or worn out printer ribbons.

We knew there had to a be a better way, and indeed there is.

I use the past tense above because all of that is ancient history. For over a year, we have used the accompanying program, SDIR, and to our surprise, SCRIPSIT suddenly became a first class word processor. We learned that its directory could be a friend, supplying all sorts of useful information. What had been an obstacle when it controlled us turned out to be a powerful ally when we took charge. We have discovered that occasionally it is even nice to have the documents organized by birthday.

Perhaps I have overdramatized the situation. But if you can identify with our plight at all, you will appreciate the solution.

The Program, SDIR

SDIR is called directly from TRSDOS Ready by entering its name, followed by a space and the drive number containing the SCRIPSIT disk; e.g., "SDIR 2" (or "SDIR :2") will display the documents on the disk in drive two. If the drive number is omitted, drive zero will be used.

SDIR displays the SCRIPSIT document names alphabetically in four columns, with each name preceded by the number of the SCRIPSIT directory screen on which that document appears. (See Figure 1.)

SDIR takes up only one gran of storage; there is no need to fear loss of precious disk space.

If you are especially prolific, you should be aware that only the first 593 document names (99 directory screens) are listed.

This compact directory can be sent directly to your printer after all names have been displayed. During display and printing, you can use both the HOLD and BREAK keys.

Programming Facts

SDIR contains no macros, peculiar pseudo-operations, or other exotic programming tools, and was written to be assembled by the cheapest TRSDOS assembler. If you don't have an assembler, but are a serious SCRIPSIT user, this might be a good time to start. The Radio Shack Series I Editor/Assembler costs only $50. In my judgment, the documentation adequately enables a non-programmer to enter and assemble SDIR, though not without a struggle.

SDIR conforms to good style (modular, top-down, and so forth), so it is not a bad program to practice with if you are new to machine-language programming and would like to begin creating your own programs. Because it never writes to a file, there is less danger of messing up a disk. Before you know it, you will be adding features of your own.

```
24 SCRIPSIT documents listed from Disk SCRIP18   Drive 2    Apr 30 1984

1 ARTICLE/ASC        2 CP5           4 CTSS3          1 PWP/ltr1
4 Babs/ltr/3/30/84   2 CP6           3 CTSS4          2 SDIR/ASC
3 CP1                5 CICS/prps11   3 HERMAN/ltr1    4 SILLY DOC
3 CP2                4 CICS/prps12   3 HERMAN/ltr2    1 SILLY DOC 2
2 CP3                4 CTSS1         3 HERMAN/ltr3    1 WINE TASTERS
2 CP4                4 CTSS2         2 OUTPUT/ASC     1 WINE TASTING/ltr
```

Figure 1

```
0010            ORG     3000H
0020    ;Displays and optionally prints document names
0030    ;    in a SCRIPSIT 2.x directory alphabetically in
0040    ;    four columns.
0050    ;If the program is named SDIR, the calling syntax is
0060    ;    'SDIR d' or 'SDIR :d', where d is the drive #.
0070    ;     If no argument is present, drive 0 will be used.
0080    ;The corresponding screen number in the SCRIPSIT
0090    ;     directory precedes each document name.
0100    ;Only the first 593 document names (99
0110    ;    directory screens) are listed.
0120    ;
0130    SDIR    CALL    INIT    ;find drive #, etc.
0140    CALL    BUILD           ;build the output table
0150            CALL    SORT    ;sort it
0160            CALL    VDOUT   ;display it
0170            CALL    PROUT   ;optionally print it
0180    DONE    RST     0       ;quit
0190    ;-----------------------------------------INITIALIZE
0200    INIT    CALL    DRVID   ;determine the drive to use
0210            CALL    DSKID   ;find the diskID
0220            CALL    DATE    ;get the date
0230            RET
0240    ;---------------------------------
0250    DRVID   LD      C,(HL)
0260            INC     HL
0270            LD      DE,ABL
0280            LD      A,46
0290            RST     8       ;find argument
0300            JR      Z,INDATA
0310            XOR     A
0320            RET             ;drive 0 in A
0330    ;
0340    INDATA  LD      D,0
0350            ADD     HL,DE
0360            LD      DE,ABL
0370            LD      A,46
0380            RST     8       ;parse argument
```

