SOLUS NEWS

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Dealer memberships ($25) and manufacturer memberships ($50) include special services.

SOLUS TO MEET AT
SECOND WEST COAST COMPUTER FAIRE

The Computer Faire creatures are at it again. There will be a second one, in
San Jose, CA, on March 3-5. SOLUS will have some sort of get-together there. Suggestions
for what to do will be greatly appreciated. Anyone in the San Francisco Bay Area who
would like to help organize a mini-program should contact SOLUS. For more info on the
Faire itself, write to Computer Faire, Box 1579, Palo Alto, CA 94302.

SOFTWARE TECHNOLOGY'S "MUSIC SYSTEM"
by Rod Hallen, Tombstone, Arizona

Having been a frustrated would-be musician for years, one of my goals has been to
make music with my SOL. Software Technology's "Music System" seemed to be the answer
and the price is right. ($24.50 PP) Seven days from order to arrival is O.K. too.

The price includes an S-100 music board kit, a forty-page manual, and a CUTIR
(and Kansas City format) tape of the program. Since the board only holds five components,
construction is a three-minute job. Very simple! The tape contains a high level music
language that makes programming easy. 4K is needed at O000H and 8K is recommended for
serious work.

Utilizing the system is not hard and the manual is well written. The tape also
contains six selections that are already coded so that you can get a feel for the system
and hear it before you attempt to code some of your favorite songs.

The audio signals out of the music board are at a very low level and you have to
supply an amplifier to raise them up to listening level. If you have a stereo in your
computer room, great. I don't, but two alternatives worked nicely.
The quickest way to hear computer music is to run the music system output to the
mike jack on your cassette recorder and record. You then play it back to hear it.

A better choice is shown in Figure 1. This is a very cheap amplifier that runs
about two watts and sounds pretty good. I built it on a two inch square piece of
perforboard. The components are all available from James Electronics - Total cost is $2.65
not counting the resistors which can be obtained locally.

Please take note that the ST "Music System" will not compete with a Moog or other
synthesizer but it is fun, educational, and best of all, it really impresses friends and
neighbors when they ask, "But what does your computer do?"

Notes:

1. Software Technology Corporation
   P.O. Box 5260
   San Mateo, CA 94402

2. James Electronics
   1021 Howard Avenue
   San Carlos, CA 94070
Figure 1

Q-1 and Q-2 are 2N3904 and U-1 is LM380N. Do not use LM380CN which is only .6 watt. All capacitors are 25 volt units and all resistors are 1/4 watt.
Fully Static — 250 nsec. TMS 4044-25

16K RAM
Available Now!

KIT
$355
Assembled, tested unit — $375

Z-80A 4Mhz. Fast
Our memory board was designed to operate without wait states in a 4 Mhz. Z-80A system and allows a generous 100 nsec. for the CPU board buffers. Our board “loafs along” in an 8080 or 8085 system. Even if you are using a slower CPU today, don’t get caught buying a memory board which may become obsolete if you decide to switch to a faster, more sophisticated CPU tomorrow.

Fully Static is Best
Our board uses the state-of-the-art Texas Instrument TMS 4044-25. It needs no clocks and no refresh. It uses a single 8V power supply and won’t be obsoleted when you buy the next generation system using a single power supply.

Fully S-100 Bus Compatible
Each 4K addressable to any 4K slot, on-board dip switch memory protect, RAM disable, DMA capability.

Commercial Quality Components
First quality factory parts, fully socketed, buffered, masked both sides, silk-screened, gold contacts, bus bars for lower noise.

Guaranteed
ASSEMBLED UNITS: if unsatisfied for any reason — return undamaged unit within 10 days for full refund. Parts and labor guaranteed for one year.

KITS: MOS parts factory tested good — no free replacements. All other parts guaranteed one year.

Shipping
If we cannot ship within four weeks we will phone for instructions, returning money if you desire.

How to Order
PHONE: Call between noon and 9 p.m., Mon. thru Thurs. for VISA or MC orders.
MAIL: Cashier’s check, MO speeds shipment. Personal check OK. VISA and MC orders require all card numbers, signature. $100 deposit on COD orders.

GENERAL: Shipped prepaid (except COD). Please include phone number. Washington residents add 5.4% sales tax.

Seattle Computer Products, Inc.
10611 11th S.E., Renton, WA. 98055
(206) 255-0750

********This is not an advertisement or endorsement for this product. We haven’t tested it. This offer was received in the mail. Seems like a good deal though. --SOLUS ********

VOLUME DISCOUNT PRICE LIST FOR

COMPUTER CLUB GROUP PURCHASES

(Prices effective until March 1, 1978)

Seattle Computer Products Inc. is pleased to announce the creation of a "Group Purchase Plan" allowing members of Computer Clubs to combine their buying power to order commercial quality 16K RAM memory boards at volume prices. The board being offered is described in the ad on this page which is running in the January issue of Interface Age.

Orders will be accepted from club members on a one-at-a-time basis at the 5-9 prices for shipment beginning approximately January 10 on a first order in, first shipped basis. If we cannot ship within four weeks, we will call, returning your money if you so desire.

In mid-March, we will tally the orders from each club, send a list of purchasers to the club to catch any errors, and, if that club’s total orders qualify its members for a lower price, issue rebate checks to all purchasers from the club.

The volume price list upon which rebate checks will be based is shown below:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>5-9</th>
<th>10-24</th>
<th>25-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kits</td>
<td>$340</td>
<td>$325</td>
<td>$310</td>
</tr>
<tr>
<td>Assembled</td>
<td>$360</td>
<td>$350</td>
<td>$335</td>
</tr>
</tbody>
</table>

(Kits and assembled units will be combined to establish volume price.)

All guarantees, including the 10-day return privilege for assembled units, apply to these orders.

Please use this form or a copy for orders.

Name of club SOL Users’ Society
Please enter my order for:
___ Kits at $340 each.
___ Assembled, tested units at $360 each.
___ $100 enclosed, ship COD for balance.
___ Charge my bank card: ___ VISA ___ Master Charge

Acct. number ____________________________ Exp. date ______

Interbank No. _______ Signature ________

Order date _______ Phone number__________

Ship to:
Name ________________________________
Address ____________________________________________
A recent addition (though announced long ago) to Processor Technology's line is a dual, full-size floppy disk memory system. The disk drive used is a PerSci 270 drive which is one of the fastest (and smallest) dual full-size drives on the market. The Helios cabinet is large enough to hold two of these drives (with mounting holes and room to spare). In its usual configuration, the cabinet has one dual drive, a power supply, an indicator panel and a fan. There are a large number of cutouts on the rear panel of the cabinet leading one to believe that it may be used in the future for an expansion backplane or an all-in-one-cabinet computer and disk.

The controller and formatter are on separate S-100 boards. The controller connects to the disk drive with a long ribbon cable and the formatter and controller are connected by a shorter ribbon cable. The formatter can be removed from the bus as it gets only power (+8 V) from it. A separate power connector is provided.

My Helios was built from a kit and required nine hours to complete. About six hours was required for soldering sockets, components and jumpers on the controller, formatter, power supply and indicator panel printed circuit boards. Another three hours was required for mechanical assembly of the disk drive and cabinet. No problems were encountered with the Helios after assembly except for a bad chip on the formatter board.

A disk test program is provided on cassette which has several automatic test procedures. In case the automatic tests indicate any errors, the manual has a long detailed procedure for testing the many functions of the formatter and controller board. The tests are driven by a test program on the cassette. The test procedure requires a triggered, dual-trace scope. These tests enabled me to discover the bad chip quickly.

The controller board runs very hot. I had to cut holes in the back panel of my Sol and add an extra cooling fan (I added two for good measure). The native cooling of the Sol just wouldn't do it.

The Helios uses 32 hole hard sectored diskettes in an unusual format. This format, called "firm" sectoring by Processor Tech, uses a combination of hard and soft sectoring techniques. A file blocksize is not restricted to one sector (in fact, every other sector hole is ignored) but physical blocks can be from one to 4095 bytes in length. By writing long blocks, space for 64 bytes is gained between each "double-sector" of 256 bytes. The diskette capacity is thus increased, long files tend to be more contiguous (fewer seeks required), but at the loss of compatibility with other "standard" hard or soft sector formats. Helios disks are usable only with other Helis.

The software provided, PTDOS, is a very complete and easy-to-use disk operating system. It has two to three times as many commands as CP/M, another well known DOS by Digital Research. This increased flexibility and power does require some additional memory. A minimum useable PTDOS system will require 20-24 K of memory. The system comes with two editors, an assembler, a dynamic debugger, BASIC, FORTRAN, and, of course, Star Trek.

I've made quite heavy use of the Helios in the past month, mostly with word processing applications. It has proved to be very reliable as a production system and easy to use as a software development system.
Although it was late, late, late, Processor Tech's Helios floppy disk system finally is real and people are beginning to use them. I haven't had hands-on experience yet, but I've read the manual and seen the unit. Here are some observations.

First, the hardware. The disk drives are housed in an attractive cabinet which has a lot of empty space inside. (It appears that PT plans to put a 10-slot S-100 backplane into the extra space as a bus-expansion option for SOL or as a stand-alone computer with disk.) There are cutouts on the back to mount 4RS-232-type connectors, 4 ribbon cable connectors, and additional fan, and other connectors. Three accessory AC sockets on the back allow turning on the whole system (SOL, Helios, TV, etc.) with one keyswitch on the front Helios panel. The DMA controller board and a formatter board plug into the computer's S-100 bus, but the formatter gets only power from the bus and could be mounted up to 12" away if power were supplied through another connector. Unfortunately in SOL where bus slots are at a premium, there is no convenient place in the SOL box to mount the formatter, so it would have to be mounted outside in an extra box, which is too sloppy for me. So Helios for all practical purposes uses 2 slots in SOL.

Helios uses a unique format for storing data on the disk, and thus it is incompatible with all other floppy disk systems. This at first seemed to be a major drawback, but many hardware-compatible disks are software-incompatible unless they use the same operating system, so incompatibility is common. The benefit from PT's unique format is a greater storage capacity (384K maximum) than the standard (256K) without any higher error rate. In the large-computer world, disks are rarely if ever used to exchange data between computers; standard tapes are the common interchange medium. With the so-called Kansas City tape standard, microcomputers can exchange data on tape just as the big computers do. So I don't regret the unique format.

One deficiency in the Helios hardware is that there is no built-in way to perform an initial program load (bootstrap) from disk. A modified personality module is available to do this, but PT wants $100 for it. Of course, the bootstrap can be loaded from tape in a SOL or a custom ROM can be used.

The F888C disk drives are fast. The worst-case access time (seek + rotational) is 266 ms with an average access time of 116 ms. In contrast, the Shugart 800/801 drives have a worst-case access time of 936 ms and an average of 343 ms.

Now, about the operating system "PTDOS." The only other floppy disk operating system with which I'm familiar is CP/M, the product of Digital Research which is available on many floppy systems including IMSAI, Digital Systems, and Tarbell. CP/M is great, but PTDOS is better. There isn't space here to go into a fully detailed comparison, so I'll concentrate on PTDOS.

The fundamental component of PTDOS is the command interpreter (CI), which is the interface between the user and the operating system. The CI reads from its input device (the Console device) or, at the user's discretion, from any file of commands. A command consists of a file name followed by some blanks followed if necessary by a list of arguments. The file named in the command is loaded into memory at the addresses specified in the file and control is transferred to the file's designated entry point, which is not necessarily within the address space of the file. If more than one file is named in the command, all will be loaded and control turned over to the entry point of the last one. The loaded programs then may read the arguments as though they were in a file, using PTDOS's file manipulating features, and carry out the designated function. The design of the CI allows the user somewhat more flexibility that the command line interpreter of CP/M does.

The system comes stocked with a large number of predefined commands as files on the PTDOS disk. There are commands to copy and format disks, reclaim lost disk space (if a disk disaster occurs), list information about files and about system parameters, copy files, save memory areas as "image files," dump files, save and get files from an archival file, manipulate files (open, close, read, write, etc.) on a command level, set memory to any value desired, and so on.
In many cases the PTDOS commands are more powerful than the comparable CP/M commands. For example, CP/M's memory saving command only allows saving memory in one chunk containing an integral number of memory pages (256 byte blocks aligned on page boundaries). PTDOS's memory saving command allows any number of memory areas, not necessarily contiguous, of any size to be saved in one image file. CP/M doesn't save an entry point address for the file; it only loads memory image files at address 100H and transfers control there. With PTDOS the user can create commands which load into memory areas reserved for them without disturbing other programs in memory.

PTDOS uses this scatter loading feature to provide certain system utility commands ("safe commands") that can be used without disturbing the users memory space. These utilities load into one of two small areas within PTDOS reserved for this purpose. One such command is a general purpose message writer which all of PTDOS uses to give error messages to the user. Thus other PTDOS commands only need to contain code numbers for error messages and not the full message text. When a message is needed, any program can call upon the utility handler to load and execute the message writer and return control to the calling program. Of course PTDOS lets the user's programs call the utility handler if desired, and the user can create his own private utility file as well. CP/M provides nothing like this to my knowledge.

Another major component of PTDOS is the file manager. It provides the user with routines his machine language programs can use to do all of the customary file operations, such as creating, opening, closing, killing (deleting), reading blocks, writing blocks, reading bytes, writing bytes, seeking a byte or block directly (random access), and so on. Each file contains seven attribute tags that can be set to protect the file against certain operations. For example, a file can be protected against reading, writing, killing, attribute changing, etc. Unfortunately, PTDOS doesn't provide passwords to identify authorized file users as some more sophisticated operating systems do, but here again CP/M doesn't provide any file protection feature.