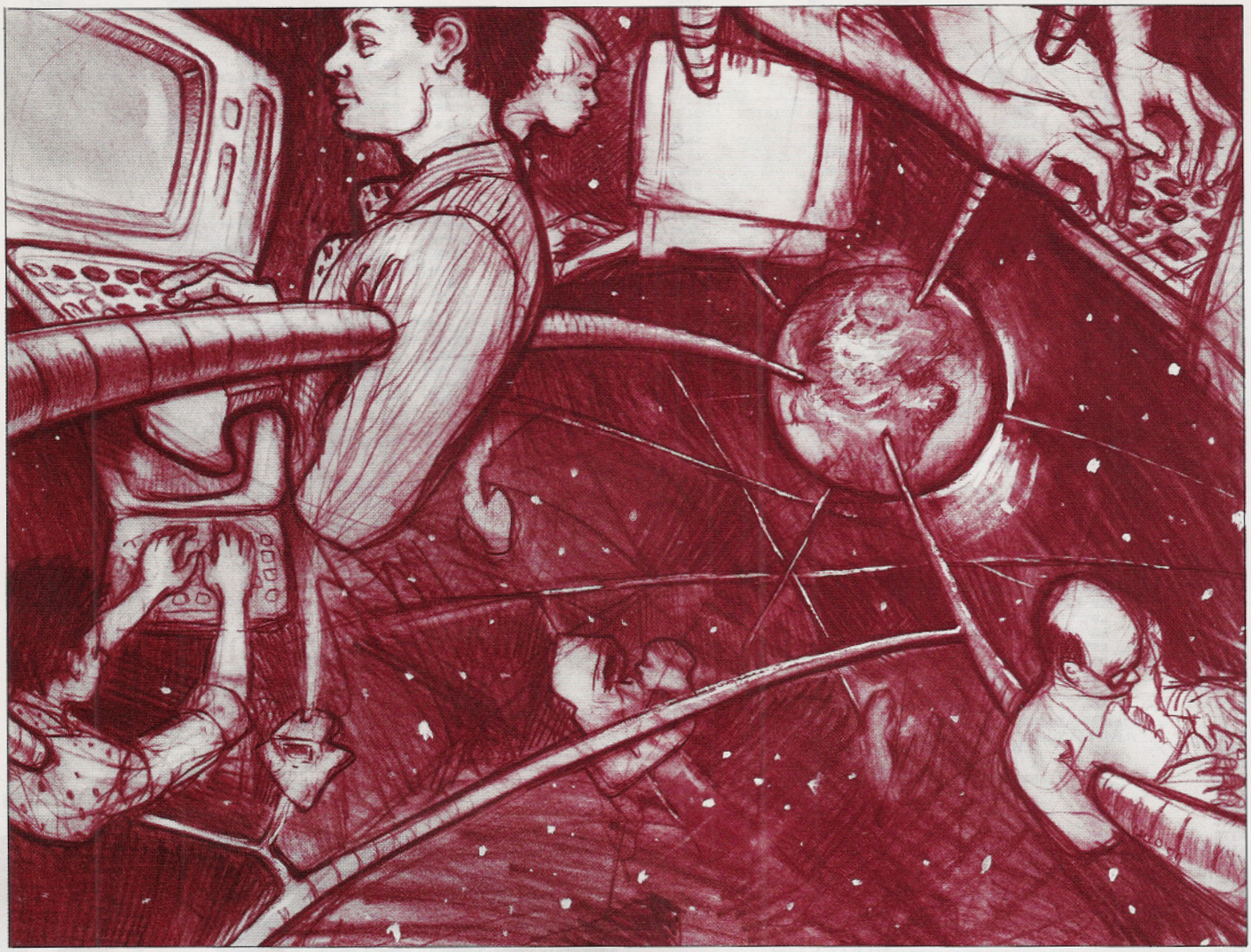
```
0390            JP      Z,INERR
0400            LD      A,B
0410            CP      3
0420            JP      NC,INERR
0430            CP      2
0440            JR      NZ,INNUM  ;if a number
0450            LD      A,3AH
0460            CPI
0470            JP      NZ,INERR  ;if not ':'
0480    ;
0490    INNUM   LD      A,(HL)
0500            LD      (FLDCB+13),A
0510            LD      (DRV+6),A
0520            SUB     30H
0530            RET             ;drive # in A
0540    ;-----------------------------------
0550    DSKID   LD      B,A
0560            LD      HL,DSK
0570            LD      A,15
0580            RST     8
0590            JP      NZ,ERR
0600            RET
0610    ;-----------------------------------
0620    DATE    LD      B,0
0630            LD      HL,INDT
0640            LD      A,45
0650            RST     8
0660            LD      DE,DT+3
0670            LD      HL,INDT+3
0680            LD      BC,3
0690            LDIR
0700            LD      DE,DT+7
0710            LD      HL,INDT+6
0720            LD      BC,2
0730            LDIR
0740            LD      DE,DT+10
0750            LD      HL,INDT+8
0760            LD      BC,4
0770            LDIR
0780            RET
0790    ;-----------------------------------BUILD THE OUTPUT TABLE
0800    BUILD   CALL    GETREC  ;read SCRIPSIT file for the names
0810            CALL    GETSCR  ;add screen numbers to the table
0820            RET
0830    ;-----------------------------------
0840    GETREC  LD      DE,FLDCB
0850            LD      HL,FLPAR
0860            LD      A,40
0870            RST     8       ;open DOCUMENT/CTL file
0880            JP      NZ,ERR
0890            LD      BC,0
0900            LD      DE,FLDCB
0910            LD      A,35
0920            RST     8       ;read 1st record
0930            JP      NZ,ERR
0940            LD      HL,(FLREC+14)
0950            LD      (NDOCS),HL      ;number of docs in file
0960            LD      (DDOCS),HL      ;number to display
0970            LD      C,13
0980            LD      HL,GETM
0990            CALL    VDLINE  ;'Now reading...' to screen
1000    ;
1010            LD      DE,FLDCB        ;DCB
1020            LD      BC,(FLREC+6)    ;rec # for 1st doc
1030            LD      HL,(MDOCS)      ;max docs displayed
1040    ;
1050    NXREAD  LD      A,B
1060            OR      C
1070            JR      Z,CLOSE         ;stop when BC=0
1080    ;
1090            PUSH    DE
1100            PUSH    HL
1110            LD      A,35    ;DE=DCB; BC=rec #
1120            RST     8       ;read record
1130            JP      NZ,ERR
1140            LD      BC,(FLREC+1)    ;next rec #
1150            PUSH    BC
1160    ;
1170            LD      DE,FLREC+5
1180            LD      HL,(NXADDR)
1190            LD      BC,21
1200            ADD     HL,BC   ;new table addr
1210            LD      (NXADDR),HL
1220            EX      DE,HL   ;now DE=table addr; HL=doc name addr
1230            LD      BC,16
1240            LDIR            ;move doc name to table
1250            POP     BC
1260            POP     HL
1270            POP     DE
1280    ;
1290            DEC     HL
1300            LD      A,H
1310            OR      L
1320            JR      NZ,NXREAD       ;go to next document
1330            LD      HL,0FFFFH       ;else maximum documents reached
1340            LD      (NDOCS),HL      ;  so flag in NDOCS
1350            LD      HL,(MDOCS)
1360            LD      (DDOCS),HL      ;  and save # to display
1370    ;
1380    CLOSE   LD      A,42    ;DE=DCB
1390            RST     8       ;close file
1400            JP      NZ,ERR
1410            RET
1420    ;-----------------------------------
1430    GETSCR  LD      HL,(DDOCS)      ;HL=doc counter
1440            LD      A,H
1450            OR      L
1460            JP      Z,NODOCS        ;if no docs in file
1470            LD      IX,TABLE-21     ;IX=table entry addr
1480            LD      B,5             ;5 docs/scr once
1490    ;
1500    NXSCR   PUSH    BC
```

```
1510            PUSH    HL
1520            LD      HL,SCT          ;dec scr #
1530            LD      DE,(SCN)        ;bin scr #
1540            INC     DE      ;+1
1550            LD      (SCN),DE
1560            LD      B,0
1570            LD      A,21
1580            RST     8       ;to dec
1590            POP     HL
1600            POP     BC
1610    ;
1620            LD      DE,(SCT+3) ;ASCII 2-digit scr #
1630            LD      A,E
1640            CP      30H
1650            JR      NZ,SMSCR
1660            LD      E,20H   ;blank 1st 0
1670    SMSCR   PUSH    BC
1680            LD      BC,21
1690            ADD     IX,BC   ;for next entry
1700            POP     BC
1710            LD      A,32
1720            LD      (IX+0),E
1730            LD      (IX+1),D        ;insert 2 dec digits
1740            LD      (IX+2),A        ;  and a space
1750            DEC     HL
1760            LD      A,B
1770            OR      L
1780            RET     Z  ;no more; IX=last table addr
1790            DJNZ    SMSCR           ;same scr #
1800            LD      B,6             ;6 docs/scr
1810            JR      NXSCR           ;update scr #
1820    ;
1830    NODOCS  LD      HL,NODOCM
1840            CALL    VDLINE  ;'No docs...'
1850            JP      DONE
1860    ;-----------------------------------------------SORT
1870    SORT    CALL    SORT1   ;alpha sort
1880            CALL    GETKEY  ;insert key for vertical sort
1890            CALL    SORT2   ;sort on key
1900            RET
1910    ;-----------------------------------
1920    SORT1   LD      C,13
1930            LD      (LSADDR),IX     ;last table addr
1940            LD      HL,SORTM
1950            CALL    VDLINE  ;'Now sorting...'
1960            LD      DE,(LSADDR)
1970            LD      B,3
1980            LD      C,21
1990            LD      IX,TABLE
2000            LD      HL,16
2010            LD      A,56
2020            RST     8
2030            RET
2040    ;-----------------------------------
2050    GETKEY  LD      HL,(DDOCS)
2060            LD      DE,(DDOCS)
2070            SRL     D
2080            RR      E
2090            SRL     D
2100            RR      E       ;div by 4
2110            LD      (NROWS),DE ;# of complete rows
2120            SLA     E
2130            RL      D
2140            SLA     E
2150            RL      D       ;times 4
2160            SBC     HL,DE   ;compute DDOCS MOD 4
2170            LD      A,3
2180            SUB     L
2190            LD      (MOD),A ;3-(DDOCS MOD 4)
2200    ;
2210            LD      DE,(DDOCS) ;DE=doc counter=sort key
2220            LD      C,0     ;C=row
2230    ;
2240    NXROW   INC     C       ;next row
2250            LD      H,0     ;HL=ordinal # of next doc
2260            LD      L,C     ;  to be printed in new order
2270            LD      B,4     ;B=col count
2280    ;
2290    SMROW   PUSH    HL
2300            PUSH    BC
2310            PUSH    DE
2320            LD      C,21
2330            LD      B,0
2340            LD      A,23
2350            RST     8       ;multiply by 21
2360            LD      BC,TABLE-2
2370            ADD     HL,BC   ;addr for this key
2380            POP     DE
2390            LD      (HL),D
2400            INC     HL
2410            LD      (HL),E  ;insert key
2420            POP     BC
2430            POP     HL
2440    ;
2450            DEC     DE
2460            LD      A,D
2470            OR      E
2480            RET     Z       ;if all entries done
2490    ;
2500            DEC     B
2510            JR      Z,NXROW ;if last col done
2520            PUSH    DE
2530            LD      DE,(NROWS)
2540            ADD     HL,DE   ;next col
2550            POP     DE
2560            LD      A,(MOD)
2570            CP      B
2580            JR      NC,SMROW;if short col precedes
2590            INC     HL      ;  otherwise add 1
2600            JR      SMROW
2610    ;-----------------------------------
2620    SORT2   LD      DE,(LSADDR)
2630            LD      B,19
2640            LD      C,21
2650            LD      H,1     ;for reverse sort
2660            LD      L,2
2670            LD      IX,TABLE
2680            LD      A,56
2690            RST     8
2700            RET
2710    ;-----------------------------DISPLAY THE TABLE
2720    VDOUT   CALL    VDINIT  ;initialize screen
2730            CALL    VDITEM  ;display items
2740            RET
2750    ;-----------------------------------
2760    VDINIT  LD      HL,HD1+2
2770            LD      DE,(DDOCS)
2780            LD      B,0
2790            LD      A,21
2800            RST     8       ;doc count to HD1
2810    ;
2820            LD      HL,HD1+2
2830            LD      E,20H
2840            LD      B,4
2850    ZM      LD      A,(HL)
2860            CP      30H
2870            JR      NZ,VDHD
2880            LD      (HL),E  ;blank out 0's
2890            INC     HL
2900            DJNZ    ZM
2910    ;
2920    VDHD    LD      C,13
2930            LD      HL,HD1
2940            CALL    VDLINE  ;heading
2950    ;
2960            LD      HL,(NDOCS)
2970            LD      A,(NDOCS+1)
2980            CP      0FFH
2990            JR      NZ,SKRPTC   ;if < 100 screens
3000            LD      C,32
3010            LD      HL,HD2
3020            CALL    VDLINE  ;'Only 1st 99 scr...'
3030    ;
3040    SKRPTC  LD      B,3
3050            LD      A,27
3060            RST     8       ;scroll prot
3070            LD      B,20
3080            LD      A,8
3090            RST     8       ;go to 1st line
3100            LD      B,1
3110            LD      A,29
3120            RST     8       ;HOLD processor
3130            LD      B,2
3140            LD      A,8
3150            RST     8       ;csr off
3160            RET
3170    ;-----------------------------------
3180    VDITEM  LD      DE,(DDOCS)      ;DE=doc counter
3190            LD      HL,TABLE        ;HL=table addr
3200            LD      C,32
3210            LD      B,19
3220    ;
3230    NXVD    PUSH    DE
3240            PUSH    BC
3250            PUSH    HL
3260            LD      A,9
3270            RST     8       ;display item
3280            LD      B,2
3290            LD      A,29
3300            RST     8       ;HOLD key
3310            POP     HL
3320            POP     BC
3330            LD      DE,21
3340            ADD     HL,DE   ;next item addr
3350            POP     DE
3360            DEC     DE
3370            LD      A,D
3380            OR      E
3390            RET     Z       ;done if DE=0
3400            JR      NXVD
3410    ;-----------------------------PRINT THE TABLE
3420    PROUT   CALL    PRINIT  ;get ready to print
3430            CALL    PRITEM  ;print the table
3440            RET
3450    ;-----------------------------------
3460    PRINIT  LD      A,1
3470            RST     8       ;init KB
3480            LD      C,1
3490            LD      HL,PRRQM
3500            CALL    VDLINE  ;'Want hardcopy?'
3510    KBRQ    LD      A,4
3520            RST     8       ;KB char
3530            JR      NZ,KBRQ
3540            LD      A,B
3550            CP      30H
3560            JR      C,KBRQ  ;if < "0"
3570            LD      A,8
3580            RST     8       ;display char
3590            LD      A,B
3600            AND     5FH
3610            CP      4EH
3620            JP      Z,DONE  ;if N
3630            CP      59H
3640            JR      Z,PRHEAD;if Y
3650            LD      B,8
3660            LD      A,8
3670            RST     8       ;bksp if not Y or N
3680            JR      KBRQ
3690    ;
3700    PRHEAD  LD      B,2
3710            LD      A,8
3720            RST     8       ;csr off
3730            LD      A,(HD1)
3740            LD      B,A
3750            LD      C,13
3760            LD      HL,HD1+2
3770            LD      A,19
3780            RST     8       ;heading to prt
3790            JR      Z,PRHD2 ;if printing ok
3800            LD      C,13
3810            LD      HL,PRERRM
3820            CALL    VDLINE  ;'Fix prt or stop?'
3830    KBC     LD      A,4
```

```
3840            RST     8
3850            JR      NZ,KBC
3860            LD      A,B
3870            AND     5FH
3880            CP      51H
3890            JP      Z,DONE  ;quit if Q
3900            JR      PRHEAD  ;or try prt again
3910    ;
3920    PRHD2   LD      A,(NDOCS+1)
3930            CP      0FFH
3940            RET     NZ      ;if < 100 screens
3950            LD      HL,HD2
3960            LD      B,(HL)
3970            INC     B
3980            INC     HL
3990            LD      C,13
4000            LD      A,19
4010            RST     8       ;'Only 1st 99...'
4020            RET
4030    ;-----------------------------------
4040    PRITEM  LD      DE,(DDOCS)      ;DE=doc counter
4050            LD      HL,TABLE        ;HL=table addr
4060            LD      B,19
4070    ;
4080    NXCOL   LD      A,(COLCT)       ;column count
4090            DEC     A
4100            LD      C,32
4110            JR      NZ,SMLINE       ;if same line
4120            LD      C,13    ;end of a line
4130            LD      A,4
4140    SMLINE  LD      (COLCT),A
4150    ;
4160            PUSH    DE
4170            PUSH    BC
4180            PUSH    HL
4190            LD      A,19
4200            RST     8       ;print entry
4210            JP      NZ,ERR
4220            LD      B,2
4230            LD      A,29
4240            RST     8       ;HOLD key
4250            POP     HL
4260            POP     BC
4270            LD      DE,21
4280            ADD     HL,DE   ;addr for next item
4290            POP     DE
4300            DEC     DE
4310            LD      A,D
4320            OR      E
4330            JR      NZ,NXCOL  ;all done if DE=0
4340    ;
4350            LD      A,C
4360            LD      B,13
4370            CP      B
4380            JR      Z,ONECR
4390            LD      A,18
4400            RST     8       ;extra CR needed
4410            LD      B,13
4420    ONECR   LD      A,18
4430            RST     8       ;one CR anyhow
4440            RET
4450    ;-----------------------------------DISPLAY A LINE
4460    VDLINE  LD      B,(HL)
4470            INC     HL
4480            LD      A,9
4490            RST     8
4500            RET
4510    ;---------------------------------ERROR HANDLING
4520    INERR   LD      A,48
4530    ERR     LD      B,A
4540            LD      A,52
4550            LD      HL,ERRM+2
4560            RST     8
4570            LD      C,13
4580            DEC     HL
4590            DEC     HL
4600            CALL    VDLINE  ;'You dummy...'
4610            LD      C,13
4620            LD      HL,ABORTM
4630            CALL    VDLINE  ;'Run aborted'
4640            JP      DONE
4650    ;---------------------------------------DATA
4660    INDT    DEFS    26
4670    NDOCS   DEFS    2       ;# docs in SCRIPSIT file
4680    MDOCS   DEFW    593     ;# docs in 99 screens
4690    DDOCS   DEFS    2       ;# docs displayed
4700    NXADDR  DEFW    TABLE-18   ;next table addr
4710    LSADDR  DEFS    2       ;last table entry addr
4720    NROWS   DEFS    2       ;# of complete rows
4730    MOD     DEFS    1       ;3-(DDOCS MOD 4)
4740    SCT     DEFM    '00000' ;dec scr number
4750    SCN     DEFW    0       ;bin scr number
4760    COLCT   DEFB    4       ;column count for print
4770    ABL     DEFW    $+6     ;parse stuff
4780            DEFW    $+6
4790            DEFW    0
4800            DEFW    0D01BH
4810            DEFW    3A01BH
4820    HD1     DEFB    75      ;heading
4830            DEFB    1BH
4840            DEFM    '       SCRIPSIT documents listed from Disk '
4850    DSK     DEFM    '       '
4860    DRV     DEFM    'Drive 0 '
4870    DT      DEFM    '               '
4880            DEFB    13
4890    HD2     DEFB    45      ;too many docs to display
4900            DEFW    909H
4910            DEFM    'DOCUMENTS BEYOND SCREEN 99 ARE NOT INCLUDED'
4920            DEFB    13
4930    ERRM    DEFB    80
4940            DEFB    13
4950            DEFS    80
4960    ABORTM  DEFB    16
4970            DEFM    ' ...RUN ABORTED'
4980            DEFB    13
4990    GETM    DEFB    25
5000            DEFB    2
5010            DEFM    'Now reading directory...'
5020    NODOCM  DEFB    30
5030            DEFM    'NO DOCUMENTS IN SCRIPSIT FILE!'
5040    SORTM   DEFB    14
5050            DEFM    'Now sorting...'
5060    PRRQM   DEFB    36
5070            DEFW    0D0DH
5080            DEFM    'Would you like a hard copy? (Y/N) '
5090    PRERRM  DEFB    72
5100            DEFB    13
5110            DEFM    'CHECK YOUR PRINTER - Press'
5120            DEFB    13
5130            DEFM    ' ..<Q> to Quit'
5140            DEFB    13
5150            DEFM    ' ..any other key to try again'
5160    FLDCB   DEFM    'DOCUMENT/CTL:0'
5170            DEFB    13
5180            DEFS    45
5190    FLPAR   DEFW    FLREC
5200            DEFW    FLREC
5210            DEFW    ERR
5220            DEFB    'R'
5230            DEFB    0
5240            DEFB    'F'
5250            DEFB    0
5260            DEFB    32
5270    FLREC   DEFS    256
5280    TABLE   EQU     $
5290            END     SDIR
```

■

By Richard A. Bilancia



NETWORKING ON XENIX

The TRS-XENIX development system includes a sophisticated and very capable networking system with literally unlimited application if you are running more than one UNIX/XENIX system; networking virtually eliminates the necessity of transferring files from one machine to another with floppy diskettes.

A single file named "datafile" can be transferred from my system (system identification 2001424) to a file called "mycopy" in the current working directory of your system while logged on to your system with the following command:

uucp 2001424!/usr/rab/datafile mycopy

Assuming that everything has been set up properly, your system will use its own auto dial modem to dial the phone number of my system, log on to my system, execute the file transfer, log off my system, and disconnect the phone line connection.

The transfer can either be accomplished immediately, or spooled for execution in the wee hours to take advantage of cheaper telephone rates.

Installing uucp

First, you must have already installed the communication programs (see sidebar) from the diskettes included with the TRS-XENIX development system, and have at least one Radio Shack modem (1200 baud recommended) with the auto-dial module (TRS-XENIX uucp will support other modems beginning with release 01.03.02). You should be logged in as root.

Next, choose a unique name for your system; exactly seven characters (numbers and/or letters) work best. Place the name as a single line of data in the file "/etc/systemid" using either editor, ed or vi. This file already contains "trs16", used with uucp. I used the serial number of my machine (2001424) as my system identification.

Verify that your "/etc/passwd" file contains the following line:

uucp::4:4::/usr/spool/uucppub:/usr/lib/uucp/uucico

If the entry is not present, put it there with either ed or vi. If it is there, you probably have "uucppublic" instead of

ILLUSTRATION BY JOE GALLO

Without a resident XENIX guru, uucp ("UNIX-to-UNIX copy"), one of several programs in the XENIX networking system, is not easy to implement. In this article Rich Bilancia describes how he installed it.

"uucppub", so edit the line accordingly by typing the following command:

mv /usr/spool/uucppublic /usr/spool/uucppub

(This edit and the rename using the "mv" command will eliminate a minor problem with the "finger" command. You can use "/usr/spool/uucppublic" as the default directory if you are not concerned about the problem with "finger".)

Also, issue the following three commands, as indicated on page 5 of the *TRS-XENIX Development System Installation Guide:*

chmod 777 /usr/spool/uucp
chown uucp /usr/spool/uucp
chgrp uucp /usr/spool/uucp

Create three files in the "/usr/lib/uucp" directory. These critical files, which control almost all uucp protocol and security options, are:

L-devices contains information about modems and hard wired connections

L.sys contains information required to make the connection

USERFILE contains user accessibility information

The L-devices File

According to the *XENIX System Reference Manual*, the format for each entry in the L-devices file is

line call-unit speed

A typical file might contain the following entries:

cul0 cua0 1200
cul0 cua0 300
tty02 0 9600

Use the first two entries if a Radio Shack 300/1200 baud modem is connected to serial channel A (i.e., "/dev/tty01") of the Model 16. Use the third entry if another UNIX/XENIX system is hard wired (with a single null modem and an RS-232C cable) to serial channel B (i.e., "/dev/tty02").

The L-devices file should have the following protection:

rw-rw----

Unless the tty port to which you have connected either a modem or an RS-232C cable is disabled, strange things will happen. Assuming that serial channel A is being used as the communications channel, type

disable tty01

while logged in as root to disable port A.