CP/M requires the user to manage his own set of buffers for multiple files. PTDOS has a built-in buffer area and automatic buffer handling with either static or dynamic buffer allocation. Files obtain buffers when needed and return buffers to the pool when they're no longer needed. Users need not concern themselves with buffers or file control blocks (FCB's), since PTDOS handles them internally. The FCB and buffer area is adequate for 8 files simultaneously open, and this can be expanded to any size desired if RAM is available.

Just about everything in PTDOS is handled as a file. I've mentioned that the command argument list is read as a file. In addition, all input/output devices are handled as files. These "device files" are read from, or written to, just like any file on the disk. Thus, for example, the file copy program can be used to "copy" data from the console keyboard device to a disk file. Any user program which is set up to read from a file and write to a file can be used without change to read from any device and write to any device by defining the proper "device files." In reality device files are the device handler routines that communicate with programs thru the standard interface created within PTDOS. This versatility allows programs to use new devices as they become available without reworking the programs. (It also provides the basis for an implementation of the UNIX operating system's "pipeline" concept within PTDOS.) CP/M only makes a primitive attempt at achieving this device independence thru the use of Intel's "I/O BYTE" feature. PTDOS is far more general and elegant than CP/M in this regard.

Although PTDOS as distributed is a single-user operating system, it has explicit provisions for real-time interrupt handling and multi-user capabilities. In addition, the Helios controller hardware can be modified (although the manual doesn't explain how) to provide signals on "seek completed" and "transfer completed." These signals can be used to free the processor to do useful computing during disk transfers. PTDOS provides the facilities to operate in this interrupt-driven environment. It is possible that PT has long range plans for a multi-user system and the basics are already built into PTDOS. The extra cutouts on the back of the Helios enclosure also suggest that Helios is to become a multi-user system, CP/M is a single-user system too, although interrupts can be accomodated in CP/M. It may not be difficult to adapt CP/M to a multi-user system, if the hardware provided the DMA and interrupt capability that Helios does. In this regard CP/M and PTDOS seem similar.
In addition to the operating system, the PIDOS disk includes two editors, a disk-based assembler, a debugger, a disk formatter and copier, a powerful macroprocessor for generating complex command sequences with parameter substitution, a disk version of BASIC/5, a disk version of the FOCAL interpreter, and TREK-80 (a real-time Star Trek game).

The operating system resides in the 12K area of memory from 9000H to BFFFFH. This includes the buffer pool area, the resident system code, a global data area, the safe command areas, and an entry point table. The bottom of memory is available to the user.

In summary, PIDOS is a very extensive, well-planned operating system with great potential. Helios with PIDOS is a powerful tool. I'm happy I waited for it.

Actually, there's a lesson to be learned from my experience with another disk system I tried to buy. After P.T. announced Helios more than a year ago, I began shopping for comparable disk systems. I wanted the largest capacity I could get. The Digital Systems dual floppy seemed to be the best I could find—even better than Helios I thought. It was a well-tested product that had been in use on IMSAI's and ALTAR's for a few years. Owners of it had high praise for it and its manufacturer. And although it was of the standard IBM format, a double density version was on the drawing board and I could have it upgraded to double density when the new controller became available. It came with C/6M. So I bought it.

The single density version worked okay, but when I had it upgraded to dual density: chaos. John Torode of Digital Systems is a super-nice person and spent many hours investigating my system but couldn't get it to perform reliably. He felt that the DMA (direct-memory-access) was too demanding of the SOL's bus at the data rate needed by double density. The noise on the bus was too much for his controller to cope with, although it worked well in his IMSAI. He and P.T. had several discussions and each felt the problem was in the other's design. I was caught in the middle. John, being the honorable businessman he is, took the system back and gave me a refund. He may have solved the problem by now; I don't know.

I was sorry to have lost the beauty of having the dual density capability, but glad to have gotten out of the mess. I hate to think what would have happened if the problems were subtle and didn't become apparent until much later. I had learned what people mean when they say SOL-100 is not really a standard. Things aren't as compatible as they seem. When it comes to complex components, such as dynamic memories and DMA devices, it is foolish to get too many manufacturers products into one system. You are too vulnerable to being caught among lots of finger-pointing.

In conclusion, Helios has a lot to recommend it for SOL owners looking for a high performance disk system.

LETTERS

The Oct./Nov. issue was excellent. I have a SOL-20 with North Star disk. I gave up on Helios. It has been over one year since PT advertised the availability of 8K BASIC. I have not seen it yet. PT gave up to the competition the head start it had. By now PT should have had a TDL-like line of software. I suspect that many SOL users have gone the North Star route. I would be interested in software to run on the SOL-North Star combination and more information on Selectric printers.

--Robert Carnighan (Prospect, Kentucky)

(Editor: I suspect that you're right about many SOL owners buying North Star disks. It's ironic that, as I understand it, the North Star people may be responsible for the great delay in PT 8K BASIC. I have no personal knowledge of the story, but from remarks gleaned from high ranking employees of PT and North Star, I think the story goes like this. In its early days, PT shared office space with the people who later formed North Star. PT contracted with them to produce a BASIC for SOL which was to start as a small 4K BASIC and be upgraded to 8K and then 12K. This BASIC is the BASIC/5 we have now. But a dispute developed over the ownership of the BASIC, and the contract for upgrading it, after North Star laid its plans to produce the North Star disk, which would also need a good BASIC. The dispute has been in the courts.)
and needless to say, PT and North Star are not on good terms. Meanwhile, PT has developed its own BASIC which should be released soon. Rumors say it takes 12K to 16K or so, and has lots of nice features. SOLUS Library will contain North Star - SOL programs, many from the North Star users library. Our library soon should be ready to service requests for software. We'll announce the procedure in SOLUS NEWS.

* * *

Stan,

The damndest thing happened—sent you check for $4.00 to join you organization. Even volunteered to set up a local chapter. Since then no word—no more newsletters—Sept. was last one. What happened???

--James F. Ruckstuhl (Barstow, Calif.)

Dear Jim,

A lot of people asked themselves the same thing. I became bogged down in making a living and couldn't get the newsletter out monthly, so I went to bimonthly and was late at that! If all goes well this issue should get me caught up.

--Stan

* * *

Has anyone successfully used an Expander Model 123P printer on SOL's parallel interface? Mine types a listing okay, but when I type in a letter it continuously types the letter until I type in the next letter. This continues until I type in the slash; then it will print all the programs I typed into the SOL-20. I noticed the READY pin #16 goes high when a letter is typed in momentarily, but when it goes high permanently it types the last letter repeatedly—I can't understand why it does not stop.

--Fred Saluna (Martinez, Ca)

DOCUMENTATION NOTES

Ron Parsons has reported that the 11-8-76 version of the SOL keyboard schematic contains an error: the gate in U27 containing pins 10 and 11 should be labeled so the output is pin 8 and the upper input is pin 9. Make note of it in your manual.

Anyone finding errors in Processor Technology documentation, or any other documentation relevant to Processor Technology equipment or software, is requested to send a copy of their report to SOLUS for publication in this section.

BOOK REVIEW


(This is a book review by indirect addressing. I've received inquiries from novices who want to know a good book for learning assembly language programming. I've glanced at this book and received very positive comments from others who've read it. By chance, BYTE magazine has a review of it in the January 1978 issue. The reviewers gave it a very good review, with the caution that it is intended for the beginner who already understands computer programming in some higher level language such as BASIC.)

LOCAL CHAPTERS

The purpose of local SOLUS chapters is to let members get together with others in their area for exchange of software, ideas, etc. The structure and activities of a chapter is entirely up to its members. SOLUS will publish the chapter's contact address and meeting schedule. Each chapter can have news and articles published as a mini-newsletter within SOLUS NEWS by submitting camera-ready typing to the editor. We hope chapters will provide us with some help in operating SOLUS and give us feedback.
CHAPTER ADDRESSES

Barstow, CA:
Livermore, CA:
San Francisco Peninsula, CA:
Sonoma County, CA:
Colorado Springs, CO:
Atlanta, GA:
Chicago, IL:
Gurnee, IL:
Evansville, IN:
Princeton, NJ:
Austin, TX:
Dallas/Ft. Worth, TX:
Bellingham, WA:
Okanogan, WA:
Canada:
Saskatchewan:

Ottawa, Ontario:

NEW CHAPTER:
Redding, CA:

James Ruckstuhl, P.O. Box 1271, Barstow, CA 92311
George Bush, 442 Fontonett Ave., Livermore, CA 94550
Bill Burns, c/o SOLUS, 1439 Kinsport Ln., San Jose, CA 95120
Earl Herr, 17 Spring Hill Dr., Cazadero, CA 95421
Larry Lerman, 1120 S. Chelton Rd., #417, Colorado Springs, CO 80910
George Reeves, 5002 Crowe Dr., Smyrna, GA 30080
Tom Dilgat, 1366 S. Finley Rd., Apt 3S, Lombard, IL 60148
Vic Wiseman, 7960 Grand Oaks Ct., Gurnee, IL 60031
Robert Heerdink, P.O. Box 3835, Evansville, IN 47737
Rod Montgomery, 52 Birch Ave., Princeton, NJ 08540
Ron Parsons, 9001 Laurel Grove Dr., Austin, TX 78758
Ron Jones, P.O. Box T, Sherman, TX 75090
Seyme Computer Club, 2700 College Pky, Bellingham, WA 98225
Joe Thomasen, Box 628, Okanogan, WA 98840
Bob Stek, Regina Mental Health Clinic, 1942 Hamilton St., Regina, Saskatchewan, Canada S4V 087
Barrie Ridsdale, 31 Ivy Crescent, Ottawa, Ontario, Canada K1M 1Y1

Dear Stan,
Hello! Merry Xmas, Happy New Year, etc. I am at last writing to you in answer to your inquiry from late Sept. about a possible SOLUS group in Ottawa. If a local chapter has not yet been set up, then I would indeed not mind coordinating some sort of activity among the SOL system operators in Ottawa, or, should a chapter already be operating in this area, would you forward your name to them. At present, I am aware of only one other SOL-20 in Ottawa, although the local dealer says several have been sold. The Ottawa Computer Group of which I am a member, is very hardware oriented and although the group's membership is near 200, most members are in mid-construction of almost every other kind of equipment except Processor Tech. stuff. I am quite anxious to discuss programs, etc., in person with other people who have the configurations I now understand. I look forward to hearing from you.

Best wishes,

Barrie Ridsdale
Ottawa, Ontario

INSTRUCTIONS FOR AUTHORS

SOLUS NEWS is produced by a very small staff and we'd like to keep our dues down. So we ask, whenever possible, send your letters and articles in camera-ready form. That means typed with a dark ribbon and clean type on plain white paper, one side only, single spaced. Use 3/4" margins all around. Corrections can be made invisibly using "Liquid Paper" correction fluid. Avoid the so-called "erasable" bond papers because they smear easily. Computer listings are fine if the ribbon is dark.

But please don't hesitate to send something because you can't get it into camera-ready form. We'll retypew it if necessary.
San Francisco Peninsula chapter of SOLUS meets at the Stanford Physics building located here.
important notices

Due to a misunderstanding, Kilobaud magazine published that our newsletter is available for $4, but our 1978 dues actually are $10 ($15 outside of USA, Canada, or Mexico). If you sent us $4 in 1978 we have placed you on our mailing list, but we must request the balance of the dues to cover our expenses. Please send your payment to our P.O. Box shown above.

If you joined us in 1977 and haven't yet paid the 1978 dues, please take a moment now to send it. We realize that $4 for the few 1977 issues of SOLUS NEWS seems overpriced. We plan to pay back our 1977 members with some sort of bonus for their early support.

SOLUS Booth at Computer Faire

Processor Technology has donated the use of a commercial booth at the 2nd West Coast Computer Faire. SOLUS plans to have exhibits, handouts, and someone to answer questions at the booth for as many hours each day as possible. If you plan to come to the Faire and wouldn't mind helping to staff the booth for a one-hour slot, please let us know. Also if you have an interesting application you'd like to exhibit, contact us right away so we can make arrangements for you to get your equipment thru the security people. Let us know when you want to present your exhibit. We're especially interested in showing home-brewed versions of SOL built from the PC board, and SOL-compatible configurations of other computers.

The Computer Faire will be Friday, March 3 thru Sunday, March 5, at the San Jose Convention Center. To take part in the SOLUS booth write to SOLUS Faire Booth, Box 23471, San Jose, CA. 95153.

back issues

If you would like the four back-issues of volume 0, send $2.00 (U.S.) and a self-addressed envelope to our post office box. Be sure to say this is for volume 0 back-issues. Members who joined in 1977 are entitled to the issues they are missing without charge. New members should receive back issues of the current volume (vol. 1) automatically. Please let us know if you were left out.
EXTENSYS AT MARCH S.F. MEETING

Extensys Corporation, makers of the 64K Dynamic RAM board, will present a program on their entire product line at the March 19 meeting of the San Francisco Peninsula chapter. Ed Hartnett, marketing Vice President, will discuss the background of Extensys, their current products, and glimpses of future products. The RM64 memory board and the FOS1000 floppy disk system will be demonstrated in a SOL. If you're thinking about buying any dynamic RAM or floppy disk, it would be a good idea to attend. Ed has some interesting comments on hardware compatibility problems in SOL's. Bring a friend. Everyone is welcome. The meeting will be 1pm, Sunday afternoon, March 19, at the Stanford physics building as usual.

NEW CHAPTERS

Oakland, CA. Richard Deal, 6957 Saroni, Oakland, CA. 94611.

Montgomery, AL. Harold Drake, 759 Mulzer Blvd., Maxwell AFB, AL 36113

Address change:
Colorado Springs, CO. Larry Lerman, 32 Frost Lane, Colorado Springs, Colo. 80916

LIBRARY? HELP!

If you've written to SOLUS for software or music from our library, you've probably not received an answer. The two members we were counting on to operate these services haven't had the time to make the library distribution happen yet. We have a new volunteer who has offered to take charge, but he needs some help. What we want to do is collect the software onto one or more tapes and have these reproduced with documentation by mass reproduction. We need someone to help organize it, edit the documentation, get it to the typist and the audio reproduction company, and arrange for the mailings. We have professionals we can hire to do the hard parts, but we need people to act as catalysts. (Catalyst = "a substance which accelerates the production of the products, but which may be recovered practically unchanged at the end of the reaction.")

The software library is like a snowball. To get software we need to show some initial activity that can be added to as the ball rolls. We have a public domain assembler, disassembler, and simulator. These tools will help more people create programs for the library. We also have programs written in various dialects of BASIC which are being made compatible with PT's BASIC/5 and their new extended BASIC that hasn't been released yet. We also have a number of musical selections for the Music System. If you'd like to receive the whole library for just a few dollars, we need to work together on it.

If you can devote some time to this project, please write to me personally: Stan Sokolow, 1690 Woodside Road, #219, Redwood City, CA 94061.

It would be easiest for someone in the S.F. Bay Area, but some of the tasks can be sent out by mail, so volunteers from any area will be helpful. Thanks in advance.
------- SOL TERMINAL DRIVER -------
(USING THE SOL PARALLEL PORTS)

BY
I. HARTLEY WURKZ
JAN. 17, 1978

THIS IS A CUSTOM DRIVER WHICH ALLOWS THE SOL TERMINAL
COMPUTER TO ACT AS A TERMINAL USING THE PARALLEL PORT IN A HANDSHAKING
MODE.

THE PROGRAM ACCEPTS DATA FROM THE CURRENT INPUT PSEUDO PORT
AND PASSES IT TO THE PARALLEL OUTPUT PORT. IT ACCEPTS DATA FROM
THE PARALLEL INPUT PORT AND PASSES IT TO THE CURRENT OUTPUT PSEUDO
PORT IN THE OTHER DIRECTION. THIS ALLOWS THE SOL TO PASS DATA
FROM ANOTHER COMPUTER TO AN OUTPUT DEVICE AT ANY SPEED UP TO THE
MAXIMUM DATA TRANSFER RATE OF THE PARALLEL PORT. (APPROXIMATELY
12 KEBYTES PER SECOND).

THE PARALLEL INPUT PORT DRIVER IN SOLOS COULD BE USED
HOWEVER THE PARALLEL OUTPUT ROUTINE IN SOLOS CANNOT BE USED AS
CODED SINCE THE SOL 8080 LOOPS IN THE PARALLEL OUTPUT ROUTINE
UNTIL EX DEVICE IS READY BUT IF THE EXTERNAL DEVICE IS ANOTHER
COMPUTER LOOING UNTIL SOL IS READY, THE HANDSHAKING FAILS.

BOTH INPUT AND OUTPUT PORT ROUTINES ARE GIVEN HERE.

THE DRIVER ALSO CHECKS FOR CONSECUTIVE CARRIAGE RETURNS WHICH
CAUSE THE CURRENT LINE TO BE ERASED SO THAT COMMANDS WHICH WERE
TYPED ON THE LINE CAN NOT BE CHECKED. THIS ROUTINE DOES THIS BY
TESTING THE CARR RETURN READ FROM THE PARALLEL PORT TO SEE IF
THE PREVIOUS CHARACTER WAS A CARRIAGE RETURN. IF NOT, THE CR
IS SENT TO SOUT, BUT IF THE PREVIOUS CHARACTER WAS A CR, IT DOES
NOT PRINT THE SECOND ONE. THIS HAS SOME ADVANTAGES OVER THE
DRIVER WRITTEN BY MELVIN SCHUELEIN WHICH APPEARED IN THE NOVEMBER
ISSUE OF ACCESS (P. 20, 21) IN THAT HIS DRIVER ALSO SKIPS CARRIAGE
RETURNS IF THE CURRENT LINE IS LONGER THAN 64 CHARACTERS (65) AND
WRAPS AROUND TO THE NEXT LINE. IF GOING TO ANOTHER PRINTER SUCH
AS THE SPECTRAC, WHICH HAS A WIDER LINE, TWO LINES ARE PRINTED ON
THE SAME LINE. THIS TECHNIQUE DOES NOT HAVE THAT PROPERTY.

IN ADDITION, THIS DRIVER SUPPORTS THE VDM BACKSPACE FEATURE
WHEN USED AS A TERMINAL WITH PROGRAMS WHICH ECHO THE DELTED CHARACTER.
WHEN A 'DELETE' CHARACTER IS TRANSMITTED, THE ROUTINE NOTES THIS
FACT AND SUBSTITUTES A BACKSPACE FOR THE NEXT CHARACTER RECEIVED FROM
THE PARALLEL PORT CAUSING THE CURSOR TO BACKSPACE. THIS IS MUCH
MORE PLEASING THAN ECHOING THE CHARACTER.

***************************************************************************
00FA = STAPT: EQU 0FAH ;STATUS PORT
00FD = PDATA: EQU 0FDH ;PAR DATA PORT
0004 = PXDR: EQU 4 ;EXT DATA READY BIT
0002 = PDR: EQU 2 ;PAR DATA READY BIT
          ;SYSTEM EQUATES
C806 = IPORT: EQU 0C806H ;INPUT PORT BUFFER
C807 = OPORT: EQU 0C807H ;OUTPUT PORT BUFFER
'C2CB = ERRIT: EQU 0C2CBH ;INPUT PORT ERROR
C2D2 = LRROT: EQU 0C2D2H ;OUTPUT PORT ERROR
C004 = SYS: EQU 0C004H ;SYSTEM REFENTRY POINT
C310 = PSCAN: EQU 0C310H ;PARAMETER SCAN ROUTINE
C33A = SCONV: EQU 0C33AH ;PARAMETER SCAN ROUTINE
C01F = SINF:  EQU 0C01FH  ;INPUT
C019 = SOUT: EQU 0C019H  ;OUTPUT
C1C0 = COMIN: EQU 0C1C0H  ;
C054 = VDMOT: EQU 0C054H  ;VDM DRIVER
C22E = FDLOU: EQU 0C22EH  ;CUSTOM COMMAND SEARCH
C80C = ESCFL: EQU 0C80CH  ;

; ***************************************************************
; CONSTANTS
; ***************************************************************
0080 = NODE:  EQU 80H  ;MODE
001B = LSC:   EQU 1BH  ;
000D = CRRT:  EQU 0DH  ;
000A = LF:    EQU 0AH  ;

C900  ORG 0C900H  ;START OF DRIVER

;*****************************************************************
; THIS ROUTINE IS THE PARALLEL PORT TERMINAL ROUTINE   
; DATA INPUT IS FROM FIRST PSEUDO PORT FIELD
; DATA RECEIVE IS FROM SECOND PSEUDO PORT FIELD
; EXIT IS BY ALT MODE

C900 CD10C3 PTERM: CALL PSCAN  ;FIND FIRST PARAMETER
C903 3206C8 STA IPORT  ;INPUT PSEUDO PORT STORE
C906 CD10C3 CALL PSCAN
C909 3207C8 STA IPORT
C90C AF XRA A  ;SET DELETE FLAG AND CR FLAG TO 0
C90D 32AAC9 STA CRFLAG
C910 32A9C9 STA DFLFL
C913 CD1FC0 TERN1: CALL SINF
C916 CA36C9 JZ TIN
C919 47 MOV B,A  ;HERE IF DATA, SAVE IT
C91A 8F80 CPI MODE  ;IS IT A COMMAND MODE?
C91C CAC0C1 JZ COMIN  ;YES -- GET OUT OF PTERM AND RETURN TO
C91F DA28C9 JC TOUT  ;NON CURSOR KEY, SEND TO TERN PORT
C922 CD54C0 CALL VDMOT  ;TO THE VDM IF IT IS A CURSOR CONTROL
C925 3336C9 JMP TIN
C928 FE7F TOUT: CPI 7FI  ;IS IT A DELETE CHAR?
C92A C230C9 JNZ NODEL  ;NO, SO SKIP TMT STORE
C92D 32A9C9 STA DFLFL  ;MAKE FLAG NON ZERO
C930 CD97C9 NODEL: CALL POUT  ;CAN SENT TO TERN PORT
C933 C230C9 JNZ NODEL  ;BUSY IT NOT ZERO ON RETURN
C936 CDA0C9 TIN: CALL PIN  ;POLL PAR INPUT PORT
C939 CA13C9 JZ TERM1  ;IF NOTHING, LOOP
 ; THE HIGH ORDER BIT IS PURPOSELY NOT MASKED HERE SO THAT
 ; THE EXT. DEVICE CAN SEND SCREEN CONTROL CHARACTERS TO THE
 ; SOL VDM.
 ; IF THIS IS NOT DESIRED, PLACE AN ANDI 7FI HERE

C93C FE80 CPI MODE  ;DO NOT ALLOW A RETURN TO SOLOS HERE
C93E CA13C9 JZ TERM1  ;ALSO IF 80H
C941 47 MOV B,A  ;SAVE IT
C942 FE1B CPI ESC  ;CONTROL CHAR IF BELOW 1B
C944 D27AC9 JHC TERM2  ;IF A PRINTABLE CHAR, WILL HAVE A CARRY
C947 FE0D CPI CRRT
C949 C25AC9 JNZ NOCR  ;SKIP COLUMN TEST IF NO CARR RET
C94C 3AAAC9 LDA CRFLAG  ;TEST TO SEE IF LAST CHAR WAS CR
C94F B7 ORA A  ;SET FLAGS
C950 C213C9 JNZ TERM1  ;DO NOT PRINT IF SO
C953 78 MOV A,B  ;CARR RTN BACK TO A
C954 32AAC9 STA CRFLAG ;MAKE NON ZERO
C957 C381C9 JMP TERM13 ;NO, SO PRINT IT
C95A AF NOCR: XOR A ;MAKE CRFLAG ZERO
C95B 32AAC9 STA CRFLAG
C95E 7B MOV AB
C95F FG0A CPI LF ;TEST FOR LINE FFED
C961 CA7AC9 JZ TERM2
C964 3A0CC8 LDA ESCFL ;ESCAPE FLAG
C967 B7 ORA A
C968 C27AC9 JNZ TERM2
C96B C5 PUSH B ;SAVF B REG
C96C 061B MVI B,ESC
C96E CD54C0 CALL VDMOT ;DISPLAY IT
C971 0607 MVI B,7
C973 CD54C0 CALL VDMOT
C976 C1 POP B ;RESTORE
C977 C381C9 JMP TER13
C97A 3A99C9 TERM2: LDA DELFL ;TEST FOR A PREVIOUS DELETE CHAR
C97D B7 ORA A ;ZERO IF NONE
C97E C287C9 JNZ NPRNT ;OTHERWISE DON'T PRINT IT
C981 CD19C0 TERM3: CALL SOUT ;HERE TO PRINT TO CURRENT DEVICE
C984 C313C9 JMP TERM1 ;AND LOOP AND LOOP AND LOOP
C987 7B NPRNT: MOV AB ;GET THE CHAR IN A
C988 FE7F CPI 7FH ;IS IT A DELETE CHAR?
C98A CA13C9 JZ TERM1 ;DON'T ALLOW IT IF SO
C98D 3E00 MVI A,0 ;ZERO THE DELETE FLAG HERE
C98E 32A9C9 STA DELFL
C992 065F MVI B,5FH ;SEND A BACKSPACE INSTEAD
C994 C381C9 JMP TERM3

; PARALLEL OUTPUT ROUTINE
;PSUDE PORT 02
; DATA TO BE OUTPUT IS IN B
C997 DBFA POUT: IN STAPT
C999 E604 ANI PXDR ;CHECK EXT DEVICE READY LINE
C99B C0 RNZ ;RETURN IF BUFFER FULL
C99C 7B MOV AB ;DATA IN ACC
C99D 33FD OUT PDATA
C99F C9 RET

; PARALLEL INPUT ROUTINE
;PSUDE PORT 02
; DATA RETURNED IN A
C9A0 DBFA PIN: IN STAPT ;GET STATUS
C9A2 2F CHA
C9A4 E602 ANI PDR ;DATA?
C9A5 C8 RZ ;RET WITH Z FLAG SET IF NOT
C9A6 DBFD IN PDATA ;GET DATA
C9A8 C9 RET

;DELFL DB 0 ;DELETE FLAG STORAGE BYTE
C9A9 00 CRFLAG DB 0 ;CARR RETURN FLAG
C9AA END
SAN JOSE NEWS, WEDNESDAY, JANUARY 18, 1978

By LARRY KRAMER
Washington Post

LAKE CITY, Mich. — When a struggling young electronics firm develops a device that prolongs and protects the life of appliances and just might also cut energy consumption by 10 or 15 percent, it could be expected that the accomplishment would be hailed.