The USERFILE File

The USERFILE contains information about the remote systems you wish to communicate with, and specifies three things: (1) which files can be accessed by a normal user of the local machine; (2) which files can be accessed from a remote computer; and (3) which login name is used by a particular remote computer.

According to the *XENIX System Reference Manual*, the format for each entry in the USERFILE file is:

[login],sys path-name [path-name] ...

where "login" is the login name for a user on the remote computer, "sys" is the system name for a remote computer, and "path-name" is the list of directories permitted to be written into or read from.

A typical file on machine 2001424 might contain the following entries:

,2001424 /
uucp,acctmth /usr/spool/uucppub /usr/spool/mail
uucp,accutul /usr/spool/uucppub /usr/spool/mail /usr/rab
, /usr/spool/uucppub

The first entry allows any user (indicated by the null before the comma) on my machine (system 2001424) to send any file on the machine to any other system. The second and third entries allow a user "uucp" on systems "acctmth" and "accutul" to read and/or write files in the "/usr/spool/uucppub" and "/usr/spool/mail" directories on system 2001424.

In addition, user "uucp" on system "accutul" can read and/or write files in the "/usr/rab" directory. The fourth line allows any user, logged in on any system, to read and/or write only files stored in "/usr/spool/uucppub".

The USERFILE file should have the following protection:

rw-rw—

Any directory to which you want a file transferred must have complete write permission. Use the command:

chmod a+w directory-name

Any directory from which you want to transfer a file must have complete read permission. Use the command:

chmod a+r directory-name

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True 16-Bit Microprocessor	Yes (80186) 16 bit/16 bit data path	No (8088) 16 bit/8 bit data path
User-Available Expansion Slots*	4	2
Grapics Options		
Color Resolution	640 × 400	320 × 200
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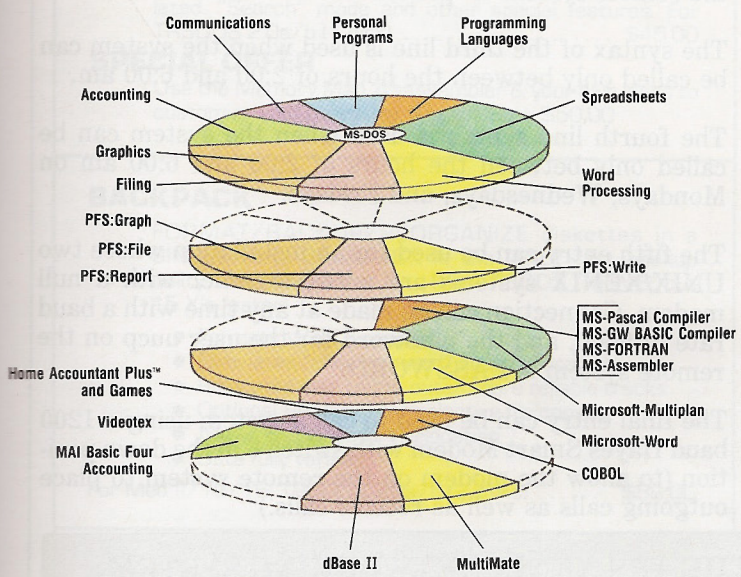

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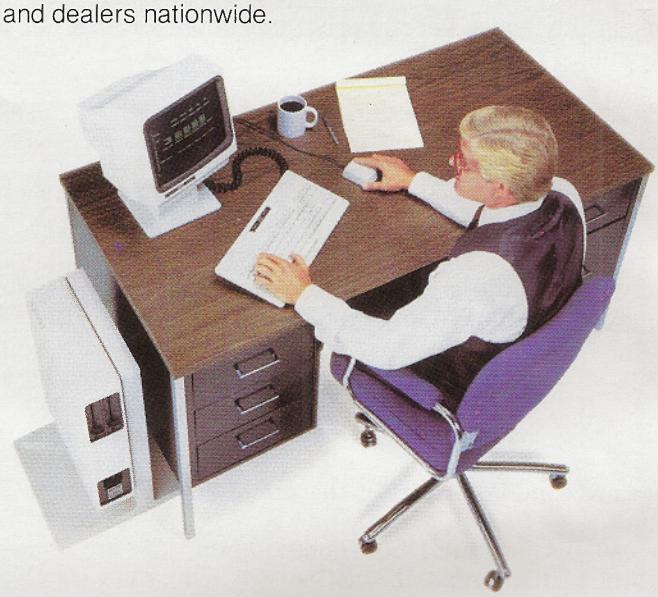

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The L.sys File

Each entry in the L.sys file represents one remote system that can be called by uucp. The format for each entry in the L.SYS file is

system time device baud phone [expect send | expect-send-expect] ...

where "system" is the name of the remote system (in its "/etc/systemid"); "time" is a string indicating the days-of-week and times-of-day when the system should be called; "device" is either ACU or the direct connected line used for the call; and "phone" is the telephone number dialed or the same string used in the device field if a direct connection.

In the last series of fields, "expect" is a string expected to be read during the login procedure, and "send" is a string sent when the "expect" string is received.

A typical file might contain the following entries:

```
fgmdsir Any ACU 1200 5551212 ogin-BREAK2-ogin uucp
acctmth Any ACU 1200 3035551212 ogin-BREAK2-ogin uucp ssword private
cleburn 0200-0600 ACU 1200 18175551212 ogin-BREAK2-ogin uucp
chrono  MoWeFr0200-0600 ACU 1200 5551212 ogin-BREAK2-ogin uucp
fgmdsir Any tty02 9600 tty02 ogin uucp ssword PASSWORD
accutul Any ACU 1200 5551212 "" ^M ogin:-\r-ogin:-\r- ogin: uucp
```

The first four entries can be used to call another system using a Radio Shack 1200 baud modem. The syntax of the first line is used when the system can be called at any time, and there is no password for the user uucp on the remote system.

Use the syntax of the second line when the system can be called at any time, and the password for the user uucp on the remote system is "private".

The syntax of the third line is used when the system can be called only between the hours of 2:00 and 6:00 am.

The fourth line syntax is used when the system can be called only between the hours of 2:00 and 6:00 am on Mondays, Wednesdays, and Fridays.

The fifth entry can be used for an installation where two UNIX/XENIX systems are wired together with a null modem. Connection can be made at any time with a baud rate of 9600, and the password for the user uucp on the remote system is PASSWORD.

The final entry can be used to call a system using a 1200 baud Hayes Smart Modem with switch 6 in the down position (to allow the modem on the remote system to place outgoing calls as well as receive calls.)

THE COMPLETE SET OF PROGRAMS IN THE TRS-XENIX NETWORKING SYSTEM

Uucp is only one of several programs in the XENIX networking system. In addition to uucp, the full set includes the following:

uucico	Does the actual copying of files.*
uulog	Maintains and reports on file transfers.
uucleana	Removes old files from the spool directory.
uux	Gathers programs or files from several systems, executes the programs if appropriate, and sends the output to any system.
uuxqt	Does the program executions requested by uux.
mail	Sends and receives electronic mail on a single system; also sends mail to remote systems.

Here are some examples of the use of uux.

```
uux ca070 < accutul!/Dta.01/jobcost/data__file
nroff doc__file | uux - chrono!lpr
uux diff acctmth! /usr/spool/uucppub/file1 fgmdsir!/usr/spool/uucp/file 2
```

The first example will execute a program "ca070" in the current user's path on the local computer, but will use a file named "data__file" in the "/Dta.01/jobcost" directory on a remote computer with a system named "accutul".

The second example will locally execute the formatter "nroff" on a local file in the current directory named "doc__file" and pipe the output to "uux" which will take the piped input (denoted by the "-") and send it to the line printer spooler ("lpr") on a remote computer with the system name "chrono".

The third example will locally execute the program "diff" on two files: "file1" in the directory "usr/spool/uucppub" on the "acctmth" system, and "file2" in the directory "/usr/spool/uucppub" on the "fgmdsir" system.

The version of uucio on version 01.02.00 of TRS-XENIX has a major deficiency; it does not wait long enough after dialing a long distance number to make a connection before giving a "time out" error message. Version 01.03.02 of TRS-XENIX corrects this problem.

The L.sys file should have the following protection:

rw-rw-rw-

Using uucp

To send a file named "data_to_send" in the current working directory on the local machine to the "/usr/spool/uucppub" directory on the system named "acctmth", use:

uucp data_to_send acctmth!/usr/spool/uucppub

Pay attention to the exclamation character that separates a system name and the file or directory name on that system; there are no spaces before or after the exclamation mark.

To retrieve a file named "data_to_get" from the "usr/spool/uucppub" directory on a machine with a system name of "fgmdsir" and place that file in the "/usr/spool/uucppub" directory with the name "received" on the local machine, use:

uucp fgmdsir!/usr/spool/uucppub/data_to_get /usr/spool/uucppub/received

Electronic Mail

The commands to send electronic mail between machines are illustrated by:

mail chrono!rdc < mail_to_send
mail cleburn!fgmdsir!hank < more_mail

In the first example, the contents of the file "mail_to_send" in the current working directory of the local machine are spooled for later transmission to the user "rdc" on the remote system "chrono".

In the second example, an intermediate system named "cleburn" passes mail to the user "hank" on a second remote system named "fgmdsir". Routing E-Mail through an intermediate system minimizes long distance telephone charges.

Both of these mail examples require implementation of the poll program described following, so periodic connections take place between the two machines.

The Poll Program

The Poll Program, a shell program (Figure A) given to me by Dennis Young from Radio Shack's National Account Customer Support Group, periodically calls one or more remote systems to transfer any files spooled for transfer; it's especially helpful when using remote mail.

The program can be invoked by the root or super-user with the following:

/usr/lib/uucp/poll system1 [system2 ...]

where "system1" and "system2" are the remote system names to be called. In addition, lines can be added to "/usr/lib/crontab" to execute the program at various times. For example, adding the following line to

```
:
:       poll uucp system
:
:       tudor apmadoc
:       9/22/83
:
disable tty01
while test "$1" != ''
        do

        for i in 1 2 3 4 5 6 7 8 9 0
            do
                if test -s /usr/spool/uucp/LCK.XQT
                  then
                    sleep 180
                  else
                    break
                  fi
            done

        /usr/lib/uucp/uucico -rl -s$1
        sleep 10

        for i in 1 2 3 4 5 6 7 8 9 10
            do
                if test -s STST.$1
                  then
                    rm -f STST.$1
                    /usr/lib/uucp/uucico -rl -s$1
                      sleep 10
                    echo 'try #' $i
                  else
                    break
                  fi
            done

            if test -s STST.$1
                then
                  rm -f STST.$1
                  /usr/lib/uucp/uucico -rl -s$1 -x9 2>/tmp/uucp$$
                fi

        shift
        done

enable tty01 2>/dev/null
```

"/usr/lib/crontab" causes the local system to call a system called "acctmth" at 03:00 am every day:

0 3 * * * /usr/lib/uucp/poll acctmth

The program should be stored in a file using one of the XENIX editors, saved in the "/usr/lib/uucp" directory, and have an ownership of uucp with the following protection:

rwxr-xr--

Diagnostic Messages

Each message in "/usr/spool/uucp/LOGFILE" has the standard format:

<user> <system> (<mm>/<dd>-<hh>:<mm>) <message>

<mm>, <dd>, <hh>, and <mm> represent the date and time of the log message. <system> is the name of the other system. <user> is the login name of a user, to the extent that it can be determined. The user name may be the login name used by the system to log in to uucp, or it may be the name of a user on a remote system who made the last request. <message> can be one of the messages detailed below.

The first series of messages relate to calls to or from another system.

SUCCEEDED (call to <system>)
A call from this system to <system> succeeded.

FAILED (call to <system>)
A call from this system to <system> was attempted and did not succeed. Possible reasons:
1.) The communication link between the two systems was disconnected.

2.) The other system was shut down.
3.) (When using modems) The telephone line of the other system was busy.

FAILED (login)
The login handshaking sequence failed when this system attempted to login on <system>. Dialing, if involved, succeeded. Possible reasons:

1.) <System> does not have logins enabled on the line.
2.) The L.sys file on this system does not have correct login and password information for <system>.
3.) The systems do not agree on what baud rate to use, or this system is having trouble getting <system> to change baud rates.
4.) The connection between the systems dropped shortly after being connected.
5.) <System> was very heavily loaded and took too long to respond.

FAILED (startup)
After logging in, the exchange of system names and agreement on a transmission protocol failed. Possible reasons:

1.) The connection between the systems dropped shortly after being connected.
2.) The connection between the systems is very noisy.

LOCKED (call to <system>)
A call was attempted to <system>, but a lock file is present, indicating that a call is already being attempted to <system>. Possible reasons:

1.) A call actually is in progress to <system>, and the uucp command started another one. This situation frequently occurs if several uucp commands are directed to the same system. The first one starts a connection, and later ones log the LOCKED message and quit. If the spool files are put in place quickly enough, the first call will transfer the information requested by the later requests.
2.) Something aborted and left a file "/usr/spool/uucp/LCK..<system>" lying around. Do a "ps -ax" to verify that no uucico process is talking to <system>; then remove the lock file.

NOT AVAILABLE (device)
A call was attempted to <system>, but no dialup lines (with an appropriate baud rate) are available. Possible reasons:

1.) There is a call to another system on (all of) the dialup line(s), or the hardwired line is in use.
2.) Something aborted and left a file "/usr/spool/uucp/LCK..<line>" lying around. Do a "ps -ax" to verify that no uucico process is using that line; then remove the lock file.

NO CALL (RETRY TIME NOT REACHED)
A call to <system> failed to connect, or was aborted in progress, and not enough time (10 minutes) has passed to try again. To force an immediate retry, remove the file "/usr/spool/uucp/STST.<system>" and start a uucico process.

HANDSHAKE FAILED (BAD SEQ)
This message occurs only if call sequence checking is enabled for the connection in "SQFILE" on one or more of the systems. Reasons for handshake failure:

1.) The sequence numbers do not match, indicating that the previous caller was an impostor.

2.) Sequence checking was enabled on one system but not the other.

3.) "SQFILE" is not readable on one system (wrong owner is a common reason).

4.) The last call failed just at the critical moment when one system had updated the sequence number but the other had not. Adjust the "SQFILE" entries on one or both systems so that the sequence count matches. Remove the "/usr/spool/uucp/STST.<system>" files on both systems.