But that has not been the case for W.N. Phillips Inc., a small precision electronic equipment company in this Michigan hamlet, which manufacturers "Power Master," a device described as a transient voltage suppressor.

When Bill Phillips founded his little firm five years ago, he was trying to develop a product that would help prolong the life of appliances and other equipment that use electric power.

Because of "surges" or "transients" that Phillips said were frequently found on power lines, some electronic equipment could be affected by the changes in voltage.

The Power Master is the name of the device Phillips designed to counteract those surges and thus lessen the wear and tear on electronic equipment. To the lay person, it is only a little black box that could be anything, since Phillips does not give out the specifications of its Power Master.

One example of a successful application of Power Master is the Boston Herald-American, a large daily newspaper.

The Herald was experiencing problems with its new computerized typesetting system. Like many major newspapers, the Herald has begun the transformation to what is known as "cold-type," or photocopying, and had begun to set the type on video display terminals, computers which appear similar to television screens with typewriter keyboards attached.

There were frequent problems at the Herald when the computer system would "crash," causing the screens to go blank, and stories that reporters had written and typed into the computer system would disappear.

Acting on the advice of a computer consultant, Herald produc-

Transient protection for minis, micros and terminals

Transistor systems ACP100B offer transient protection for mini computers, microprocessors and computer terminals. The ACP100B plugs into any standard (grounded) wall plug to provide immediate protection from hazardous transient surge, high voltage or high line condition. In operation a multiple stage transient voltage suppressor works in 5 nanoseconds to suppress (clip) overvoltages. After each transient the protector automatically resets to be ready for the next occurrence. The ACP100B will suppress most induced surges from lightening. However, it is not designed for direct strike. Available from stock, the ACP100B is priced at $119 for most mini applications.


what are voltage spikes?

Voltage spikes are brief high voltage surges that can occur in any electrical system. Most common causes in home circuits include:

- Lightning strikes near power lines
- Switching ON and OFF appliances within the building (such as an air conditioner or oil burner furnace).

Voltage spikes of less than 600 volts pose little threat of damage to most electronic equipment. Household spikes as high as 3,500 volts have been recorded, however, and at such extreme voltages there is a high risk of destroying solid-state components that are not protected against spikes.

The GE VSP absorbs excess spike energy and allows only a safe voltage level to enter the protected equipment. This clamping action is diagrammed.

GE SP-752
VOLTAGE SPIKE PROTECTOR WITH GE-MOV® VARISTOR

MAXIMUM RATING LINE VOLTAGE LINE CURRENT V.A.C. 125V @ 15A SUPPRESSED VOLTAGE 500V 15A SURGE FOR 20 µSEC.

MADE IN U.S.A.

$10.00

A simple, compact spike protector, but notice the 20 microsecond response time. The one to the left costs 10 times as much but has a 5 nanosecond response. I have no specifications on the "Power Master."

Can anyone separate fact from fiction on these little black boxes? What do we really need? The GESP-752 may protect my SOL from damage, but it sure doesn't protect it from temporary insanity when my washing machine goes "clunk!"

--Editor
I am enclosing $10 for next year's dues. I would also like to report on interfacing an Axiom EX-800 printer to the SOL. The Axiom printer does not have a ready signal, instead it has an acknowledge line which does not have the proper timing. I connected jumper J3 in the printer and wired it to the SOL's parallel output as shown:

<table>
<thead>
<tr>
<th>AXIOM</th>
<th>SOL</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 7</td>
<td>Pin 2</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>Pin 23</td>
<td>Pin 19</td>
<td>Data Bit 6 (bit 7 not used)</td>
</tr>
<tr>
<td>Pin 21</td>
<td>Pin 20</td>
<td>Data Bit 5</td>
</tr>
<tr>
<td>Pin 19</td>
<td>Pin 21</td>
<td>Data Bit 4</td>
</tr>
<tr>
<td>Pin 18</td>
<td>Pin 22</td>
<td>Data Bit 3</td>
</tr>
<tr>
<td>Pin 17</td>
<td>Pin 23</td>
<td>Data Bit 2</td>
</tr>
<tr>
<td>Pin 16</td>
<td>Pin 24</td>
<td>Data Bit 1</td>
</tr>
<tr>
<td>Pin 15</td>
<td>Pin 25</td>
<td>Data Bit 0 (1sb)</td>
</tr>
<tr>
<td>Pin 10</td>
<td>Pin 17</td>
<td>NOT Strobe/Not Output Load</td>
</tr>
<tr>
<td>Pin 14</td>
<td>Pin 16</td>
<td>ACK/NOT XDR</td>
</tr>
</tbody>
</table>

A copy of the software driver is attached. It is written to be compatible with ALS-8 which explains the strange location and deleting the delete (ALS-8 outputs two deletes after each carriage return.

It should be noted that this paper can not be erased. It will take pencil and some inks. Also for fine lined permanant writing I use a test probe with 5 to 10 volts on it realize to the rest of the paper.

An Axiom rep at one of the trade shows said they in Feb. they will be coming out with a mod to print 6 lines per inch instead of the current 5. I must note however that he also said that I could get a part to convert to 8 lines/inch now for $4-5 when I wrote the factory they quoted $421! other than that I am very happy with the unit.

How often will your newsletters be coming out? Does anyone know anything about the source listing for Basic5 which was promised in PT's ads about a year ago? I assume that by now you know about MSA's 8K BASIS for SOL. It is almost the same as MITS 8k 4,0 except comes with almost no documentation i.e. they don't even give the address for the USR command; however since it is so close to the MITS that the same locations are used (for USR the user's subroutine address goes locations 0049 and 004A hex low byte first.) Also the tape routines are not in the normal format.

I have patches for both MITS 8k and Extended 3.2 (?) which are compatible with SOLUS in addition the useless CONSOLE has been replaced with SETOUT = which does the obvious and with port 3 called it will call an Axiom routine.

DE30  
DE30 C5  
DE31 DB FA  
DE33 E6 04  
DE35 C2 31 DE  
DE38 78  
DE39 FE 7F  
DE3B CA 4F DE  
DE3E 0E 70  
DE40 0D  
DE41 C2 40 DE  

DE30  
DE30 C5  
DE31 DB FA  
DE33 E6 04  
DE35 C2 31 DE  
DE38 78  
DE39 FE 7F  
DE3B CA 4F DE  
DE3E 0E 70  
DE40 0D  
DE41 C2 40 DE  

OUTPUT DRIVER FOR AXIOM EX-800

DE30  
DE30 C5  
DE31 DB FA  
DE33 E6 04  
DE35 C2 31 DE  
DE38 78  
DE39 FE 7F  
DE3B CA 4F DE  
DE3E 0E 70  
DE40 0D  
DE41 C2 40 DE  

(Continued)
Greetings. Lee Felsenstein has been kind enough to provide the enclosed information on the necessary changes for modifying a revision D Sol-PC board for use with vectorred interrupts which includes tapping an otherwise unassociated gate! A somewhat more textual explanation will appear in ACCESS. I would have sent this information last week but instead became involved in preparing an exhibit for a show in which we're currently participating.

I agree that all change notices should specify the revision level for which the information applies. Our internally circulated engineering change notices do reflect this data, I'll see what I can do with our documentation group to effect this.

Ralph IL Palsson
Customer Applications Manager
Processor Technology

(Editor: The letter above was Ralph's reply to my request for a retrofit to Rev. D-SOL's which will let them work properly with interrupts. Ralph is an unusual person in that he does what he says he'll do and in a timely manner. The accompanying blueprint he sent shows the partial schematic below and the instructions:
"On bottom (solder) side of SOL PC Board, add jumper wires (24 AWG or smaller, insulated) from Pin 96 of J10 to Pin 9 of U57, and from Pin 8 of U57 to Pin 6 of U34."

Thanks, Ralph and Lee.)
Did you know that the Helios II (unlike North Star, Micropolis, ICOM, and Digital Systems floppy units) does not have a physical write protect? Obviously, Processor Technology did not want to spend the extra money to make this valuable feature available. Therefore, the physical write protect slot, which is standard on all diskettes I’ve seen, is absolutely useless. Also Space-Byte's 16k static memories are flaky on a Helios II. I also can't get my TDL 280 CPU to work with my Helios II, though my IMSAI 8080 works fine with it.

This is in response to Joe Maguire's Oct. 25, 1977 request for an 8080 driver for the Digital Group impact printer that he's hooked up to his SOL-20. Yes, I have an 8080 driver for that printer. If he needs it, tell him to write me and I'll send him a copy. Me and two other friends are working with the printer being used by the Digital Group. One of us actually bought the Digital Group printer. The interface electronics (which is just a parallel port) is actually quite simple. However, the power supply was really done crummy and dangerously. It would not be that difficult to burn-out your printer because of some software or minor hardware glitch in your system. The sloppy Digital Group power supply design for their printer really surprised my two hardware friends since they felt the design on all of Digital Group's other products was pretty solid. For example, if you turned-off the power to your computer and your printer at the same time, the fuse on the Digital Group interface board would pop! Also not all of the secondary AC is completely isolated from the digital electronics. There are other things wrong too, but would take too long to explain here. My two hardware friends are re-designing the Digital Group power supply and interface electronics to the printer, which is manufactured by Practical Automation. Re-designing the power supply is a little bit tricky because the power supply requirements of the Practical Automation printer are really strange.

Ken Young
3311 W. 3rd Street, Apt. 1-319
Los Angeles, California 90020

I use my SOL 20 for hobby and would like to get in touch with anyone who uses it with ham gear. I am a ham and my call sign is VE3CJC.

I would also be interested in any commerical programs that have been developed as well.

I am also trying to interface the Digital Group printer to the SOL with no luck yet. Maybe someone has already committed hari kari and I can take over from him on this problem ha ha.

E. B. Robinson
Trenton, Ontario

Here's something you might put in Bits & Pieces. I'd like to know how to disable the moving cursor under the short range scanner in TREK-80—that really bugs me, that thing going back and forth. Also I'm anxious to hear how that Vandenburg 16K static board works in a SOL.

Larry Lerman
Colo. Spgs., Colo.
I have the 32K version of the Extensys board - no operating problems, but one big gripe: the 8K blocks of memory are not re-addressable. I suppose this is no problem if you have a full 64K board, but otherwise you must physically move the chips! Since my PT software starts at 0H and my PolyBASIC at 2000H and my ALS-8 needs memory at 0000H, this was very annoying. I partially solved my problem with a 4K board which I address at 0000H when using ALS-8 (along with bank #8 of the Extensys) and I re-address it at 6000H when running long BASIC programs in PolyBASIC. Of course this still wastes 8K starting at 0H. When PT's 8K BASIC is released, I won't have the problem.

By the way, PT's 5K BASIC is pretty fast when run on a SOL. I did the timing comparisons as published in Kilobaud #6, and 5K BASIC came out near the top when running benchmark program #7. Only the Zapple 8K and Altair 8K running on Altair machines were any faster.

I am happy to report that the number of SOL systems in Regina has doubled since my last report - there are now two of us! I expect it to double again within the next year as there are several people interested in it after I showed off my system at the second meeting of the R.O.M.S. (Regina Organization for Microcomputer Systems, of which I am co-founder).

Good fortune for all SOL users in '78!

Bob Stek
Regina, Saskatchewan

I have a couple of comments concerning the Oct./Nov. 1977 SOLUS NEWS.

I may have an answer to Dr. Sakurai's problem with a D+7A in a SOL. I had a similar problem. IN port would input a FF sometimes when the DAZZLER was in the bus, while if the DAZZLER wasn't in the bus the D+7A worked correctly. The problem was that I had a TI 8080 which came with the SOL, when I changed it to an Intel 8080A everything worked right. I tried two other 8080 chips and a different brand of 8080A which did not work. A Radio Shack 8080A chip did work also. I don't know why the difference in the 8080 and 8080A, but I tried everything in a different SOL and the same thing happened.

I was very interested in the article on Selectrics. I have an A-J 841 also interfaced with a 3P+S. The driver which I wrote for it for both input and output uses 100 hex bytes plus 100 hex bytes for the look-up table. If anyone is interested in this program, I would be glad to send them a copy.

Jim Dixon
RR3 Box 151A
Alexandria, IN 46001

I was quite happy to hear about the formation of SOLUS in Byte Magazine. I have recently assembled a SOL-20 and am eager to start programming it. It sure would be nice to swap software with other SOL users. May I suggest that there be a column in your newsletter
describing requirements for decent system software and an action plan for the design and implementation of this software. I don't think we can depend on Processor Tech to dream up what we really need.

Some examples of useful software we could all use are:
1. A full screen, multi-file editor with such features as:
   'BLOCK' MOVE, DELETE, COPY, BLOCK MOVE ↔
   MERGE FILES; TAB SETTING. ALS-8 could be used as a base.
2. A high level compiler like PL/1, PASCAL (or if you must BASIC)
3. A linkage editor and loader

I would be quite willing to work with members to produce any of the above or to get involved with more detailed specifications.

Peter Needham
Richmond, B.C.
LOST SOUL

The following member(s) have an incorrect address in our files and we have been unable to reach them. If you know anyone on the list please have him write to us so he can continue (or begin) receiving the mailings.

Doug S. Miller, Menlo Park, CA

CONSUMER PROTECTION

If you are ordering a 16K Static RAM from "Seattle Computer Products, Inc." using the Group Discount offered in Vol.1, No 1, please let us know so we can audit the amount of rebate they send you. We recommend you seriously consider purchasing it assembled rather than as a kit because of the 10-day return privilege and the better warranty. Never pay in advance. This board uses the same memory chip as the Artex 32K board, which we've seen used in SOL with DMA devices, so it should be fine — but one never knows for sure.

SOLUS NEWS
Stan Sokolow, Editor
1690 Woodside Road, #219
Redwood City, CA 94061

FIRST CLASS
DUES REMINDER

We still have many names on our mailing list who haven't sent in the current year's dues. We are about to purge these names from the list. If you are one of these folks, read this issue. If you still feel we are doing something relevant to your needs and deserving of your support, send in your dues. Remember it's $10 in the US. (See above for foreign and special memberships.) If we don't hear from you, this is your LAST ISSUE!

We also want to remind new members that memberships run on a calendar year (Jan thru Dec) basis. Members who join mid-year should receive the current year's issues back to January. If you don't, let us know. Allow about a month for processing...we're all doing this in our spare time.

One last thing: Those who sent us $4 dues in response to the erroneous note in Kilobaud, please send in the balance of your dues. That note was sent to the magazine in 1977 when the dues were $4, but wasn't published until it was outdated.

NEW FORMAT

Take a peek inside and you'll see we are trying a new format for SOLUS NEWS. We are trying to pack more into the same number of pages. At the same time we are hoping to be able to give more rapid turn around on letters we receive. To do this, we are reducing the letters and articles we receive to half size. They are the actual letters themselves, not retyped, and only slightly edited with a pair of scissors. Authors should be sure to use a dark ribbon so their letters reproduce well. Letters that require retyping will get into print much slower than camera-ready ones. In the future we may be able to take letters on cassettes and let a word processor do the work, but we don't yet have the software for this. Anyone interested in working on that should contact the editor.

2nd WEST COAST COMPUTER FAIRE

As we reported in the last issue, SOLUS had a commercial sized booth at the Fair held in San Jose on March 3 thru March 5. Processor Technology donated it to us. It was a good way for us
to recruit new members, and it made a great hang-out for members of the chapter. We recommend this sort of activity for all of our other local chapters. If a club booth is not available at your area's computer show, contact us and we'll see if P.T. is interested in sponsoring a commercial booth there.

We also had a general meeting at the faire, which was attended by over 100 people. Members of the SOLUS steering committee reported on the results of the mailing and got lots of good ideas from members. Some suggested that we put on a program at each of the local chapters, directed at the novice who can't even understand the basics of the SOL. One person suggested we develop a self-tutorial cassette tape (audio recording) that leads the user through the steps of getting his SOL (assembled) to talk back to him on the screen. (Processor Tech's Ralph Falsson told your editor that P.T. realizes the manual is not good for the 100% novice to computers, and they are considering printing a beginner's guide.) Some people came up to volunteer for various projects.

Another activity SOLUS engaged in at the faire was rounding up new products for our Hardware and Software Reviewers. We'll report on these in the coming months.

NEW CHAPTERS


Metropolitan Washington, DC: Jim Logan, 6817 Melfose Dr, McLean VA 22101. (703) 356-1068.

Tallahassee, FL: Mitch McCann, Rt. 7, Box M.L.C., Tallahassee, FL 32301.


To join a local chapter, contact the coordinator directly. Each chapter is free to organize as its members desire. Chapters are provided so SOLUS members are able to meet face-to-face, trade software, tinker with hardware, visit local manufacturers, hear lectures from invited speakers, etc. If you would like to start a chapter in your area, send SOLUS your chapter area name, and the name and address of the coordinator to publish here. We'll print the SOL list twice a year.

Local chapters are encouraged to write to us so we can hear what you are doing.

DOCUMENTATION NOTES

Here's a potentially dangerous error in the SOL systems manual reported by Warren Harkness. On page AVII-3 (appendix) the description of S-100 pin 2 function is correct, but the SIMSOL and RAME should be +16v not -16v. Warren wrote "Please publish that so no one else assumes pins 2 (+16v) and 52 (-16v) which are across from each other, are the same voltage. I tried to measure voltage there one time, shorted 2 and 52, and blew my power supply." Pin 52 is correctly designated -16v. On page AVII-4.

At the February meeting of the S.P. Peninsula chapter, David Frye demonstrated a PC board which has impressed him to its unique features. It is a backplane board simialar to the one which Processor Technology makes to plug into the SOL S-100 connector煊ook board. The SOL-20 slot is in the SOL-20 card cage. However, this "daughter board" provides 10 slots in about the same size, five on the front, and five on the back. It won't fit a SOL-20 case, but have its home-brewed memory system from the SOL-PC, so he doesn't care. The board also has a regulator circuit to provide the regulated voltages needed by the SOL-PC itself. The board is made by Elektor Electronics, 885 Aeter Avenue, Palatine, IL 60067. The same fellow also makes a metal card cage to support the boards, and an 8K RAM board. Contact him for more info. See the illustration in this issue for a sketch of the "daughter board." (Page 4).

Ron Parsons wrote, "I would be interested in being contacted by anyone who has successfully attached an expansion backplane with five or more slots to a SOL-20." We have heard at the 2nd West Coast Computer Fair that an S-100 manufacturer who makes a terminated bus computer has a working prototype for adding his box and motherboard to the SOL as an expansion accessory. The problem is not easily solved you can't just run a couple of ribbon cables out to a motherboard because of such things as noise, transmission delay, and bus loading. What works for some boards plugged in out there may not work for others. Processor Tech is looking for such an expansion method too. If anyone has done it successfully, please let us know how so Ron and the rest of us can give our SOL's some growing room.

Bill Fuller, of Grand Prarie, TX, wrote that most 2-80 cpu's do not support the S-100 interrupt enable INTR output. If converting the SOL to 2-80 (such as with the Dutronics adapter) be sure to check for that signal being generated, otherwise the P.T. Co. music board won't work. It uses that signal to make the music. We hope anyone considering the Dutronics adapter for the SOL reads the hardware review in this and previous issues before making the purchase.

Anne Weiss, of Somerset NJ, asked if we know of any device to eliminate interference from SOL to a TV in the same house, especially on channels 2 and 4. Ham radio operators have had similar interference problems. Some of the radio frequency interference comes out of the gaps in the SOL case and a lot comes out along the AC power cord, or so we've been told. Good grounding of both sheet metal covers and SOLS to the chassis and installation of a CORCOM RFI power line filter 37P will help. The filter costs about $10 and in is a direct replacement for the normal SOL power cord receptacle on the back wall of the power supply. More details are in the Vol 0, No 1 issue of SOLUS NEWS. Another solution is a one-piece metal cover for SOL sold by CURTIS ELECTRO-DEVICES, Box 4090, Mountain View, CA 94040. They make this case and RFI filter for use in their amateur radio system. It costs about $100.

In the last issue, I asked if anyone knew how to protect against the temporary insanity my SOL goes into when my washing machine is running at the same time. Simple voltage spike protectors don't help much. The Letters section of this issue has a couple of replies.
My Sol and CP/M — and a Helios??

By Ron Parsons
Austin, Texas

One disadvantage of Processor Tech's PTDOs and Helios II is the unique format of PTDOs diskettes. This was discussed in the articles by Stan Sokolow and myself in the Jan./Feb. 1976 SOLUS NEWS. There is a large amount of CP/M software available on standard format soft sector diskettes. Because I already had the most expensive part of a CP/M disk system (the PerSci drive in my Helios), I wondered how could I use it with CP/M and PTDOs concurrently?

I had several objectives to satisfy: a) No modification should be needed to any of the Helios hardware or software, b) Switching between PTDOs and CP/M should be under software control, and c) There must be a way to transfer files from one OS to the other.

My solution was to use a Tarbell Floppy Disk Interface Board to act as a controller for CP/M. The Tarbell controller uses a 1771 LZI disk controller chip for controlling and formatting soft sector diskettes. The board puts the processor in a wait state while waiting for the disk request to complete. DMA is not used as in the Helios for controller-memory data transfer. Thus there is very little time spent in the wait state except during seeks. This board has four spare 16 pin IC slots and space for two more pin headers for ribbon cable. With four additional ICs (hex tri-state buffers) and a few unused gates scattered around the board, I installed a multiplexer for the signals from the controller (now controllers) to the PerSci drive. The multiplexer state is set by a software command (an OUT instruction). The signals from the drive to the controllers are not multiplexed. The 50 wire cable from the drive connects to the header J1 on the Tarbell board and a short six inch jumper cable connects the Helios controller to header J2 on the Tarbell board. I burned both the PTDOs and CP/M bootstraps into my 3758 version SOLUS disk in place of TERMIN and cassette byte routines. The CP/M boot requires zero wait states. This was done by lifting pin 71-1 on the main Sol board. I also added a one second one-shot timer to the load circuit so the head returns to the head on the second after the 1771 "releases" it. This eliminates the wear and noise associated with repetitive loading and unloading of the head.

The only problem I encountered with the Tarbell Interface was due to an unterminated 3600 bus line (2K - external clear). Noise, probably from XRDY, occasionally cleared a latch. This caused the PerSci drive to switch randomly from disk 1 to 0. Tying this line high with a 22K resistor cured the problem.

Creating and debugging the EOFS (the hardware dependent part of CP/M) was very easy since it could be assembled and tested under control of PTDOs. The 3755 output from the 1771 chip was not used. Instead, stepping pulses under software control were used to take advantage of the fast seek capability of the PerSci drive.

Since the PTDOs bootstrap uses the first 380H of memory, I've established 000H as the origin of all programs and files to be shared between PTDOs and CP/M. I also had to write conversion routines for some programs. The CP/M format is (text)(CR) while the CP/M format is (text)(CR)(LF). Now the world of CP/M programs is available to me. However, because PTDOs is so much more powerful than CP/M, I often find that I transfer files from CP/M to PTDOs for processing.
In this month's column we shall discuss the Dutronics DZ80-80R 280 adapter board, the Extensys RM64 dynamic memory board, and also the Tarbell 1011A floppy disk controller board. The Dutronics board was supplied to SOLUS courtesy of Mr. Dave Dutra of Dutronics. The Extensys board was loaned to SOLUS for evaluation by Mr. Dan Pichulo of Extensys. The Tarbell board was purchased as a bare board and built up for use mainly in his Altair 8800.

Evaluations have been performed by the author and two of his colleagues, Messrs. I. Hartley Wurks and Seymour Bugs. It should be noted that all three of us are using SOLs which were built from boards, and each is uniquely packaged and expanded.

Dutronics DZ80-80R

The Dutronics DZ80-80R 280 adapter board is a small (2.75 x 5.5 inch) circuit board which includes a 280 CPU chip and twelve additional support chips. It is designed to plug into the forty pin socket in place of an 8080 chip and thus provide the power of the 280 instruction set in a system originally designed for the 8080. It is especially attractive for SOL owners because the SOL does not have an S100 bus CPU card which can be replaced by one of the S100 bus 280 CPU cards now available from several sources. Unfortunately, it proves to be difficult to fool the SOL into thinking that the DZ80-80R is an 8080!

Several months ago SOLUS received a prototype DZ80-80R board for evaluation in SOL applications. After some use, several problems became apparent, specifically pertaining to proper response to the onboard SOL-generated wait states, and writing to the parallel output port. Dutronics was notified, and Mr. Dutra personally visited the author's home, bringing along his own test equipment to observe the symptoms. Just before Thanksgiving, 1977, Dutronics supplied a new board, with several modifications installed, which supposedly fixed all known problems with the DZ80-80R when used in a SOL. The author made the same modifications to the older prototype board which he still had, and gave the new board to Mr. I. Hartley Wurks for testing in his SOL.

Mr. Wurks reports that the Dutronics board worked in his SOL with static memory boards using 2102 type memory chips. It did not work reliably when using the Extensys memory board, however. (Programs tended to “blow up” when using the Dutronics board and Extensys board at the same time. The Extensys board worked reliably with an Intel 8080A.) The parallel port worked OK with the fixes made by Dutronics. (Mr. Wurks uses the parallel port for interfacing his SOL as a terminal to his IMSAI.)

Mr. Wurks also reports that before he could read tapes with his SOL while using the Dutronics board, he found it necessary to replace the tape interface C7MP. (He replaced a GI AY5-1013, which worked fine with the 8080A, with a TI TMS-6011, which then allowed him to read and write tapes properly.) Mr. Wurks was unable to get the Dutronics board to work in his IMSAI 8800.

Mr. Wurks then gave the Dutronics board to Mr. Bugs for further testing. Mr. Bugs found that the Dutronics board doesn’t act quite right when writing tapes. For some reason the screen display is altered during the writing process, although Mr. Bugs says that the tapes are written correctly and can be read in correctly. He also found that the parallel output port did not work properly in his SOL.

Mr. Bugs agrees that the Extensys board does not work reliably when using the Dutronics board.

The author has found that the Dutronics board (the old one, updated with the same changes as the new one) works somewhat in his SOL. It now works with the parallel output port, which he uses for controlling his I/O Selectric typewriter. He was able to read tapes which had been previously written with an 8080, but found that the SOL display did strange things when trying to write tapes using the Dutronics board. Furthermore, the tapes just written could not be read in without error.

The author has succeeded in getting the Tarbell floppy disk controller to operate in his SOL (using an 8080), but must admit to having had no success in getting it to operate in the SOL with the Dutronics board. This is quite perplexing inasmuch as the Dutronics board has worked quite well in the author's Altair using the Tarbell controller.