The next series of messages relate to file transfer once a call has been established.

Many of these messages will reference spool file names of the form C.<system><grade><sequence>, D.<system><grade><sequence>, or X.<system><grade><sequence>, where <system> is a system name (local or the remote involved), <grade> is a single character, and <sequence> is a 4-digit sequence number. These files are found in "/usr/spool/uucp."

REQUEST (S <local filename> <remote filename> <user>)
A file transfer was requested by <user> on this system to send <local filename> on this system to <remote filename> on <system>. The normal message on completion is REQUEST (SUCCEEDED).

REQUESTED (S <remote filename> <local filename> <user>)
A file transfer was requested by <user> on <system> to send <remote filename> on <system> to <local filename> on this system. The normal message on completion is COPY (SUCCEEDED).

REQUEST (R <local filename> <remote filename> <user>)
A file transfer was requested by <user> on this system to fetch <remote filename> on <system> to <local filename> on this system. The normal message on completion is COPY (SUCCEEDED).

REQUEST (R <remote filename> <local filename> <user>)
A file transfer was requested by <user> on <system> to fetch <local filename> on this system to <remote filename> on <system>. The normal message on completion is REQUEST (SUCCEEDED).

REQUEST (X <source filename> <destination filename>)
A user on <system> requested that a uucp command be executed on this system to copy from the source to the destination file. Both source and destination may have system name prefixes. This request is the result of a user executing a uucp command that requests file transfer with neither source nor destination on the local machine.

COPY (SUCCEEDED)
A file transfer to this system succeeded, for one of the requests above.

REQUEST (SUCCEEDED)
A file transfer from this system succeeded, for one of the requests above.

RCV REQUEST (REMOTE DENIED)
File transfer permission was denied because of security rules on <system>. This may mean USERFILE specifications, files not readable/writable by everyone, or files/directories that did not exist.

SEND PERMISSION (UNIX DENIED)
File transfer permission was denied because of security rules on this system.

BAD READ (EXPECTED "<c>" got FAIL)
The protocol between the two machines got confused and the system gave up because of too many errors. Probable reasons:

1.) <system> was heavily loaded and did not respond quickly enough.

2.) The transmission link was noisy and too many errors occurred.

3.) If <c> was "H", this may mean that <system> was moderately loaded, but has a large spool directory that took too long to search.

CAUGHT (SIGNAL <n>)
The uucico process caught signal <n> and terminated. See signal(2) for signal numbers. Typically the signal is a hangup (the line disconnects unexpectedly), or a kill signal (someone attempted to kill the uucico process).

The following series of messages relate to command execution.

<user> XQT (PATH=/bin:/usr/bin; export PATH; <command>)
<user> on <system> requested that <command> be executed, and execution was attempted. Typically <command> will be "rmail <targetuser>". <user> will probably be shown as uucp if the mail was forwarded through <system> from a system to which it is connected.

<user> XQT DENIED (<command>)
<user> on <system> requested that <command> be executed, and permission to execute the command was denied. Typical reasons:

1.) <command> was not on the authorized list of remote commands (rmail, rnews, uusend)

2.) shell features such as "command," several commands on a line, etc., were used that are considered a security risk.

QUEUED (C.<system><grade><sequence>)
A uucp command has queued a request for file transfer with <system>. The request is stored in the spool file indicated. ■

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STARFLIGHT® — This is a Star Trek type game. The object is to collect data about Omega VI, an unexplored area of the galaxy; to locate and destroy the 20 Klingon Invaders.

CONCENTRATION — The computer will make up the game board. You will try to find the matching prizes. After each correct guess, you will have a chance to guess at the secret number. Guess right, and you win all of your prizes.

TREASURE HUNT — The Lumas caves, located in Lumusville, Vermont, are said to have 20 hidden treasures in them. Few explore the caves because it is said that pirates and dragons live there, and there are deep pits which many have fallen into and died. You, a smart and brave human, and I, an alert computer, will explore the caves and try to find the treasure.

BANKO — The Game is similiar to Black Jack. You draw numbers stopping before the total point value exceeds 11. If you go over 11, then your hand will be zeroed. If you draw 5 times without going over 11, then you'll receive bonus points equal to the value of your hand at the time you end your turn.

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The object of a game is to amass treasure for points or accomplish some other goal such as preventing the destruction of the automated nuclear plant in Mission Impossible. Successfully completing a game, however, is far easier to state than achieve. In many cases you will find a treasure but be unable to take it until you are carrying the right combination of objects you find in the various locations.

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#2 PIRATE ADVENTURE — The lost treasures of Long John Silver lie hidden somewhere — will you be able to recover them?

#3 MISSION IMPOSSIBLE ADVENTURE —In this exciting Adventure, time is of the essence as you race the clock to complete your mission in time —or else the world's first automated nuclear reactor is doomed!

#4 VOODOO CASTLE — The Count has fallen victim to a fiendish curse with you his only possible hope. Will you pull off a rescue, or is he down for the Count for good?

#5 THE COUNT — It begins when you awake in a large brass bed in a castle somewhere in Transylvania. Who are you, what are you doing here and WHY did the postman deliver a bottle of blood?

#6 STRANGE ODYSSEY — At the galaxy's rim, there are rewards aplenty to be harvested from a long-dead alien civilization, Will you be able to recover them and return home?

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By H. Peter Friedrichs

CARING FOR YOUR HARD DISK DRIVE

The hard disk drive is a remarkable marriage between ultra-fast digital electronics and electro-mechanical servo mechanisms.

Hard Drive Components

In the case of Radio Shack's 12 meg, three rigid magnetic platters, stacked vertically much like the 45s in the old style juke-boxes, comprise the medium on which information is stored. Housed in a specially sealed chamber, the platter assembly is spun at 3600 rpm.

Perhaps the most remarkable physical feature of the hard drive is the read/write head. Six heads are mounted on the tips of long "fingers" geared to move in and out, above, below, and in between the rotating platters, providing six surfaces on which to record data. The heads themselves never actually touch the magnetic coatings on the platters, but rather float a molecule's width above them.

Two hundred thirty tracks are recorded on each surface, and six tracks in a vertical row are termed "cylinders." Control circuitry, both in the back of your computer and on boards in the drive itself, deposits data on the platters to the tune of 10,000 bits per inch!

Handling the Drive

Ownership of a hard drive demands a great deal more responsibility than simply unpacking the unit and plugging it in. The hard drive is a delicate mechanism, and every effort you make to take care of the unit is simply that much more insurance that the "big crash" will never happen.

Mechanical mistreatment of the hard drive is a big no-no. You wouldn't dream of banging your fine Swiss watch about; the drive shouldn't be treated any differently.

Once the hard disk drive for your computer is unpacked and hooked up, your approach toward the use of this device will ultimately determine whether it ends up being a godsend, or an electronic Pandora's Box.

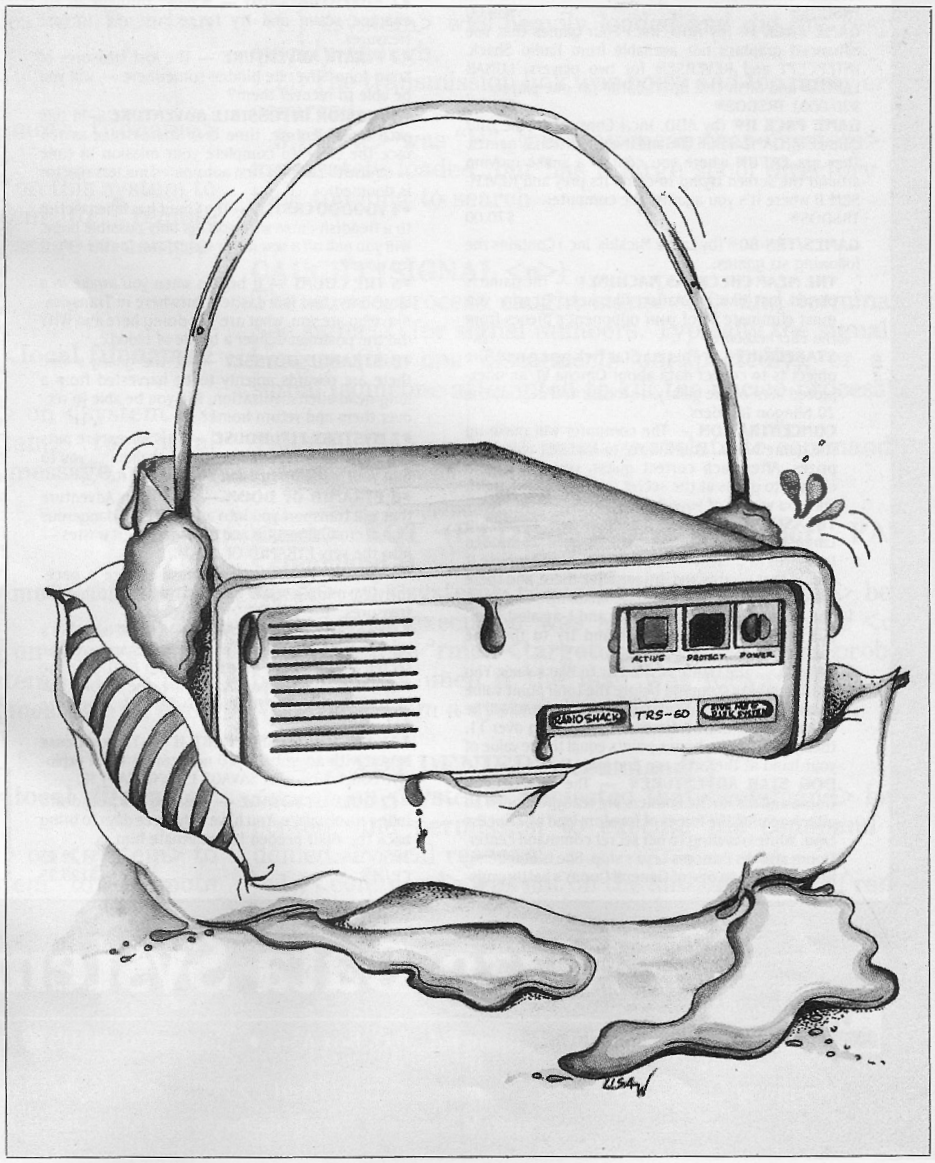


ILLUSTRATION BY LISA WORTMANN

The heads glide precariously above the whirling platters, and little effort is required to cause them to crash into and damage the coating on the platter. Never lift, slide, or move an operating hard drive in any way, unless you have already made funeral arrangements well in advance.

For those of you who own Radio Shack system desks, and are currently storing your drive on the shelf above the drawer, it is advised that you reconsider. Should that drawer ever close sharply, your payroll and general ledger may become a thing of the past. Shortly, I will explain how I dealt with that problem.

Environmental factors are also very important. Keep the telephone, typewriter, and electric fan off of the drive's cabinet. Virtually all electric devices generate a magnetic field of some intensity, and the risk of losing your boot track or directories is not worth it.

Keep temperatures reasonable as well. The drives were not designed for use in the Arctic, nor were they designed for use in the Amazon River Basin. Generally speaking, if you can work comfortably in a given location, so can your computer.

Dust is another factor frequently overlooked. These seemingly innocent particles are terribly destructive to precision computer equipment, and all steps taken to minimize the threat are well spent. Keep your drive's air filter clean because dirt will seep into the machine if the filter clogs. Also, a drive that can't "breathe" properly will overheat. At best, your data will disappear. At worst, the damage to the drive will be permanent.

A Solution To The Problems

I took direct action against these threats to our data by purchasing a common stereo cabinet. Once assembled, I covered the cabinet's open back, with the exception of an exhaust slot near the top, and installed two small cooling fans near the bottom. A sheet of filter material was secured over each fan.

Once completed, I moved our hard drive and several accessories into the cabinet, allowing the drive to sit clear of the computer where it won't be disturbed. The glass door allows operators to see the drive activity light, modem status lights, and our voltmeter without having to open it.

Cool air, drawn through the filters and the fans, is cleaned and forced under pressure into the cabinet. Once the heat is removed from the enclosed equipment, it rises and escapes from the exhaust slot.

With this arrangement, the hard drive runs considerably cooler than it would otherwise. Also, I haven't had to clean the drive's filter in several weeks. My only maintenance involves cleaning the fan filters every so often.

I've also been able to cut back drastically on our dust problem with the use of a cheap box fan. Our printers run nearly eight hours a day. Churning print heads and reams of paper throw buckets full of dust into the air. By taping a common furnace filter onto the back of our floor fan and allowing it to run constantly, the dust problem has been significantly reduced.

Backups Are Important

There will always be problems, whether a control board breaks down or an operator pushes the wrong button. It is inevitable that data will disappear from time to time. We have discovered through experience that **nothing** is worth more than a good set of backups. TRSDOS users will find the SAVE and RESTORE utilities handle this job nicely. A word of caution to XENIX users, however. Do not give in to the temptation of using the SYSADMIN utility. Stick to the TSH-shell SAVE routine because restoring a crashed system from SYSADMIN backups may be more trouble than starting over from scratch.

When it comes right down to it, your hard drive is a device engineered to perform a task nothing short of a miracle. All it asks for in exchange is some simple care and respect. If you are willing to provide that, you may well find your hard drive is the best purchase you have made in a long time. ■

By Burt Reany

ISAM FILES: RECOVERY & RESTORATION

BASIC and COBOL utility programs for the RSBASIC user, and users of RSCOBOL or TRS-80 Ryan-McFarland COBOL.

Have you ever been processing the final monthly run against your Indexed master files of a Compiler BASIC or COBOL application package and seen that glorious cancellation message that says your master file has a bad index?

Once your indices are found to be inconsistent, your programs can no longer open the master file to produce a sequential backup master, or provide inquiry against any of the file records.

Judicious backup procedures can ease the pain of file recovery, but who can forget the time it took 18 hours to isolate and re- enter the input needed to update the backup file?

BASIC Recovery Program

It seemed to me that a less time-consuming solution was in order, so I wrote a BASIC utility program (Program A) that parses the damaged ISAM (Indexed Sequential Access Method) master file for its control information so that it can scan the Indexed file for logical data records, and then creates a sequential backup data file of the recovered records.

If you're using a COBOL program, first you'll need to run the BASIC utility program. Then run the COBOL restoration utility program (Program B), a simple program skeleton which, when modified in the SELECT and FD record layouts with data displayed by the BASIC recovery program, will restore the Indexed data file.