CONCLUSIONS:

While you might be able to get the Dutronics DZ80-80R board to operate properly in your particular SOL (hopefully using static memory), you cannot at this time give an unqualified recommendation. If you feel that you want to add the 280 to your SOL, and that the Dutronics board is the way to do it, be sure to get a guarantee that all parts of your system will work together properly. Based on our experience, it seems likely that just when you think everything is great, you will get a new board, or try something new, which reveals a hitherto unknown bug.

Extensys RM64

The Extensys RM64 memory board is a dynamic memory board designed around Intel 2108 8K dynamic RAM chips. The board gives us the impression of being carefully designed. We noted that the 70-3 style 5-volt regulator did not have a heat sink, and ran rather hot.

An Extensys RM64 dynamic memory board with 48K of installed memory was originally provided to SOLUS by Mr. Dan Pichulo of Extensys at the
October SOLUS meeting. The author promptly plugged it into his Altair, found it wouldn't work there, plugged it into his SOL found it didn't work right there either, and called Mr. Picchulo to find out more. (This particular board had inadvertently been left on the SOLUS meeting, and therefore came with no documentation.) Mr. Picchulo arranged to replace that original board with one which had the necessary modifications, and that board, with documentation, arrived in early December. The evaluation results pertain to the replacement board, serial number 10863-H.

The author immediately found that the new board wouldn't work in his Altair, either. This is probably caused by the fact that Extensys uses pin 3 of the 8-100 bus to request wait states. The Altair, as modified per MITS' authorization (as published in Computer Notes), uses pin 3 for the front panel, and is always tied to an active tri-state driver. The transistor on the Extensys board probably can't pull down against the 8T97 on the Altair front panel. Unfortunately, there is no provision on the board for selecting between pins 3 and 72. The Extensys User's Manual for the RM64, which lists a price of $10 on the cover, doesn't include a schematic diagram, so it was not possible to try to understand the problem in detail.

The author found that the Extensys board did not operate reliably in his SOL. It appeared to work for short periods, but would inevitably "blow up" sooner or later. For example, if a tape of 12K basic were loaded, and a program then loaded, it would blow (suddenly end up back in SOLOS) when the program was run. It was not possible to run CP/M for any length of time before unpredictable events occurred.

Mr. I. Hartley Wurz found that the Extensys board worked fine in his SOL as long as he stuck to the 8860. As previously mentioned, however, it did not work with the Datronics board.

Mr. Wurz also reports that he tried the Extensys board in his IMSAI and found that it would work from the front panel, but could not be used with his IMSAI floppy disk controller (which uses DMA).

Mr. Wurz then tried the Extensys board with his Ithaca Audio 280 board in his IMSAI and found that the memory didn't work at all. The Ithaca Audio board works fine with static memory and the floppy controller's DMA.

Seymour Bugs found that the Extensys memory would work OK in his SOL with an 8860, but not when using the Datronics board.

**Conclusions:**

The Extensys RM64 dynamic memory board appears to work well in most standard SOLs. The author does not understand why it fails to operate reliably in his particular SOL, when he has been able to run for hours on end with static memory without problem. The Extensys board is a very nice looking board, the first 3-layer 8-100 bus board we have seen. It is about 5/16 inch higher than the standard 8-102 board, and is extremely densely populated, leaving very little space around the sides. If the high density and low power consumption of this board appeal to you, we suggest again that you only buy it with a guarantee that it will work properly in your unique system.

Notes on Using the Tarbell Floppy Disk Interface in a SOL

The Tarbell Floppy Disk Interface is a highly versatile board which includes a Western Digital FD1771-11 controller chip along with the necessary interfaces to the 8-100 bus and any of several popular floppy disk drives. It also includes a bootstrap circuit and switch which allows easy loading of an operating system like CP/M in an Altair or IMSAI environment. Before rushing out and buying one, however, SOL owners should be aware that there are certain aspects of the SOL which makes using this interface a little less straightforward than using it in other 8-100 bus computers.

The standard port addressing on the Tarbell board is E8 through F7. That group of addresses is already used by the onboard SOL 1/0 circuits. This precludes using the Standard bootstrap ROM which is supplied with the complete kits. (The author did not implement the onboard bootstrap function on his board.) The board does, however, allow easy selection of the port addresses, so it is very easy to write another bootstrap program which works. The author has not tested the onboard bootstrap, either in his Altair, or his SOL.

There is one input port circuit, which Tarbell calls WAIT, in which the tri-state gating logic does not include P00H. Because of the bi-directional data bus in the SOL, this WAIT port may not operate properly. It is very straightforward, using spare gate circuits already on the Tarbell board, to correct this omission.

One more thing that may prove to be a problem is that the SOL always inserts one wait state for every onboard memory read or write, and always inserts a wait state for every input and output instruction, onboard or not. The author, who is using a 2708 personality module, has defeated all memory wait states, and has modified the 1/0 wait state circuit so that only onboard input and output address lines insert wait states. Proper operation of the wait state circuits is critical for proper operation of the Tarbell interface circuit. Also, all programs which read or write to disk must run in no waits state memory.

The key element of the Tarbell interface is the Western Digital FD1771-11 chip, and most of the important capabilities and limitations of this interface are those of the 1771 itself. This chip allows use of a variety of soft-sector formats, allows writing of these formats, and most importantly at the present time, supports the IBM 3740 soft-sector format. This allows the use of CP/M or other operating systems using IBM format compatible disks. The controller does not support hard sectoring, and is not compatible with controllers such as used in the Helios system.

Figure 1 shows the changes which the author has made to his SOL to defeat memory and offboard 1/0 wait states. If you are using a 5224 or 6834 personality module, you probably cannot run without the wait states. These changes do not require that any lands be cut or that any new IC's be added.
Figure 2 shows the changes made to the Tarbell board to include DBIN in the tri-state gating logic for the WAIT input port. Here, one card must be cut, but no new IC's are required.

The author has been running the Tarbell board for almost two months in his Altair with very satisfactory results. It worked superbly with the Dutronics Z80 board. He is using 32K of static memory (all 21L02 type). He was unable to try it with the Extensys memory there, because the Extensys memory board didn't work at all in the Altair.

A few days ago, he got around to modifying SOLOS, by replacing the Terminal mode command with a disk bootstrap command. He then proceeded to try various combinations of things in the SOL. He ended up with the following set of conditions:

1. 24K of static memory
2. Wait states defeated on all memory and offboard I/O
3. 8889 CPU

Under these conditions the system works reliably for hours at a time. The Dutronics board would not work with the Tarbell board in the SOL. It seemed to read in one byte from the disk and then either hang up or get lost. The lack of a front panel on the SOL makes it very hard to know exactly what is happening.

Since the author could not get the Extensys board to operate reliably in either of his computers, he cannot conclude whether or not the Tarbell board would work with the Extensys board.

CONCLUSIONS:

The Tarbell Floppy Disk Interface may be a low cost way for you to get a floppy disk system running on your SOL. It takes a little more effort to use it in the SOL than in other 5-100 bus systems, but it is relatively straightforward. Again, there may be incompatibility problems when trying to get this board to work with other equipment.

![Diagram of SOL modifications](image)

**a) Original Circuit**

**b) Circuit as Modified**

- REMOVE U54, BEND PIN 10 OUT, REINSERT IN SOCKET
- REMOVE U53, BEND PIN 10 OUT, SOLDER JUMPER FROM PIN B TO 7, REINSERT

Figure 1.

Changes to SOL
Since a large number of Sol owners also own the North Star Micro-Disk System, SOLUS has been trying to improve the integration of these two units. As part of this goal, we worked with and encouraged Bruce Kendall in his efforts to make his DQS relocation program available. The standard North Star DOS is located at 2000h, which conflicts with long Basic-5 programs or long Music System programs. Extended Cassette Basic, and many other programs which have their origin at 0. Starting with the DOS at 2000h, the DQS Mover allows a user to create as many additional versions of DQS as desired and locate them anywhere. I have tested it and it worked perfectly. It even moved the I/O drivers along with the DOS. The documentation is extremely well done. I recommend this package highly and I will do a full review in the next issue. If you don’t want to wait you can get the program on a diskette for $18.75, plus $1.22 tax if you live in California, plus $1.00 for shipping to Digital Dell Computer Store, 80 West El Camino Real, Mountain View, CA 94041.

PRODUCT REVIEW: TWO "INEXPENSIVE" 16K STATIC MEMORY BOARDS

by Bill Burns
(using the technical knowledge of Ben Wilander and Ron Findlay)

Since the five empty slots on the Sol-20 are filling up on most of our systems, “slot conservation” is becoming more important. One 16K memory board is better than two 8K boards.

Top technical people have told us that unless there is a large price difference, static memories are preferable to dynamic memories. The reasons are: 1) greater simplicity, and 2) less chance of present or future incompatibility with other boards.

When we heard of the Vandenberg Data Products Board ($310 kit, $365 assembled) and the Seattle Computer Products Board ($325 for 450 nsec. chips and $375 for 250 nsec. chips assembled, but $375 and $425 after May 1) we asked for and received an evaluation board from both companies.

Both boards were used for several weeks in a Sol-20 with a North Star Microdisk System. There were no problems except that each initially had a single bad chip. (There evidently is no fully effective memory test.) Both of the bad chips passed most of the memory tests that I have accumulated.

Both boards require “hard-wire” memory addressing instead of using DIP switches. They both use wire-wrap pins on the component side and therefore you must solder or wire wrap each 4K memory block to its starting address. This disadvantage can become an advantage by using a “parallel addressing” scheme. We suggested this possibility to both manufacturers and they both independently came up with the same design. Rod Brock, of Seattle Computer Products, responded with a complete article which is printed elsewhere in this issue. I am testing this now and so far—no problems. It even ran well in a short test using Hello DMA. The Vandenberg mod is identical except that the resistors are 2.2K ohms (47k) and the diodes are either 1N4148 or 1N914. In both cases the companies said they would consider the modification as authorized for warranty purposes.

These are both “good” boards—the choice between them depends on how you view the tradeoff between “fully static” and low power. Seattle. This board, which uses the NXS 4044 chip (either the 450 nsec. or 250 nsec version) is fully static. The board is well designed, is properly gated for the Sol bidirectional bus, and allows a lot of options for atypical systems. For the Sol the SINF, SOUT, and 8WHITE signals should be implemented. The designers have done several things
to minimize noise—they have used "bus bars" and separate regulators for each 4K. Also the regulators are on the right which shortens the ground path which minimizes the possibility of ground loops. The board can be disabled using the phantom line, but they did not put a pad next to line 7, so the jumper must be soldered to the top of the socket finger. Also the data input lines are "conditioned" but are not buffered. So far this has not caused any real problems.

The board we tested had the 250 nsec chips and it ran with everything that we tried with. (interrupts, and Ithaca Audio 2-80 Board, Imael Disk System, North Star Disk, Imael, Helios II, and a Sol. The major concern is power dissipation. The board uses 1.7 amps nominal and the specs give 9.0 volts as max for the 9 volt supply. Many Sol's exceed 5 volts (mine is 9.7 V). A note on the spec pages states: "The input regulators will handle higher voltages than +9, however, special cooling for the regulator heat sinks is required at these higher input voltages." The heat sinks are indeed small and ventilation in the memory board area of the Sol is not good. The warranty defines "unreasonable use" as including input voltages exceeding the spec and temperatures exceeding the spec caused by inadequate cooling. Therefore many Sol owners would need to make some sort of modification to safely use the Seattle board. I have already added a fan on the back of my Sol which blows in over my boards. With this extra fan turned on, the board runs at the same temperature as it does with an 8 volt supply in an open cabinet, which is about the same as, or even perhaps cooler than most other static memory boards.

Vandenbery. This is a very cool running board even without the fan. Since it has very low power consumption (560 ma at +5V, 90 ma at +12V, and 16 ma at -5V). This is due to the fact that it is "a fully static board". The board uses the NEC µPD4140 which is an "edge triggered" memory chip.

The board is completely static and does not require refresh. The static storage cell is, however, combined with dynamic peripheral circuits (such as decoders). An activation edge must be provided by the system in order for the chip to generate clocks internally (article in the Sept., 1979 Electronic Products Magazine goes into more detail.) The chip has the low power virtues of dynamic memory. Unfortunately it also seems to have at least some of the incompatibility vices. It worked with Imael DMA and one Helios, but not with another Helios. It did not work with some of the earlier interrupt systems or an Ithaca Audio 2-80 Board (Vandenbery said it worked fine with theirs. It worked flawlessly during an extended test in a Sol with a North Star Disk.

The inputs are buffered, the read data is properly gated with DBIN for a bi-directional bus, and the regulators are on the right to shorten the ground path. Also, the people at Vandenbery have been very pleasant and helpful, but they lose two points for advertising their board as "static" without any qualification.

Conclusion. The tradeoff between the low power consumption of dynamic chip circuitry and the greater simplicity of fully static chips is one on which reasonable and knowledgeable people will differ. My personal bias is toward trying to stay with fully static memory to minimize the chances of problems with other boards in the future.
Figure 1 — Memory map showing effect of parallel addressing.