The BASIC recovery utility program looks at the control blocks of the damaged ISAM master file and displays the number of index key fields in each master record, together with the length and displacement in the record of each key field. The logical

```
10 REM  COBOL ISAM data records occur in the physical file, prefixed
20 REM    by a two-byte length attribute, on 32-byte 'AU' (Allocatable
30 REM    Unit) boundaries. LRL is the Logical Record Length of the
40 REM    data record to be recovered.
50 REM             * Burt Reany - (412) 543-9385 or 763-9601 (home) *
60 REM (This routine only works for records of less than 4094 bytes LRL)
70 REM (You must respond with the actual LRL for it to find your records)
80 REM
90 PRINT "          Recovery Routine for Crashed Cobol Isam Files."
100 PRINT "           (Works on Basic or Cobol Indexed Data Files)"
110 PRINT "  "
120 PRINT "        (You must enter the actual logical record length"
130 PRINT "          for it to be able to find your data records)"
140 PRINT " "
150 INPUT "    Which input data file?  ",FILE$
160 TREE#=65533!
170 LINK#=65534!
180 OPEN "D",1,FILE$,1
190 FIELD 1,1 AS A$
200 FOR I=1 TO 2
210 GET 1,I
220 IF ASC(A$)=255 GOTO 240
230 PRINT " (Probably not an Indexed file - please check file name"
240 NEXT I
250 INPUT "   Which output data file?  ",OUT$
260 PRINT " "
270 GET 1,5
280 LRL#=(32 * (ASC(A$)-1))-2
290 PRINT " MIN LOG RECORD LENGTH = ";LRL#
300 LRL#=(32 * ASC(A$))-2
310 GET 1,3
320 PKL#=(32*ASC(A$))+1
330 GET 1,PKL#
340 PRL#=ASC(A$)
350 GET 1,PKL#+1
360 PRL#=PRL#+(256*ASC(A$))
370 PRINT " MAX LOG RECORD LENGTH = ",LRL#
380 PRINT "         (Probable LRL) = ";PRL#
390 INPUT " LOGICAL RECORD LENGTH = ";LRL#
400 IF LRL#>3 GOTO 430
410 PRINT "*ERROR*  - Length too small"
420 GOTO 390
430 GET 1,31
440 KEY#=ASC(A$)
450 OPEN "D",2,OUT$,LRL#+1
460 FIELD 2,LRL#+1 AS B$
470 PRINT "         NUMBER OF KEYS = ",KEY#
```

record length is then isolated and displayed.

With this information, it isn't difficult to modify the skeleton of the COBOL restoration utility program, which then re-creates your ISAM master file from the recovered sequential file.

Since the BASIC recovery utility provides the key information needed to reconstruct the ISAM file, the program can also be used to restore ISAM master files of COBOL Application Packages which do not include the source code for the programs.

(For those of you who enjoy a challenge, the BASIC recovery utility could also be written in COBOL. The COBOL restoration program can be re-written in Compiler BASIC, if the file has a single ISAM key field; but if it has more than one key field, only a COBOL mulit-key program will restore it.)

The key to the operation of the BASIC recovery utility lies in the format of ISAM files, which are used both by Compiler BASIC and Ryan-McFarland COBOL. ISAM files are direct files, or fixed length record (FLR) files, which use a special format to overlay the FLR records.

For ISAM work, the FLR records are arbitrarily divided into 32- byte blocks called Assignable Units (AUs). The control, index, and user data records on the file are kept separate from one another by storing each record type in an individual AU.

```
480 FOR SUBA = 1 TO KEY#
490 GET 1,19+(SUBA*14)
500 PRINT " "
510 PRINT " KEY NUMBER;  ",SUBA
520 PRINT "          (LENGTH)        ",ASC(A$)
530 GET 1,21+(SUBA*14)
540 PRINT "          (DISPLACEMENT)  ",ASC(A$)
550 NEXT SUBA
560 PRINT " "
570 REM
580 P#=1
590 Z$=""
600 PA#=32*P#
610 PA#=PA#+1
620 GET 1,PA#
630 P#=P#+1
640 IF EOF(1) THEN GOTO 890
650 IRL#=ASC(A$)
660 GET 1
670 IRL#=IRL#+(256 * ASC(A$))
680 IF IRL#=TREE# THEN P#=P#+15: GOTO 600
690 IF IRL#=LINK# THEN GOTO 600
700 IF IRL#=LRL# THEN 710 ELSE 600
710 GET 1
720 REM     IF A$="S" THEN 730 ELSE 600
730 PRINT A$;
740 REM       (This is the remains of an edit routine to further
750 REM           identify valid data records.)
760 Z$=""
770 Z$=Z$+A$
780 FOR I=1 TO LRL#-1
790 GET 1
800 PRINT A$;
810 Z$=Z$+A$
820 NEXT I
830 PRINT "*EOR*"
840 Z$=Z$+CHR$(10)
850 LSET B$=Z$
860 PUT 2
870 P#=INT(LOC(1)/32)+1
880 GOTO 600
890 CLOSE 1,2
900 END
```

When a new object record is needed in the file to store data, the BASIC recovery utility program adds as many new AUs as necessary to hold the object at the end of the existing file. (Evacuated AUs, in which the data has been deleted, may be re-issued if they are available.)

The ISAM Master File

There are four types of objects in the ISAM master file: (1) User Data Records; (2) Header (two or more AUs at the file start); (3) Index Trees (each node is 16 AUs in length); and (4) Linked Lists.

User Data Records

When each User Data Record is added to the ISAM master file, it is prefixed with a two-byte binary length attribute field. This prefix is in Least Significant-Most Significant format. Thus, a 90-character User Data Record will be prefixed by two bytes with a value of hex 5A00.

The BASIC recovery utility program assigns as many contiguous AUs as necessary to hold the User Data Record with its prefix when the record is created. Thus, the recovery program can step through the ISAM master file, look at the first two bytes of each AU for a record length attribute equal to the user's logical record length (LRL), and identify the User Data Records. When an AU containing the LRL in the first two positions is discovered, the LRL number of bytes is read; a hex 0A is added after the last User Data Record character, and these (LRL+1) characters are written to an output sequential master data file.

After an AU is filled out, any space remaining is not used by the system, meaning that a User Data Record of 31 to 62 characters will fit in two AUs, but a 63 character record will require three AUs for each record. Thus, a 62 character record requires 64 characters of file space per data record, but a 63 character data record requires 96 characters per data record, a considerable waste of precious file space.

Header Record

The Header Record, containing primary control for the file, is the first set of AUs on the ISAM master file. The fields contained are as follows:

1.) Header code word (Hex FFFF)
2.) Number of AUs of Header
3.) Number of AUs for each User Data Record
4.) Head of Free Node List
5.) Number of Free Nodes
6.) Head of Free Record List
7.) Number of Free Records
8.) Head of Free Duplicate Block List
9.) Number of Free Duplicate Blocks
10.) Next Free AU
11.) Flag Word
12.) Number of User Key Fields per record
13.) Key Length*
14.) Key Offset (Number of bytes from the 1st byte of the User Data Record to the start of the Key Field)*
15.) Index Tree Height*
16.) Root of Index Tree*
17.) Next Available Stamp Number
*Repeated for each key

If the ISAM file has only one key, the Header is only one AU in length. If the ISAM file has more than one key, fields 13 through 16 are repeated for each of the alternate keys, making the Header record more than 1 AU in length. In our example dump of a dummy file (created by opening an output ISAM file and closing it without creating any user data records) the values are parsed and explained. See Figure 1.

Index Tree Records

The Index Tree Records are the actual index fields used to find and retrieve the User Data Records in a random read. Because the Index Tree Records are all 16 AUs in length, the BASIC recovery program skips these 16 AUs when an Index Tree is identified.

1.) Node Count Word (Hex FDFF)
2.) Number of keys in this node
3.) Left Pointer
4.) Data Pointer*
5.) Key Value*
6.) Right Pointer*
*Repeated for each key

Linked List Records

Linked List Records are identified by a hex FEFF in the first two bytes. These objects don't seem to have an easily detectable length attribute that allows the recovery program to skip to the start of the next object.

```
 IDENTIFICATION DIVISION.
 PROGRAM-ID.                RSTRISAM.
 AUTHOR.                    BURT REANY.
*
*****************************************************************
*     This routine restores an ISAM master file to disk from    *
*     the sequential output file created by the BASIC ISAM      *
*     file recovery utility. The 'SELECT' statement and the     *
*     record layout must be revised for each file, to agree     *
*     with the data provided on the recovery run screen.        *
*****************************************************************
*
 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
 SOURCE-COMPUTER.  TRS-80-16.
 OBJECT-COMPUTER.  TRS-80-16.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
*
     SELECT ISAM-MSTR  ASSIGN TO RANDOM ISAM-MSTR-FILENAME
            ORGANIZATION IS INDEXED
            ACCESS IS RANDOM
            RECORD KEY IS ISAM-01-10
            ALTERNATE RECORD KEY IS ISAM-41-46
                 WITH DUPLICATES
            ALTERNATE RECORD KEY IS ISAM-51
                 WITH DUPLICATES
            FILE STATUS IS IO-CHECK.
*
     SELECT MSTRSEQ    ASSIGN TO INPUT-OUTPUT  MSTRSEQ-FILENAME
            ORGANIZATION IS SEQUENTIAL
            ACCESS IS SEQUENTIAL
            FILE STATUS IS IO-CHECK.
*
 DATA DIVISION.
 FILE SECTION.
 FD  ISAM-MSTR
     LABEL RECORDS ARE STANDARD.
 01  ISAM-REC.
     03  ISAM-01-10          PIC X(10).
     03  FILLER              PIC X(30).
     03  ISAM-41-46          PIC X(06).
     03  FILLER              PIC XXXX.
     03  ISAM-51             PIC X.
     03  FILLER              PIC X(49).
*
*
 FD  MSTRSEQ
     LABEL RECORDS ARE STANDARD.
 01  MSTRSEQ-REC             PIC X(100).


        *
         WORKING-STORAGE SECTION.
         77  ISAM-MSTR-FILENAME  PIC X(20) VALUE "WTSMSTR/DTA".
         77  MSTRSEQ-FILENAME    PIC X(20) VALUE "WTSMSTR/SEQ".
         01  IO-CHECK.
 000100*01  IO-CHECK-STATUS-BYTES.
 000125          88  IO-IS-SUCCESS              VALUE "00"  "02".
 000150          88  IO-IS-DUPLICATE            VALUE "02"  "22".
 000155          88  IO-IS-SEQ-ERR              VALUE "21".
 000160          88  IO-IS-NOT-FOUND            VALUE "23".
 000165          88  IO-IS-BOUNDARY             VALUE "24".
                 88  IO-IS-GENERAL-INVALID      VALUE "90".
                 88  IO-IS-GENERAL-UNOPENED     VALUE "91".
                 88  IO-IS-GENERAL-UNCLOSED     VALUE "92".
                 88  IO-IS-GENERAL-UNAVAILABLE  VALUE "93".
                 88  IO-IS-GENERAL-BAD-OPEN     VALUE "94".
                 88  IO-IS-GENERAL-BAD-DEVICE   VALUE "95".
                 88  IO-IS-GENERAL-BAD-POINTER  VALUE "96".
                 88  IO-IS-GENERAL-BAD-LENGTH   VALUE "97".
                 88  IO-IS-GENERAL-BAD-INDEX    VALUE "98".
                 88  IO-IS-GENERAL-REC-LOCKED   VALUE "99".
 000175      03  IO-CHECK-1                 PIC X.
 000200          88  IO-IS-AT-END               VALUE "1".
 000225          88  IO-IS-INVALID              VALUE "2".
 000250          88  IO-IS-PERMANENT-ERR        VALUE "3".
 000275          88  IO-IS-GENERAL-ERR          VALUE "9".
 000300      03  IO-CHECK-2                 PIC X.
        *
```

```
PROCEDURE DIVISION.
HOUSEKEEPING.
    OPEN INPUT MSTRSEQ.
    OPEN OUTPUT ISAM-MSTR.
READ-CYCLE.
    READ MSTRSEQ     INTO ISAM-REC
        AT END GO TO ABANDON-SHIP.
    WRITE ISAM-REC
        INVALID KEY  PERFORM NULL-ROUTINE.
    GO TO READ-CYCLE.
ABANDON-SHIP.
    CLOSE MSTRSEQ.
    CLOSE ISAM-MSTR.
    STOP RUN.
NULL-ROUTINE.
    DISPLAY ISAM-01-10, ", io-check = ", IO-CHECK.
```

The BASIC recovery program ignores the first AU of the Linked List object and continues its search with the start of the next sequential AU.

Because the next AU may still be within the Linked List object, the first two bytes of the AU may have a value equal to the record length being sought. The BASIC recovery program will then write a spurious entry to the output sequential file, and may miss a legitimate User Data Record. Further editing of the data located in the suspected Data Record can resolve this problem. (If anyone has further clues into the nature of this beast, please let me know.)

Limitations of the Program

Several observations should be made to explain the limitations of this recovery program. RSBASIC, unlike COBOL, does not require the value of the key field of the User Data Record to appear in the User Data Record itself. This program requires that the key field appear in the User Data Record. (A modification to scan the Index Tree for the keys and read the associated User Data Record will be required if your files use this feature.)

The screen display of the User Data Record will help identify any invalid sequential output data records found by the program. These can then be removed from the sequential file before the restoration by standard edit programs.

The data records output to the sequential backup file were in sequence somewhat by the time they were entered in files with low delete activity. Deleted records are sometimes reused when new records are added, so this is never certain.

Sorting the output sequential backup file into primary key sequence before restoring the ISAM file will reduce the filespace for the ISAM file but will increase the time required for a random lookup, because the Index Tree will have only one level. Sorting the file on a non-key field, which will randomize the primary key, will result in a slightly larger, but much faster, random lookup ISAM file.

Note that the addresses mentioned in these pointers are AU numbers, which conserve address space on the ISAM file. ■

A	B	C	D					
0000000	ffff	0300	0400	0000	0000	0000	0000	0000
					E			F
0000020	0000	0000	0000	0000	0000	0400	0000	0300
	G	H						J
0000040	0a00	0000	0000	0000	0000	0000	0000	0610
	K						L	M
0000060	2800	0000	0000	0000	0000	0000	0110	3200
0000100	0000	0000	0000	0000	0000			

HEADER RECORD DUMP

A. Data Addresses (Octal)
B. Header Code Word (identifies start of Header Record)
C. Header Length (will occupy three AUs)
D. User Data Record Length (95-126 characters long)
E. Next Free AU (the next AU added to the file will be AU #4)
F. Number of User Keys (each User Record has three indexed key fields)
G. Primary Key Length (ten characters long; no duplicate values allowed)
H. Primary Key Displacement (the primary key is displaced 0 bytes from the record start)
J. Secondary Key Length (six characters long; duplicates allowed)
K. Secondary Key Displacement (The secondary key has a displacement of 40; characters 41-46)
L. Tertiary Key Length (one character long; duplicates allowed)
M. Tertiary Key Displacement (The tertiary key is displaced 50 bytes; character 51)

Figure 1
Example of a Header Record Dump

No tree heights or root addresses are shown since no records have been created. A dump of one of your smallest ISAM files will give you a fuller example of the spectrum of records supported.

CLEAR THE SCREEN ROUTINE FOR XENIX

By Richard A. Bilancia

In the May/June 1984 issue of *Advanced Computing*, in his article entitled 'The Scenery in XENIX Part II," John Esak writes: 'I would love to hear how to clear the screen from the keyboard. <CTRL> L is close but no cigar. If anyone knows how, other than writing a C program for cursor control, please let me know."

OK, John, here it is:

Enter this program using Vi.

```
case $TERM in <ENTER>
<tab>VT100) <ENTER>
<tab><tab>echo "<^V><ESC>[2J"
<tab><tab>exit 0;;
<tab>*)
<tab><tab>echo "<^V><^L>"
<tab><tab>exit 0;;
esac
```

Save the file as CLS in /usr/bin. Do a chmod to make it executable. And to use it, type CLS.

This program works assuming you are using the console, a DT-1 terminal emulating an ADDS 25, or a DEC VT100 terminal. ■

By Robert P. VanNatta

SPREADSHEETS COMPARED, CP/M PLUS INTRODUCED

If you work with numbers, and have a computer, consider buying one of these CP/M based spreadsheets: SuperCalc2, CalcStar, or Perfect Calc. Also, take a sneak peek at Radio Shack's CP/M Plus.

VisiCalc, originally written for the Apple, introduced the world to spreadsheets. Almost singlehandedly, it brought the Apple computer into the offices of this country. More than one pundit has insisted that the Apple computer is a VisiCalc accessory; I tend to agree. Ultimately, VisiCalc migrated to the Radio Shack computers, but only under control of TRSDOS.

No VisiCalc for CP/M

Conspicuously, VisiCalc did not migrate to CP/M-based equipment because, it has been said, its video functions did not lend themselves to generic CP/M installation.

This is easy to believe because CP/M lacks a good, standard way to manage a video screen quickly. Some CP/M compatible computers, including the now defunct IMSAI, and the functionally similar Models II/12/16, have had the hardware capability of direct video access, but this has been largely unsupported due to a lack of industry standards. CP/M was written with the benefit of a Teletype for a terminal, and contains no standardized calls to directly access the tube.

VisiCalc didn't make it to CP/M, leaving an opportunity for the so-called "Visi-clones." SuperCalc, one of the Visi-clones, has been **the** spreadsheet for CP/M computers. It is certainly not alone in the market, but appears to be well entrenched.

Controversy has surrounded VisiCalc recently because of disagreements between its owners and marketers over the responsibility for failure to materially improve the product over the years. In comparison, SuperCalc2, available for CP/M 80, CP/M 86, and MSDOS computers, has been enhanced. It is not SuperCalc3 or LOTUS 1-2-3, which are quite different products, but it is still an improved spreadsheet.

If you work with numbers, and have a computer, consider buying one of these CP/M based spreadsheets: SuperCalc2, CalcStar, or Perfect Calc. Functionally, all three spreadsheets work similarly; however there are differences. Overall cell capacity is a reasonable measure of spreadsheet power because it is the one thing that does vary widely.

CalcStar

CalcStar from MicroPro, widely distributed with a number of computers (most recently Kaypro), is the sure loser when it comes to cell capacity. Older versions (1.2) allowed only about 470 cells to be used. The current version reportedly has somewhat more capacity, but even if it has doubled, it is barely up to SuperCalc2 standards.

I don't care much for CalcStar, although it meets all the criteria for an acceptable program. It works, and it has been widely distributed. Its conventions for data entry, however, vary radically from SuperCalc2 and Perfect Calc and are, at least to me, inconvenient. CalcStar has its supporters, but I don't think they like it for its horsepower.

SuperCalc2

SuperCalc2, from Sorcim, is in the middle between CalcStar and Perfect Calc in terms of cell capacity. The original SuperCalc supported about 1200 entries with Pickles and Trout CP/M, and as many as 1900 using ATON bankswitched CP/M. SuperCalc2 can support about 970 entries for P & T and 1430 for ATON. These capacity figures are relative because the amount of memory consumed by any one cell depends on its contents.

It can be menu installed for P & T CP/M and can be installed following the step-by-step instructions furnished by ATON for use with ATON CP/M. By using ATON CP/M with bankswitching, SuperCalc2's capacity is increased one and one-half times, quite important if your task pushes the limits of your spreadsheet.

If you are using P & T 2.2m, consider removing every module you can spare, because each module retained directly and adversely affects the performance of any of these spreadsheets, most particularly SuperCalc2 and CalcStar as they are memory bound.

Disk drive performance is irrelevant when evaluating SuperCalc2's performance since it does everything in core.

It has its irritations, however. The folks who wrote SuperCalc2 (and CalcStar) forgot some features taken for granted in a word processing program. The four arrow keys chase the cursor around the screen, period.

Things such as page up/down just aren't there. To move 20 lines you must either use the GOTO routine or push the arrow key 20 times.

The ability to sort a row or column is the principal difference between the original SuperCalc and SuperCalc2; Perfect Calc and CalcStar can't sort. The price you pay for the sort facility is a noticeable reduction in the total number of cells which may be used.

SuperCalc2 is a solid and acceptable product with a good reputation for reliability. Its user interface could be improved with some screen scrolling commands, but it's possible to live without them.

Perfect Calc

Because it uses a file swapping routine permitting portions of the sheet to be written out to a work file called the "swap file," Perfect Calc is the king of capacity. Although nearly 3000 cells may be active, this capacity is mostly theoretical.

I bash my computer any time a program makes me wait for it. Perfect Calc has generated far more than its fair share of bash marks on my computer. Floppy disks fail to provide a sufficiently high data transfer rate to make the virtual memory concept very useful. Perfect Calc is the slowest of the three spreadsheets; when the work file is rewritten every time you move to a new cell, the delays are maddening.

Perfect Calc has all the features that either SuperCalc2 or CalcStar has, except one--a reputation for reliability.

One prominent bug in Perfect Calc version 1.00 is the inverse video facility. On all II/12/16 implementations, except Lifeboat 2.24d, it goes crazy. Perfect Calc will, of course, work without highlighting, but who wants a spreadsheet without highlighting?

Perfect Calc presents the best understanding of what a spreadsheet ought to be. Specifically, the folks at Perfect Calc recognized that a spreadsheet is a number processing program. Good word processing programs have a great number of screen and cursor manipulation controls; so do good number processing programs. Perfect Calc understood this and provided them. Beyond the four arrow keys of SuperCalc2 and CalcStar, Perfect Calc supports numerous controls including screen up, screen down, scroll left, scroll right, and every other kind of a screen and cursor movement command you can think of. Perfect Calc not only supports multiple windows, but also multiple files.

Feature-wise, Perfect Calc is the handsdown winner. If it only worked! The occasional crashes, lockups, and data losses that sometimes occur with Perfect Calc, coupled with the its slowness, have to be balanced against its ingenious design. Perhaps the newer versions have cured the outright bugs. There is no fix, however, for the lack of speed, and that is my biggest frustration.

I will continue to use Perfect Calc, because I am willing to deal with somewhat temperamental programs; but, when suggesting one to someone else, I lean toward a more conservative choice, SuperCalc2.

Spreadsheet Conclusion

If you get the feeling that the ultimate spreadsheet has yet to be written, you are probably correct. It never will be written for an 8-bit system. There is no way to get all the code necessary to support all the features a spreadsheet should have, together with all those numbers, into 64K of memory. Today's state-of-the-art number processing programs run on IBM PC and Tandy 2000 MS-DOS versions. Tomorrow's will run on processors that don't insist on 64k segments; then, and only then, will we see a major break-through in spreadsheet capabilities.

A spreadsheet running on a MC68000 for a single user installation with about 500k of memory would provide both the space and horsepower to do a very nice job.

Sad as it may seem, spreadsheets never have and never will sell the

II/12/16 line, whose forte is numerous high-capacity disk drives. Spreadsheets need lots of memory and good video characteristics, but very little disk space. If you compare the disk to memory ratio of the 2000 to the II/12/16, you will understand what I am saying. CP/M based spreadsheets are available because many people use CP/M and want spreadsheets. Many II/12/16 computers run spreadsheets, but this doesn't mean they are the ultimate machine to manage numbers in almost any fashion imaginable.

I have whined about the finite capacity of all of these spreadsheets, but confess my complaints are exaggerated. If each of these programs handled 10,000 cells without difficulty, I would gripe because they didn't handle 20,000.

I recognize that most of the time, most people write routines using only a few hundred cells for their spreadsheets. However, because I consider performance at the outer limits worthwhile, testing these three programs with only 150 active cells is worthless. Therefore I run around blowing up number processing programs by cramming thousands of numbers into them, and insulting word processing programs by hooking them onto 500k files.

CalcStar is available from:
MicroPro International Corporation
33 San Pablo Avenue
San Rafael, CA 94903
415/499-1200

Price: $195.00

Perfect Calc is available from:
Perfect Software, Inc.
1001 Camelia Street
Berkeley, CA 94710
415/524-1926

Price: $249.00

SuperCalc2 is available from:
SORCIM Corporation
2195 Fortune Drive
San Jose, CA 95131
408/942-1727

Price: $295.00

CP/M PLUS INTRODUCED

CP/M Plus

As I write this article, CP/M Plus has arrived at my local Shack store; I am, therefore, going to smuggle a few comments about it into this review. CP/M Plus arrived on 3 floppy disks, one labeled banked, one labeled unbanked, and a conversion disk containing utility programs. The unbanked worked immediately when plugged in, so I have played with it a few hours, and have already acquired some likes and dislikes. The banked version requires some hardware modifications neither I nor Radio Shack have.

Unbanked Version

Three absolute bombshells come with CP/M Plus at no extra charge. The first problem involves getting the operating system, which comes on a single-sided disk, onto a double-sided disk. Format the two-sided disk using the FORMAT option of COPYDISK, then select the COPY SYSTEM TRACKS ONLY option and move the system tracks to the two-sided disk. If you attempt the COPY ALL option, you will crash because the media is incompatible. Exit COPYDISK and complete moving files with PIP.

Even this, however, is easier said than done. Two very critical files on the distribution disk have the SYSTEM attribute set, meaning they are invisible on the directory (and to PIP). In order to get the job done, you must not only understand how to use PIP, but also understand how to use PIP TOGGLES. Specifically, use the R toggle:

PIP B:=A:*.* [R]

The alternative would be using the SET routine (formerly part of STAT) to remove the SYSTEM status of these files before the move.

If this seems incredibly complex, it is.

The second problem involves the I/O byte. As is common with CP/M, the distribution disk comes with the LIST device set to the parallel port, which is what you want if you have a parallel printer. If you have a serial printer, use the DEVICE routine to redirect the LIST output to the serial port.

The exit routine to the SETUP utility has a SAVE ATTRIBUTES option which is functionally equivalent to the Pickles and Trout FREEZE. Thus, if you run the DEVICE utility, and then follow on with the SETUP and execute the SAVE ATTRIBUTES from SETUP, you can work around the problem.

The most serious problem with the unbanked version is that it consumes horribly large amounts of memory. Under MBASIC 5.21, CP/M Plus reports 22584 bytes free as compared to 31288 for Lifeboat and 37944 for ATON switched, over 15K less work space available. On some programs, this is not going to make a difference, but on a spread sheet it comes right out of your capacity. The effective capacity is about one-half of that available under ATON switched, with P&T in the middle.

Banked Version

As of May 10, 1984, Fort Worth advised me that a relatively simple hardware modification kit would have to be installed in order for the banked version to work. At that time there was no stock number, price, or availability date. They only said the modification will be available for only Models 12 and 16b; models II and 16a will not be supported.

Don't expect a whole lot of information about CP/M Plus from your local computer center right away either. After I was unable to get my banked version to work, I called two local computer centers to find out what hardware I needed for this product. Neither even knew CP/M Plus existed, let alone how to use it.

This is absolutely incredible when you consider the documentation has a March 1983 printing date. Only 35 pages of documentation relate specifically to Radio Shack computers. The model 16B and the 15 meg hard drive had not been invented in March of 1983, and no mention is made of either piece of equipment. It is not immediately apparent whether the 15

meg hard drive is supported or not. You would think the documentation would tell you what kind of a computer is needed to make the software work, but it doesn't.

I have successfully installed SuperCalc2 using CP/M Plus and it does work, only its capacity is badly impaired. A custom installation routine to make all the features operable is listed in Appendix A. Selecting the DEC VT-52 option on the install menu yields a working version of SuperCalc2, but neither the highlighting nor the arrow keys work. You can readily turn on the highlighting and define the arrow keys by entering the custom installation menu using a secret x option taken from the main installation menu.

Other Software Installations

With respect to other software, I briefly tried the full version of VEDIT, reviewed last issue. It runs without re-installation. Wordstar 3.3 will work; however, it does not have a menu selection for the VT-52, meaning you must select the CUSTOM TERMINAL option and enter the ESCAPE codes one at a time.

It is my understanding that Veritas Technology wrote the BIOS for CP/M Plus. It should be no surprise that CP/M 86 on the Veritas DPO board uses the same disk formats as CP/M Plus. Likewise, the BIOS dependent utilities work the same on CP/M Plus as their CP/M 86 counterparts; even the bugs are related. For example, my complaint about the difficulties of moving the operating system to a two-sided disk are equally applicable to CP/M 86, sold for the Veritas DPO.