Figure 2 — Circuit mod. for Seattle computer 16K RAM board for parallel addressing of columns 1 & 2.
SOFTWARE NOTES

On page 3 of the Dec issue, Eli Lord complained about the lack of provisions in the Micropolis disk operating system for peripherals. Jerry Lenz wrote that he has his printer working under the Micropolis, but not the cassette. The two of them are going to get together to figure out how to drive their peripherals. Anyone with more info is requested to let us know. Has anyone asked Micropolis about this? It is incredible that they would not provide for anything other than the disk and the terminal.

Robert Prase (Germantown, TN) asked if we know any little secret that might help him get his Mits 8K 4.0 BASIC to run on his SOL. Well, we do. It's called Dr. Dobb's Journal, Box 2, Menlo Park, CA 94025. In issue number 18 of this publication, a letter from Jack L. Callaway gives the listing of all the needed patches. We've reproduced the article here for those who don't yet subscribe to this great journal. You really should. It takes no advertising, so it is free to criticize any manufacturer without fear of being cut off of advertising revenue. It's on our side. There's a subscription form reproduced here for your convenience.

PTC MAY PRODUCE SOL-HARDWARE DEBUGGER

Processor Technology is contemplating the production of a device that would let one SOL diagnose hardware problems in another SOL. The device, which they proudly call the Paramola (because it takes a pair of Sol's to make it work), would sell for about $150 retail, including hardware and software. Paramola would consist of a board that plugs into the "sick" Sol and a ribbon cable to connect to the parallel port of the "doctor" Sol. Software in the "doctor" Sol would let the user perform tests that would pinpoint malfunctions in the "sick" Sol. Originally intended for the product for their dealers only, but if there is enough demand they will make it generally available. SOLUS chapters, computer centers, and other clusters of Sol's may want to share one of these. If you would like one, let PTC know you are interested. Mention you read about it in SOLUS NEWS.

RUMORS

Processor Tech is putting the finishing touches on their FORTRAN. The disk version will be released first, but the cassette version will not be far behind. PT has provided a stipend and a computer with Hellen to a UCSD grad student in the portable Pascal project. In exchange they will receive a Helens version of the UC San Diego Pascal system that was discussed at the 2nd West Coast Computer Faire. When? They don't know. Cost? They don't know. PT has a 2KRA dynamic RAM board that has been delivered to dealers only. They haven't advertised it yet because their suppliers can't ship them enough chips yet. PT is still working on their high-density graphics board for the SOL's graphics expansion plug. Rumors say that it will display 200x200 points, using a bit-mapped technique with memory included on the same board. It will have R/W and color, and it will allow graphics mixed with regular SOL characters. PT is currently holding tight to their new policy of not advertising until the product is on the shelf.

RELOCATING CASSETTE ALSB

by John Cusman
Homewood, IL

Processor Technology's ALSB package, as distributed on CTR tape, leads into RAM at addresses (hex) 71EC0 through 71FFF, and uses 2560 through 31FFF for system storage. Since most other PT software, including BASHL and games, loads at address 0, users with small amounts of memory (<2K bytes) are forced to switch memory manually between high and low areas. To avoid this, ALSB may be relocated to occupy addresses C000-E0FF; in fact, with the information given below, relocation to any 1K boundary is possible. A note of warning: software that uses ALSB utility or return entry points must be modified accordingly. The necessary relocation is accomplished by subtracting an offset from the high-order byte of each address. The offset is given by:

\[ \text{Offset} = D0_{16} - \text{(high-order byte of origin of ALSB system storage)} \]

The information for the steps below was collected through several evenings of listing, changing, and testing, aided by a disaster/simulator package that I wrote last fall, and an automatic relocator that was published in 2TE. (*) The steps in the relocation process are:

1. Load ALSB at address XX00 -- XX is the high-order byte of the start of ALSB system storage plus of hex.

2. Relocate blocks of code listed below.

   - EPB0-EF55
   - E6D7-E77C
   - EB82-EBE4
   - F022-F495
   - F634-P5DE
   - F4AC-F6A4
   - FAD9-FF45
   - H578-H6C6
   - H6C8-HF8A

   An automatic relocator program should be used for this step.

3. Manually relocate addresses in the following tables.

   - E36E-E49C -- Six-byte entries; last two are high-low address.
   - F6C5-FA9E -- Three-byte entries; last two are low-high address.

4. Adjust special cases as follows.

   - E10F, E11E, F0E8 -- replace D0 with high-order of ALSB system XA
   - E450 -- replace D0 with high-order of ALSB system XA plus one instruction at E4A9 and E5C5 -- these should contain address fields of 50FF, is -6, and must be un-relocated manually.

   - Similarly, the instruction at 24A8 should contain 5FF9 (-7).

   - Remember that these go in low-high order (FA FF and not FF FA).

   Since relocating ALSB, I have tried most of the features, and all those that I tried worked as the same as they did before. The ability to work on assembly language and extended BASIC programming without constantly opening up my SOL has been a pleasant reward for the work involved.

PATCHING MICROSOFT'S 4.0 BASIC
ON P.T.'S SOL

Dear Dr. Dobbs:

Just a quick note to pass along a couple of things. First, the kudos and brickbats. The good guys, Dr. Dobbs, your publication is the most interesting of all the "home computing" publications. Xybeek, and their PROM programming board, a good product with excellent documentation, and people with a genuine desire to help their customers. Micro-Chess, a superb chess playing program, with good documentation and priced fairly. The bad guys: the multitude of manufacturers who have promised so much, and have delivered so little, (IMSAI, where's the 12K BASIC, Processor Tech, where's the 8K BASIC so long overdue?).

Attached are the patches I made for a friend so he could use his Altair BASIC on his new Sol. I know you would prefer an assembler listing, but I did these patches by hand. The program should first be loaded, the patches made, and a copy of the modified program be dumped before running the first time. The first column is the old data, the second column is the change. I understand that there may be more than one version of the extended 4.0, so take care that your version is the same as this one.

Thanks for the neat publication. I enjoy it from cover to cover.

Jack L. Calaway
165 E Sierra Madre Blvd
Sierra Madre, CA 91024

P.S. This has been typed using Michael Shrayser's "Electric Pencil Word Processor".

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| J PATCHES TO ALTAIR CASSETTE VERSION OF LEVEL 4.0 BASIC
FOR USE ON A PROCESSOR TECHNOLOGY SOL WITH SOLO
LOAD THE ORIGINAL PROGRAM, MAKE THE CHANGES AND SAVE A COPY BEFORE RUNNING IT.

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Amateur Computing 78—July 22-23
Sheraton National Motor Hotel Arlington, Virginia

CALL FOR PAPERS - This is to invite you to present a paper, participate in a panel discussion, display an amateur computer system or sponsor a tutorial at Amateur Computing 78. This will be a weekend microcomputer festival with attendance of several thousand people interested in personal computing from viewpoints of users and avid hobbyists.

Those interested in making a presentation should submit a letter of intent along with a one-page abstract or outline by April 15 to John Wull Miller, Program Chairman, 6921 Pacific Lane, Annandale, VA 22003, telephone (703) 256-5702. Authors presenting papers will be provided with instructions for preparation of camera-ready papers which are due by June 1. Areas of interest are: personal computing applications of microcomputers; home educational uses of computers; speech, music and graphics; standards for hardware, software and interfacing to the real world; and, subjects of interest to beginners.

Commercial exhibitors will include retail computer stores, computer systems manufacturers, computer services, computer magazines and others. An exhibitor prospectus will be available from Amateur Computing, P.O. Box 682, McLean, VA 22101.

Amateur Computing 78 will be held in the modern, attractive and completely equipped convention facilities of the Sheraton National Motor Hotel which is near the Pentagon and overlooks the monuments of Washington, DC. Out-of-town attendees will want to reserve one of the 363 luxuriously appointed rooms at the hotel. All requests for rooms should be directed to the hotel at (703) 521-1900 (not the toll-free 800 number) mentioning Amateur Computing. Or, write to the hotel at Columbia Pike & Washington Blvd., Arlington, VA 22204.

This event is being sponsored by AMRAD who held the highly successful AMRAD Computer Test in October 1976 in Vienna, Virginia. The 1976 test in one day attracted over 1500 people. Amateur Computing 78 will be a two-day show in a fine, new hotel.

Homebrew Computer Club,
P.O. Box 626, Mountain View, CA 94042
This letter was inspired by the March 19 issue of SOLUS NEWS. First, I ordered the Vandenberg 16k static RAM board by telephone on 4 January and had it on the 7th. It has been in my SOL and working perfectly ever since.

My computer is built around the SOL 8088 based board. The power supply is home brew, the keyboard surplus, the other memory boards are the ECONOMIC II and ECONOMIC III. I have the hardware technology "Music System" software interface card, Peripheral ROM, and DFX-26 interface card, Relocator Software, and DFX-26 Interface card, Peripheral ROM, and DFX-26 Interface card.

The DFX-26 kit is also giving me trouble. It works most of the time but gives me CS errors when running BASICs for no reason and it will not even read some ROMs but will read others.

The Selectric hasn't been interfaced yet. It is E485 and RS-232 and I have a program but just haven't gotten around to it yet. This letter was written by SOL on the Model 43 using the "Electric Pencil" by Michael Shriver. This is a fantastic text editor and it comes on a 451S tape cassette with a very good manual. No changes were required to run it. The Model 43 has a T1 interface and the T1 to RS-232 interface converter for $7.00 from Electronic Systems is all I needed to get it up and running.

I also had washing machine problems and I installed a surge filter and RF filter but it didn't help. I mounted the PC board and power supply in a metal cabinet and grounded everything and I haven't had any more problems. My computer and my washing machine are on the same 30 amp breaker. I plan a separate circuit soon.

That's it for now, Stan. I'm still selling articles all over the place. Seventeen since January 1977. Lastly, I think that the Teletype Model 43 is the best printer buy on the market. For $150 I got the best printer in Arlington Heights, Illinois. It includes a very nice solid state keyboard. The paper is also much cheaper than the type used in the Alcom 800 written up in SOLUS NEWS.

Sincerely,

Bill Jones

VARION, OHIO

---

THE ENCLOSED CIRCUIT MAY BE WHAT YOU ARE LOOKING FOR IN ORDER TO REMOVE POWER LINE "HASH" IN YOUR SOL.

I Too, had trouble with power line garble (especially with my video monitor, since that was visible). The circuit shown is not critical at all but the voltage ratings of the capacitors must be observed. The inductors were homemade using 16 ga. wire (insulated) and wound on a half inch rod. The nice thing about this circuit is that it is cheap. Also, note that it's not designed to protect against a nearby lightning strike (as are the units equipped with 3.5x10^{-6} microfarad units). Rather, it filters the "hash" only.

TRY ONE, YOU MAY DO AS I DID AND PUT ONE IN EVERYTHING AROUND--(SOL, VIDEO MONITOR, PRINTER, AND DISK).

Sincerely,

Bill Jones

VARION, OHIO

---

I HAVE NOTED A SPORADIC PROBLEM IN MY SON'S SOL-20 (AND HAVE HEARD OF THE POSSIBILITY OF SIMILAR PROBLEMS IN OTHER SOLS). IN A DISCUSSION WITH A COMPUTER TECHNICIAN, PHIL (WORKING AT THE SANS RAPID BYTE SHOP), THE SOL-20 BCB (SLOT BACK-PLATE BOARD) IS INSERTED INTO J1L THE S-100 BUS OF THE SOL PC MOTHERBOARD. WHEN ATTACHING AND TIGHTENING THE CAGE AND BRACKET ASSEMBLY INSTRUCTIONS IN SOL SYSTEMS MANUAL}, SOME BCB PRINS MAY LOSE CONTACT WITH THE S-100 BUS.

THIS PROBLEM SHARED ITSELF AS A REPEL INABILITY TO USE TWO DIFFERENT MEMORY BOARDS SIMULTANEOUSLY, AND HAS BEEN RESOLVED BY ENSURING THAT THE BCB HAS BEEN PUSHED FIRMLY INTO THE S-100 BUS.

THINGS FOR THE WEEK TRUE ON SOLUS NEWS.

P.S. ENCLOSED IS A FIRST PAGE OF SUMMER COUNTY COMPUTER CLUB NEWSLETTER.

Sincerely,

Rod Montgomery

33 SPRING HILL DRIVE

COLUMBUS, OH 43201

---

Be advised that I am plugged into the Pascal News, and have even ordered 2-90/8090 Pascal for my company (PDC), from the University of California at San Diego. I'll report when it works (it costs $2000/boxed).

Sincerely,

Rod Montgomery

---

AC in

AC to SOL

power supply

Caps = .02 @ 600v (ceramic)

Coils = 3 feet of #16 ga. wound closely

on a 1/2" form.
Per Sol & VDM GraphicAdd

Your readers may be interested in a Canadian addition to the support available for Sol and VDM. The attached sheet describes a graphics package that is available from Micro-Ware Ltd. in Toronto (27 Firstbrooke Rd., Toronto, Ont. M4E 2L2).

I purchased the GraphicAdd kit and I am extremely happy with it. The piggyback PCB was easy to assemble and install. Everything worked immediately. The documentation is good, and the graphics driver supplied on CUNTS tape is easy to use.

All in all I regard GraphicAdd as a satisfying addition to my system acquired at a very reasonable price.

Yours sincerely,

Arthur L. Close

VANCOUVER, B.C.,
CANADA

(Edited: We'll have a review of GraphicAdd and another graphic add-on for Sol in a future issue.)