With respect to CP/M Plus, I have hardly done it justice in the few days I had to look at it. I am satisfied at the moment, however, that the unbanked version will be less suitable for most applications than our familiar variants of CP/M 2.2. The banked version may be satisfactory, if it works. I wouldn't reformat all Pickles and Trout disks yet.

CP/M Plus is available from:
Radio Shack distributors
Price: $249.00

INSTALLATION ROUTINE FOR SUPERCALC2 ON CP/M PLUS OPERATING SYSTEM.

First load the INSTALL program and find the main terminal menu. Then follow these instructions step by step. The input is on the left and the explanation is on the right.

input	explanation
D	"DEC" TERMINAL OPTION
1	SUB-OPTION FOR VT-52
B	GOTO TERMINALS SCREEN
X	ENTER CUSTOM MENU (SECRET COMMAND)
N	DON'T ERASE VALUES
B	EDIT ATTRIBUTE DATA
1	SET CURSOR ATTRIBUTE
Y	CHANGE?
2	TWO BYTES FOLLOW
1B	ESC -INVERSE VIDEO
70	"p"
2	CLEAR CURSOR ATTRIBUTE
Y	CHANGE?
2	TWO BYTES FOLLOW
1B	ESC - NORMAL VIDEO
71	"q"
X	EXIT THIS MENU
C	EDIT INPUT KEYS
1	CHANGE LEAD IN
Y	YES
SPACE	SPACE FOR NONE
Y	DO IT
2	EDIT UP KEY
Y	YES
UPARROW	PUSH ARROW UP KEY
Y	DO IT
3	EDIT DOWN KEY
Y	YES
DOWNARROW	PUSH ARROW DOWN
Y	DO IT
4	EDIT LEFT ARROW
Y	YES
LEFTARROW	PUSH LEFT ARROW
Y	DO IT
5	EDIT RIGHT ARROW
Y	YES!
RIGHTARROW	PUSH RIGHT ARROW
Y	YES
X	EXIT THIS MENU
E	EDIT MISCELLANEOUS DATA
B	CURSOR ATTRIBUTES
1	THIS SWITCHES ON HIGHLIGHTING
N	NO GUARD CHARACTERS
X	EXIT THIS MENU
F	EDIT TERMINAL NAME
MODEL II/12	APPROPRIATE TERMINAL NAME
X	EXIT THIS MENU
A	SAVE SELECTION-DONE

APPENDIX A

By Sherry Symonds

REVIEW OF FOOTNOTE

I mentioned that I had to type a term paper for a graduate course to Barbara Albert, *Advanced Computing* editor, who suggested I do so using WordStar and Pro/Tem Software, Inc.'s enhancement package, Footnote. She and I were both anxious to see how this nifty program works in real-life applications since we had both written too many papers as English majors where such a package would have been a godsend.

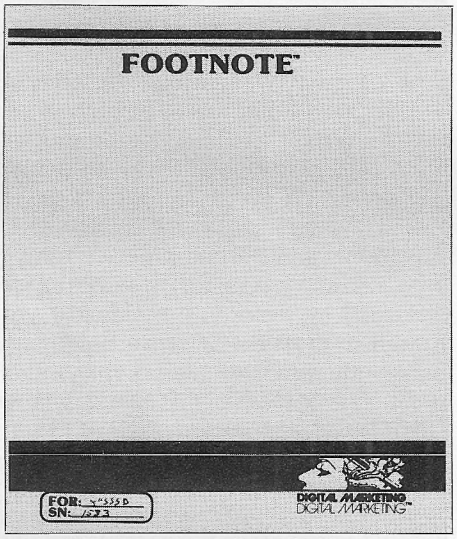
Begin With Basics

The Footnote manual advises to write the text first and then prepare the accompanying notes, so after my paper was written, I read and worked through the tutorial.

Since I am accustomed to preparing the notes after the text, I entered my paper into one WordStar file, "Anglo.txt," and my footnotes into another, "Notes.txt." In Anglo.txt, I typed the symbol "@" at each location where a footnote number should appear (referred to by Footnote as the "note call"). In Notes.txt, I entered a @ to signify the beginning of each footnote. The end of each footnote is signalled by <ENTER> and a blank line.

(I used a separate file for text and a separate file for notes. However, if your usual method of creation is to include notes and text together, Footnote can number and format documents created in this manner.)

The Footnote program is menu driven to make it especially easy to learn to use. After both text file and note file were created, I invoked the Footnote program by typing "fn". The main menu appeared. The tutorial advised me that the procedure to perform after creating the requisite files is to number the notes both in the text file and in the notes file (two



separate steps), so I selected the "number" option from the menu.

The Number Routine

During its numbering procedure, Footnote replaces all the @ symbols in text and notes with a series of characters,^E^T1^T. The ^E is used to keep track of each note call, and the ^Ts turn superscript on and off.

After number was finished and I returned to the menu, Footnote told me how many notes had been numbered in both files. The numbers should match.

During "number," Footnote saved a .BAK (backup) file containing my original file in the event of confusion. And when working with many notes and many pages, confusion is a distinct possibility! The file containing properly numbered footnotes is Anglo.txt; the original document is now Anglo.bak.

The Merge Routine

Now it's time to merge the notes and text files into one. All I had to do is select the "merge" option from the menu, and sit back and wait.

An examination of the Anglo.txt file after the program finished showed that two ^Ys had been inserted following the last line of text on a page. These symbols indicate that Footnote has added blank lines at the end of the text portion of each page to force the footnotes to the bottom of the page where they belong.

The beginning of the footnote region is marked by a ^R and by a rule line, and the bottom is marked by a .pa. The ^R is used by Footnote to keep track of the footnote region; the ^R will not print and the rule line will. The .pa, the WordStar command to force a page break, guarantees that the footnotes will be the last item on a page.

After you have successfully merged the text and notes files, the notes file can be deleted; I kept mine in case of disaster.

Editing a Merged File

The full potential of Footnote lies not in its ability to merge a text file and a notes file, but in its ease of editing already numbered notes once you're well on your way to a final draft.

After revising my introductory paragraph, I reformatted Anglo.txt by selecting the "format" option from the menu.

Adding and deleting notes can be done in the Anglo.txt file or in separate text and note files. Because I was not moving extensive blocks of text, I chose to add and delete directly in Anglo.txt. By performing the necessary additions and deletions in my text file, I was able to scroll up and down, ensuring that I dealt with the correct notes. If you opt to add or delete via separate files, you'll have to save each in WordStar, number each in Footnote, and then merge.

The only requirement for adding new text is to make sure that the new material is inserted before the ^Ys used by the program to mark the end of text. Any new note calls are marked by a @. Any additional footnotes are added in the footnote region; they are denoted by the usual @.

I returned to the Footnote menu and selected the "number" option again. The program numbered all the calls on a page and then gave each note a matching number. The bottom left corner of the screen shows the note numbers during the numbering process.

Then I ran "format" again, the utility that places footnotes in the proper place at the bottom of the page. This time through the file, the notes were removed from Anglo.txt and put into a temporary work file. The proper location of the footnotes was computed, and the notes were taken out of the temp file and merged into Anglo.txt. The screen shows you at which step in the procedure the program is working: removing the notes, formatting the pages, and merging the pages.

When you must renumber your footnotes, always enter 1 as the beginning note number. I learned the hard way that Footnote renumbers the entire file, beginning to end, and not just from the point of change to the end.

Another nice feature of Footnote is that you can force a page break and then format the text. I had an indented quotation at the top of a page whose introductory clause was at the bottom of the previous page. Typing .pa before the introductory clause forces a page break once you format the file. Only the text moves to the following page; the notes remain at the bottom of the previous page.

Changing Options

Everything went smoothly with the work in Footnote and Anglo.txt until I tried to print on our NEC Spinwriter 7725; the output looked like the sound effects for a Batman and Robin comic.

I wasn't sure which of the three control characters used by Footnote was incompatible with our version of WordStar and/or our printer; the

program uses ^R (Rule, marking the beginning of a footnote region); ^E (Repcall, replacing the @ to keep track of calls and notes); and ^Y (Eotext, marking the end of the text on a page when Footnote inserts extra linefeeds). I turned to the steps listed in the manual's Appendix A ("Printer Problems: The Control Characters Used in Footnote") to remedy the situation.

Process of elimination determined that ^E was the culprit; however, our WordStar is patched in such a way that we don't have many unused control keys with which to make substitutions. Of the three characters suggested in the Appendix, ^Q, ^W, and ^F, I used ^F since the printer uses ^Q and ^W to access special characters.

Also, I had to settle for un-superscripted notes in both the text and footnotes because the printer didn't recognize the ^T as the superscript character. I considered that a small price to pay for not having to resort to an IBM Selectric for the final draft!

If you must change control characters in OPTIONS.FN, the file containing Footnote options, remember to number and format a new copy of your text file using the Footnote menu. Discovering incompatible control characters initially can save you headaches later, so complete the tutorial before proceeding to the real thing.

One Problem

The only snag I encountered using Footnote was when I tried to move a note call to the previous line in the text after the file had been numbered and formatted. I deleted the call, ^E^T32^T, and typed in ^E^T32^T at the location where I wanted it to be. During the numbering routine, the lower left corner of the screen displayed a message, "Discrepancy at Note 33." Because the problem had to be resolved before I could format the file again, I entered the WordStar text file and discovered two ^E^T32^T calls; one at the original location and one at the desired location.

I changed the second note call 32 to @, saved the file, and ran Footnote's number routine, but still received the discrepancy at Note 33 message. I entered the WordStar text file again, changed the first ^E^T32^T call to @ and deleted the second ^E^T32^T call. This time the number routine ran with a hitch.

I was unable to find an example in the Footnote documentation that addressed this specific situation, but decided moving should be treated like adding, except you deal with the call only, not the call and note. I am still perplexed that the discrepancy was shown at Note 33 when there were two ^E^T32^T calls in the text.

Recommendation

I can make no claims as to its effectiveness when writing a dissertation or book, but Footnote was an immense help in preparing the final manuscript for my Old English Language and Literature research paper (how's that for irony!). The original text was 15 pages, with over 85 footnote entries. When merged, the finished paper was 20 pages.

Other Capabilities

Footnote also comes with a PAIR utility that checks WordStar files to make sure that the control character used to begin underlining (^S), boldface print (^B), superscript (^T), etc., is paired with an ending control character. Pair also checks to make sure that quotation marks, parenthesis, and brackets have mates.

PAIR sends a "beep" as a warning message that a problem has been located; the file is marked with "}" in the location where no ending or double mark appears. After PAIR has run, you can go back into WordStar and use ^QF to locate the "}" and remedy the situation.

If you have ever accidentally underlined an entire letter because you forgot that second ^S, you will immediately appreciate the usefulness of this little program.

Footnote/Pair is available from:

Digital Marketing
2363 Boulevard Circle
Walnut Creek, CA 94595
800/826-2222
Price: $99.00

SAMPLES OF FOOTNOTE SCREENS

The following examples illustrate the various steps involved when using Footnote. (The samples were taken from the Footnote Manual, for which we thank them.)

The first example shows a simple text file (FILE.TXT); the note calls are marked appropriately with the symbol "@".

FILE.TXT
When in the course of human events, it becomes necessary for one people@ to dissolve the political bands which have connected them with another@...

This is a sample note file (NOTE.TXT). Each entry signifies a separate footnote. Proper procedure indicates that the beginning of each entry be marked with a "@"; the ending of each entry is marked by a hard carriage return and a blank line.

NOTE.TXT
@ This is a reference to the American colonists.

@ That is, with Great Britian.

Select the "Number" option from the Footnote menu to properly number all note calls in both the FILE.TXT and NOTE.TXT files. The following examples show how the two files look after the note calls have been numbered.

FILE.TXT
When in the course of human events, it becomes necessary for one people^E^T1^T to dissolve the political bands which have connected them with another^E^T2^T...

NOTE.TXT
^E^T1^T This is a reference to the American colonists.

^E^T2^T That is, with Great Britian.

The next step in the process to properly format the note calls is to select the "Merge" option from Footnote's menu. The program merges the NOTE.TXT file into the FILE.TXT file and formats the page so that the notes appear at the bottom.

When in the course of human events, it becomes necessary for one people^E^T1^T to dissolve the political bands which have connected them with another^E^T2^T...
^Y^Y

[lines omitted]

^R_____
^E^T1^T This is a reference to the American colonists.

^E^T2^T That is, with Great Britian.
.pa

The finished page will look something like this. Lines have been deleted in the interest of saving space.

When in the course of human events, it becomes necessary for one people[1] to dissolve the political bands which have connected them with another[2]...

---

[1] *This is a reference to the American colonists.*

[2] *That is, with Great Britian.* ■

By Vance A. Tucker

CHECK OUT YOUR DISK DRIVES

Using Dysan's Digital Diagnostic Disk (DDD), an ordinary-looking double-density 8-inch floppy disk which contains intentionally misplaced data, is the easiest and cheapest way to monitor the condition of your disk drives. The testing procedure takes about one minute per drive, requires no tools, and the computer case need not be opened. You can adjust your drives with the product and simple hand tools, and you will get a better result than your local service center.

The extent to which your drives can read the misplaced data on the DDD indicates their condition. You can test for radial and azimuthal head alignment, disk centering, head-positioning, hysteresis, and disk rpm. These tests diagnose misalignment, dirty heads, worn head-load paths, wobbly spindle bearings, faulty disk-clamping mechanisms, and electronic problems.

In order for your drives to read the DDD, you must have appropriate software. Dysan has put into the public domain an 8080 assembly language program running under CP/M-80 capable of performing the DDD tests. You can find it on various bulletin boards, usually under the name DDD, the same name as the disk.

The DDD program was not written for the TRS-80 Models II, 12, and 16, but for Dysan's single-board computer with a 4-megaHertz Z-80 microprocessor, a 1793 Western Digital Corporation floppy disk controller, and a Hazeltine 1500 terminal. However, Models II, 12, and 16 are very similar to Dysan's computer; they have the same clock rate and microprocessor, and functionally the same floppy disk controller (the 1791 in the Model II and the 2793 in the Model 12).

How the DDD Disk Works

To understand how the DDD and DDDII (a modified DDD program that runs under TRSDOS and CP/M) work, consider the format in which information is recorded on the disk. An 8-inch disk has 77 concentric tracks, from track 0 (outermost) to track 76 (innermost). On double-density disks, each track is a magnetized strip 13 milli-inches wide. Tracks are separated by a non-magnetized strip 8 milli-inches wide. Tracks may be recorded on one or both sides of a disk.

A track is divided into 26 two-part sectors, each 370 bytes long; a 21-byte identification (ID) field containing the track number and the sector number, and a data field containing 256 bytes of data.

The DDD data fields are recorded in a peculiar manner, and the ability of the disk drive's read/write head to read them is the basis for the DDD's diagnostic abilities.

Head to Track Alignment

When reading data from a track, the head contacts the floppy disk and converts reversals of magnetic flux into an electronic signal. If the head is perfectly aligned with the track, the signal has maximum strength, but if the track is to one side of the head, the signal weakens. In extreme misalignment, the signal is so weak that the head cannot read the track. There are three types of misalignment.

Radial Misalignment

Radial misalignment occurs when the center of the hole in the disk coincides with the center of rotation, but the distance from the center of rotation to the head is not the same as the track radius. The amount of radial misalignment does not change as the disk rotates. The cure is to reposition the head.

Wobble Misalignment

In the case of wobble, the center of the hole in the disk coincides with the center of rotation, but the center of rotation moves when the bearings supporting the spindle on which the disk rotates are loose. Since the center of rotation moves, the head cannot maintain a fixed distance from it, and the amount of misalignment varies as the disk rotates. The frequency of this variation might be equal to the disk rotation rate, but not necessarily.

Eccentricity Misalignment

Eccentricity occurs when the disk is clamped off-center on the spindle. The center of rotation is fixed, but it does not coincide with the center of the hole in the disk. Since an eccentric track does not have a constant radius relative to the center of rotation, the head cannot maintain alignment as the disk rotates. The amount of misalignment varies with a frequency equal to the disk rotation rate.

DDD Sector Arrangement

The DDD has its sectors arranged in such a way that it can be used to detect, among other things, the three types of misalignment, i.e., radial, wobble, and eccentricity.

The DDD sector ID fields have the proper radius, but on some tracks the data fields are offset by various amounts, either toward the center hole or away from it. A head, properly aligned or not, will sooner or later fail to read an

offset data field, but it usually can read the ID field and report the sector number in which the failure occurred. The sector number identifies the offset of the unreadable field, from which you can deduce the degree of misalignment and its cause.

The offset data fields on a DDD track are arranged in a regular, alternating pattern. The odd-numbered sectors have offsets toward the center hole, and the even-numbered sectors have offsets toward the edge of the disk.

Six of the tracks (0, 3, 38, 41, 70, and 73) have progressive offset data fields forming two spirals; the odd-numbered ones spiral inward and the even-numbered ones spiral outward.

Three other tracks (35, 44, and 47) have fixed offsets. All odd-numbered sectors spiral toward the center hole, and all even-numbered sectors spiral away from it.

Track 76 has the data fields written on the track centerline but progressively rotated. The head writing the data fields was not tangent to the track, but was rotated around an axis through the head, parallel to the disk drive spindle.

DDDII Tests

The program DDDII loads into RAM from a CP/M disk, and the DDD disk is placed in the drive to be tested.

Three of the DDDII tests, the radial test, the centering test, and the azimuth test, relate to alignment, and they all read the DDD disk the same way. The head moves to the selected track and begins reading the data fields of the odd-numbered sectors, starting with 1.

When an unreadable data field is encountered, its sector number is stored, and the head begins reading even-numbered sectors, starting with 2. Again, the sector number of the first unreadable data field is stored. DDDII then computes the offsets of the previous data fields (the last readable ones) and displays them in a format appropriate for the test. If no sectors can be read, DDDII reports "FATAL READ ERROR."

The Radial Test

The DDDII radial test reads tracks with progressive offsets to determine whether the head and track are misaligned, and how tolerant the head is of misalignment.

You can diagnose eccentric and radial misalignment with the radial test by removing and reclamping the disk several times. Once a disk is clamped eccentrically, the radial test display does not change as it is updated because the sectors that the head fails to read are the same with each revolution.

There is no way to distinguish the results from radial misalignment, or from perfect alignment. However, when the eccentric disk is reclamped it is unlikely to have the same angular position on the spindle that it did before, and the display changes. Any unchanging misalignment is radial in nature.

The radial test indicates wobbling misalignment if the display changes each time it is updated. It is possible, though unlikely, that the wobble would have the same frequency as the disk rotation rate, in which case wobble would have the appearance of eccentricity.

The Centering Test

The DDDII centering test is carried out on the fixed offset tracks (35, 44, and 47) near the middle track. All of the offsets on these tracks are the same size, but are in alternate directions.

If DDDII can read an equal number of even-numbered sectors and odd-numbered sectors on a track, it reports "CENTERING OK." If it reads unequal numbers of and even- and odd-numbered sectors, it reports "RE-CLAMP DISKETTE," because the disk is eccentrically mounted. If it can't read the data fields of either sector 1 or 2, it reports "FATAL READ ERROR."

The centering test is thorough for the region near the middle track of a disk drive, but a passing grade on the middle tracks does not guarantee the inner tracks are equally readable. It is not unusual for the head-read width to be narrower on the inner tracks, particularly for CDC drives. Check for this with the radial test.

The Azimuth Test

The DDDII azimuth test reads track 76, containing sectors with progressively increasing azimuth rotations in alternate directions, and reports azimuth rotations for the last sectors it can read on the track, or "FATAL READ ERROR" if it can't read the data fields of either sector 1 or sector 2. A head develops azimuth asymmetry only when it has been rotated in its mounting, so this test is useful after the head has been replaced. It also confirms that the innermost track can be read.

The Hysteresis Test

The hysteresis test determines radial positioning by reading the intermediate track as the head swings between two progressive offset tracks.

The Spindle Speed Test

The DDDII spindle speed test counts the number of intervals that occur between photocell detections of the index hole. The test display will show the time for one revolution and the number of revolutions per minute. You don't need the DDD disk for this test; you can use any disk (even unformatted) with an index hole.

The spindle speed test should show a constant reading of about 360 rpm on Model IIs because their disk drives have constant-speed AC motors, instead of the variable-speed DC motors found in some 5-1/4 inch drives. The rpm would be less if the disk were slipping in the clamp or the drive belt to the spindle were slipping.

Repairing Model II Disk Drives

Model IIs come with three types of disk drives. The single drive in the computer case is made by Shugart, except some Model IIs made in the last year of production have a Texas Peripherals, Inc. (TPI) drive. CDC drives were used in the disk expansion bays before 1982; they do not have lights in the door latches. TPI drives were used in the bays starting in 1982; they have rounded corners and lights in the door latch.

The CDC drives are functional and reliable as long as they are carefully maintained. Unfortunately, the conventional analogue alignment techniques used by service centers do not get at the source of the problem, so one cannot be sure of getting the drive properly repaired. With the DDD, maintenance may be done on site quickly and easily.

The DDD allows you to repair your own disk drives, depending on your technical expertise and tools. If you have a drive making read errors or possessing a head-read width less than 5 milli-inches, you might consider making repairs.

Disk Drive Alignment

It is easy to align the head on a disk drive, but don't be hasty to do so. The alignment mechanisms are quite stable, and the head-read width of a properly functioning head is so wide that mechanical misalignment is usually trivial. Drives should run for years without requiring alignment.

CDC drives are notorious for requiring realignment, but the DDD radial test shows the problem lies elsewhere; the head-read width becomes narrower on the inner tracks. A slight misalignment will cause read errors on the inner tracks.

Realignment can help, but the solution is to expand the head-read width. Furthermore, alignment is usually done on the middle track, 38, of an analogue alignment disk, not necessarily bringing the head over the center of the inner tracks.

The Symmetry Adjustment

CDC drive head-read widths can be increased by adjusting a trimming potentiometer (trimpot) while DDDII displays the results on the screen.

Determine the trimpot's effect by adjusting R32, the lowest trimpot on the disk drive's circuit board, and observing the head-read width on track 73. At some point, the head-read width will be maximum. Turning the trimpot to either side causes the head-read width to become narrow and erratic until finally DDDII announces "FATAL READ ERROR." The adjustment is quite sensitive.

The trimpots are easy to find on the disk drive's printed circuit board; you're looking for R32, the lowest one. Don't be afraid to break the paint seal and adjust the trimpot. The factory setting is not always optimal, and if you go too far, you can always bring the trimpot back to a functional position by observing the results on the screen.

The Disk Clamping Problem

Another problem peculiar to CDC drives arises with the disk-clamping mechanism, which is different from that on Shugart and TPI drives. In CDC drives, a white, plastic cone slides into the disk's center hole, then expands to lock the disk to a spinning metal cup. In time, the disks wear circumferential grooves in the plastic, preventing them from sliding fully onto the cone. The result is a disk that distorts or becomes eccentric when clamped. The head does not contact the distorted disk properly on the inner tracks, causing DDDII to show a narrow and erratic head-read width on these tracks.

Check for distortion with a bare disk that has been removed from its protective envelope. When the disk is clamped on a rotating drive, you see bulges or waves on its shiny surface.

The cure for distortion is to replace the plastic cone with a new one; its easy to change by removing one snap ring. Radio Shack sells the part mounted on a shaft for $58.

Making DDD into DDDII

To get DDDII up and running, you will need the source code for DDD version 1.0 and the CP/M operating system. Use the CP/M editor ED to change DDD into DDDII, and assemble it with the CP/M assembler ASM.

The source code for DDD is 30 pages long, nicely formatted with related statements collected into blocks, each with a name boxed in with asterisks. It can be conditionally assembled to run under three versions of CP/M; Lifeboat 2.24 and 2.25d, and Pickles and Trout 2.2e (as well as TRSDOS 2.0a).

DDDII will run under TRSDOS 2.0a, but you need the CP/M operating system to get it into a TRSDOS disk file.

Conclusion

Aside from its utility in diagnosing disk drives, DDDII is a valuable tutorial on peripheral programming techniques. The programmers at Dysan Corporation did a professional job, including many helpful comments. You will find examples of how to program the floppy disk controller chip and the direct memory access chip, an arcane business indeed. You will need to study the manufacturer's literature on these two chips to understand the programming, but the information is all there.

DDDII includes innovative display techniques such as direct cursor addressing, interesting data conversion routines, look-up tables and other examples of the assembly language programmer's art. The program is long and intricate, and you can go mad trying to follow the jumps and calls. First paginate the source code and print an alphabetical list of labels with references to the pages on which they can be found.

Like any disk, the DDD will wear out, but the wear rate can be higher than normal because certain tracks are used again and again, and for prolonged periods. Wear shows up gradually as a narrowing of the head-read width. You can see this by comparing the radial test results on a worn DDD with those from a new DDD; disks wear out not necessarily by catastrophic failure, but by a gradual diminution in signal strength.

Digital Diagnostic Disk is available from:

Dysan Corporation
1244 Reamwood Avenue
Sunnyvale, CA 94089
800/551-9000
Cost: double-sided: $40.00
single-sided: $30.00

DDDII source code is available from:

Vance A. Tucker
Department of Zoology
Duke University
Durham, NC 27706
919/684-3484
Cost: $15.00
Specify TRSDOS or CP/M version

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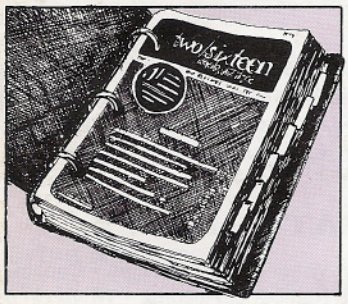
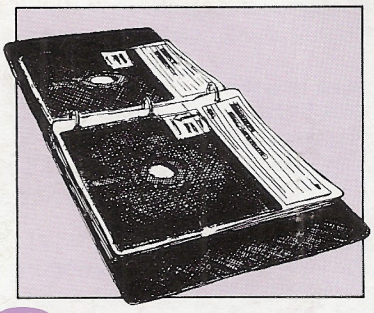
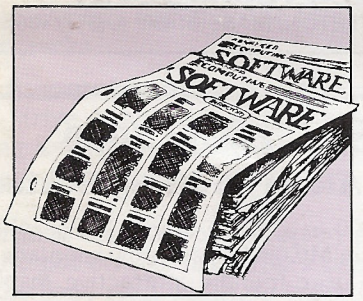


1 Three-ring binder with internal tabs containing specially printed loose-leaf versions of back issues of **two/sixteen**, and back issues of **Advanced Computing** (successor to **two/sixteen**), and current issues of **Advanced Computing**, as published, to complete a one year enrollment in the ACS (enrollment year runs from April 1984 to March 1985; no matter when you enroll, you will receive a combined total of 18 issues of **two/sixteen** and **Advanced Computing**).

2 Newsletter to be published 26 times per year. It will contain product announcements, articles and correspondence outside **Advanced Computing** magazine's scope (because of time-value, large size, or specialized content), and the latest news of interest to serious users (mostly gleaned from dozens of other computer publications, and including abstracts of the more important articles).



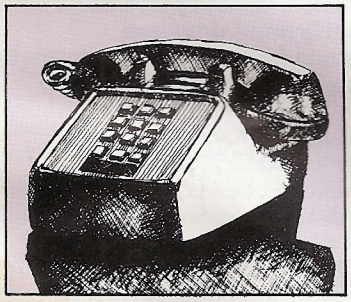
3 Diskettes with documentation (five or six per year), provided in loose-leaf sleeves. Includes all programs published in **Advanced Computing** magazine, all programs and patches that we receive and check out which are available for public distribution (along with our comments and documentation, and source code when available). At least one diskette per year will be devoted to each of the major operating systems (TRSDOS, CP/M, XENIX) used with Radio Shack II/12/16 computers.



4 Comprehensive software directory of all commercially available programs known to function correctly on II/12/16 computers under one or more of the three major operating systems. Compiling this directory is a major undertaking, but we plan to issue the first one in 1984, with updates at least annually.

5 Master cumulative index of all of the above. **Advanced Computing** magazine will include its own cumulative index in every third issue, beginning with Nov-Dec, 1983 (Vol. 2, No. 3). The Advanced Service index will include, in addition to the **Advanced Computing** magazine index, the newsletter, diskettes and documentation, and the software directory, all in a single comprehensive index.

6 Binder for newsletters, diskettes, comprehensive software directory, and master index.



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