Congratulations on a fine job with SOLUS NEWS up to now; keep up the good work! To help you keep it up, I am enclosing my $10 membership dues for 1976, as indicated in the October/November issue. Also enclosed with this letter is a brief description of my adventures with relocating cassette ALS8 to a more convenient location in my SOL system. If this information might be useful to other members, please include it in a future issue. Also, any additional information or corrections would be appreciated. (By the way, do all ALS8 tapes contain the same version? Users who attempt the relocation should check my information against their actual code before changing anything.)

I am happy to see new SOLUS chapters forming, including two in the Chicago area. (Though Lombard, IL is almost as far from Chicago as I am in Homewood!) What is involved in being a local chapter coordinator? I might be interested in coordinating the suburban Chicago members, if there are any, if I knew what that might involve.

Does anyone in SOLUS have a DXPC PR-40 printer attached to a SOL? If so, are there any difficulties in interfacing? I've been looking at the PR-40 as a possible addition, but need to know what I'm getting into. Also, does anyone have practical information about YCEA's Alpha 1 digital tape system used with a SOL?

I just got my Extended Cassette BASIC this week, while it's a little larger than I expected, it seems to be quite good. I hope PT gets on the ball and gets that promised software done and shipped soon (as well as their ACCESS). Thank you for taking the time to listen to far-distant members.

Yours truly,

John Osendar

Homewood, IL

Another SOLUS member wrote in a recent SOLUS NEWS (Nov. 3) issue that anyone who has verified IT's ALS-8 to be more compatible with SOL. (The person asking was Mr. Bruce Barron). Well, YES!

The following patches were made to the ALS-8 cassette tape that I received from P.T. Inclusion of these patches will allow the straight-forward 20V new of ALS-8, without regard to P.T.'s change notice 48 or the "Z-80 Garbage" referred to by Mr. Barron.

May I make a suggestion? How about including the address of those that write to SOLUS NEWS? This would allow those persons looking for information quicker response from other readers.

Keep up the good work, Stan!

Bill Jones

MARION, IN

(Edited: Thanks for the info and the suggestion, Bill. I will gladly print anyone's address if they explicitly say it's okay to print it. In general my policy is not to print addresses because of two reasons. First, I want to encourage open letter among members rather than a lot of side correspondence so we all can benefit from the information. Second, the Southern California Computer Society has had a bad experience because members' addresses got into the hands of thieves.)

HOW DO YOU LIKE THE NEW FORMAT?

We realize the new format needs a bit more polishing up and would like to know reader reactions to it. Is it too hard to read? Is the print too small? Did you prefer the old format? Is the nuisance a reasonable price to pay for getting twice the information? Let us hear from you. Write to the editor please.
Dear Sirs:

As the SCI dealer, assembler and technical support in Israel, we have assembled about a dozen SCI's, and have a few lists for others.

1) If resetting is a problem, replace U76 = 74LS76 with a 54LS176 (military version). Similar replacements have also been found to help with stubborn SCI driver problems.

2) The RS-232 pullup resistor, R29, should be disconnected from the 5v supply and reconnected to 15v (e.g. 31 emitter).

3) The AUI-R can be modified to work directly with the SCI:

ALS driver
E160 A9 D0 CD A4 D0 CA 9F D0 DB 01 86 7F 47 0D DE D0
E190 E6 40 09 CD A4 D0 CA EF 2D

revised ALS driver (chnger underlined)
E160 A9 D0 CD A4 D0 22 96 D0 1B FA 86 7F 47 09 0F FA
E190 E6 1F C9 FA 0A 05 0C FF 04 0D

Sincerely,  

Dr. Yehuda C. Fr. C. Engr'

By now, you have probably heard that PI inadvertently omitted a means of sending nulls to a printer from Extended Basic. I was told that they had planned to let Solos do it, but, as it turns out, LB does not send the proper message to Solos.

For Diablo owners, it means that we have to operate it at baud rate each time we want to use EB; for me that is a pain since 90% of my work is with the Electric Penetration at 1200 baud. It is possible to include a PSE (extended output statement line, but that does not help if you need to list a program. Has anyone in the club written a software "fix" for this problem?

If you are overwhelmed with SOLUS NEWS, I might be able to help out with some of it.

Regards,

Gerald Hatwood

I have an insurance agency, and am using the tol to type letters, rate policy quotes etc. I felt that if I was going to use a computer to address my customers, I didn't want them to know it. This meant I had to have a solid character printer, but I couldn't get myself sold on the technical conversion because they are slow and the mechanics remind me of a corn threshing machine. I wound up with a used EP-20r, a Da (the terminal which after 3 months is completely reliable, quiet and compact. Help: the Sol and Terminator seem to think that they are talking to another computer through the serial interface, so the transmitted data (CA) and received Data (DH) signals must be reversed. Also you must change the request to Send (CA) and Clear to Send (CM) lines.

There has been lots of discussion on tapes. Late one night I needed a tape and was out of the expensive ones. I sliced in a "chessie", and it worked fine. Now I use radio shack condensed, three C-10's for $2.50. My recorder is a Panasonic 44-1000, with automatic track volume setting, and it makes a very hot tape. I saved enough to buy 4 hellos.

Finally, can you reccomend a text, or has any one written software to index disk data files. If so, and when the hellos and BASIC get together, I will have about 100 customer files to Access with non sequential customers.

Any who can get to the last line without reading every one in between, happy diodes!

Martin Hill, Jr.  
Aurora, Colo.

Sent: The best assembly language programming book that I've seen is 8808/8885 assembly language programming by Levine & Nash - Osborne & Associates.

ROG HALLEN
Tombstone, AZ
A PATCH TO EXTENDED CASSETTE BASIC TO PROVIDE NULLS AFTER EACH OUTPUT LINE

By Processor Tech

16 REM.
24 REM. CHANGE CLIP ROUTINE IN BASIC TO CODE
30 REM. TO THE CLIP ROUTINE IN SOLOS/CUTER
46 REM. WHICH WILL OUTPUT A NUMBER OF NULLS
56 REM. EQUAL TO THE NUMBER SET IN SOLOS/CUTER
60 REM.
70 REM. FOR SOLOS AND FOR CUTER LOCATED AT 0C600H
80 REM. THE ADDRESS OF THE MEMORY LOCATION THAT
90 REM. CONTAINS THE NUMBER OF NULLS TO OUTPUT IS
100 REM. 51216 DECIMAL. THE NUMBER OF NULLS OUT-110 REM. PUT CAN BE CHANGED BY THE USER:
120 REM.
130 REM. POKE 51216,N
140 REM.
150 REM. WHERE N IS THE NUMBER OF NULLS NEEDED
160 REM.
170 FOR N=0 TO 4
180 READ DI: POKE 98460+N,D
190 NEXT N
200 REM.
210 REM. FIND OUT WHERE SOLOS/CUTER IS LOCATED
220 REM.
230 LET A=PEEK(9852)+256
240 REM.
250 REM. CALCULATE ADDRESS OF CLIP IN SOLOS/CUTER
260 REM.
270 IF PEEK(A)=0 THEN LET A=49+13 ELSE LET A=A+834
280 REM.
290 REM. POKE LOW BYTE OF ADDRESS OF CLIP IN SOLOS/CUTER
300 REM. THEN POKE HIGH BYTE OF ADDRESS
310 REM.
320 ROC 9645,(A/256)=INT(A/256)+256
330 ROC 9646,INT(A/256)
340 END
350 REM.
360 REM. THE DATA BELOW IS EQUIVALENT TO:
370 REM.
380 REM. XRA A
390 REM. STA 86FH
400 REM. JMP
410 REM.
420 LDAD 175,5,111,40,195
430 REM.

The program above was sent to us by the Processor Technology support people. It corrects the problem mentioned by Gerald Harwood on page 27. Apparently BASIC expected SOLOS/CUTER to supply the null characters necessary to kill time while hard copy terminals return the carriage to column 1, but BASIC didn't do it right. This patch program will modify BASIC in memory. Save the corrected version of BASIC for future use.
The Atlanta chapter of SOLUS is alive and active. Our first meeting was Friday, January 13 (at a public library, meeting time) with about 10 members present. In the three meetings we've held since then our number has just about doubled (19). We usually meet on the first Tuesday and the third Thursday of each month, although this is subject to change, and our meeting place varies from time to time, so you'd better subscribe to SOLUS NEWS for any interested readers to contact us first for current information (+404) 410-0718.

Our first club project will be the establishment of communication capabilities through the use of modems. We are currently testing a modem kit put out by Electronic Systems of Duluth, GA. If you'd be interested I'm sure we can provide you with a critique of this piece of equipment.

I personally would be interested in corresponding with anyone who has built and successfully implemented the 520A PLM programmer that was written up in the September issue of Kilobaud.

Is there anything that I can do from afar to help with the software library? I am very interested in this activity and would be happy to help in any way that I can. Have you thought about regional distribution of the software?

Keep up the good work. You'll be hearing from me on a fairly regular basis.

Sincerely,

George F. Reeven

METROPOLITAN WASHINGTON SOL USERS GROUP FORMS

Several SOL users from the Metropolitan Washington DC area have been meeting monthly since the Fall of 1977. The first few meetings were "get acquainted" meetings with members of the group explaining certain features of the SOL system (e.g., UNM), demonstrating the EXPANDER printer with a SOL, and presenting home brew software. In addition to these monthly meetings, the group is also sponsoring a weekly workshop in assembly-language programming techniques; the goals of this workshop include the development of a text processor to be used in preparing letters, reports, etc. We expect to get our second project started in a few weeks; this project will probably use Extended BASIC and develop a family financial accounting system. Anyone in the area interested in participating in any of these activities may contact:

Jim Logan
6517 Melrose Dr.
McLean, VA 22101
703-556-1688

SONOMA COUNTY COMPUTER CLUB NEWSLETTER #2 MAR/APR 1978

THE SONOMA COUNTY COMPUTER CLUB WELCOMES ANYONE INTERESTED IN PERSONAL COMPUTERS. THE CLUB WILL HOLD ITS NEXT MONTHLY MEETING ON MONDAY, MARCH 27, 1978, AT THE COORDINATING COMMUNITY MEETING ROOM (SECOND FLOOR) NEAR KPFS RADIO. THE MEETING WILL BEGIN AT 7:00 P.M. AND THE GUEST SPEAKER WILL BE WESLEY A. STONE, CHP. MR. STONE IS A SMITH-RUSH CHP AND WILL DISCUSS THE PREPARATION OF ORDINARY AND NECESSARY EXPENSES IN A FAMILY BUSINESS. HE WILL ALSO DISCUSS HOME LOSSES AND EDUCATIONAL EXPENSE.

THE MARCH 27 MEETING WILL ALSO INCLUDE THE DEMONSTRATION OF A PERSONAL COMPUTER SYSTEM BY CLUB MEMBER EARL HERR. USING THE PROCESSOR TECHNOLOGY "SOL-20" COMPUTER AND "HELIOS II" FLOPPY DISK WITH A PRACTICAL AUTOMATIC IMPACT LINE PRINTER.

THE SONOMA COUNTY COMPUTER CLUB WHO STARTED OVER TWO YEARS AGO BY LIZA LOEP AND MARK ROBINSON, MEETING AT THE LOEP'S CENTER IN ROTI, WHERE THE COMPUTERS CLOSED, THERE WAS A HALF YEAR LAG, UNTIL MEETINGS RESUMED AT THE COORDINATING MEETING ROOM IN JANUARY, 1978. AT THE FEBRUARY 27 MEETING, MARK ROBINSON WAS ELECTED CLUB CHAMPION, WHO HAD A ROOM FOR PRESENTING AN EXCELLENT EXAMPLE OF COMMUNITY COMPUTER ACCESSIBILITY IN THEIR IMPRIN COMPUTER CENTER ON BEAUTIFUL AND PRACTICAL CENTER AT 7:00 SKYVIEW TERRACE, PAVE MILL, SONOMA COUNTY COMPUTER CLUB ANNOUNCE BELOW.

THE SONOMA COUNTY COMPUTER CLUB WILL HOLD REGULAR MEETINGS AT 7:00 P.M. ON THE LST MONDAY EVENING OF EACH MONTH, EXCEPT THURSDAY, APRIL 27, AND DECEMBER 7TH NOT SET YET.

OTHER MIKE MEETINGS:
- MARIAN COUNTY COMPUTER CLUB: 1ST WEDNESDAY OF MONTH AT 7:00 PM AT PARK IN COMPUTER CENTER (NOVEMBER, DECEMBER, JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER)
- MARIAN COUNTY COMPUTER CLUB: 2ND WEDNESDAY OF MONTH AT 7:00 PM AT MARIAN CENTER (NOVEMBER, DECEMBER, JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER)
- MARIAN COUNTY COMPUTER CLUB: 3RD WEDNESDAY OF MONTH AT 7:00 PM AT MARIAN CENTER (NOVEMBER, DECEMBER, JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER)
- MARIAN COUNTY COMPUTER CLUB: 4TH WEDNESDAY OF MONTH AT 7:00 PM AT MARIAN CENTER (NOVEMBER, DECEMBER, JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER)
- MARIAN COUNTY COMPUTER CLUB: 5TH WEDNESDAY OF MONTH AT 7:00 PM AT MARIAN CENTER (NOVEMBER, DECEMBER, JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER)

SONOMA COUNTY COMPUTER CLUB NEWSLETTER INFORMATION: CALL EARL HERR AT (707) 822-0620

Extensive was not able to demonstrate their SOL-compatible products at the March meeting of the Sonoma Peninsula chapter. They plan to do it at the April 16 meeting. Consult the last issue for the time and place.
AXIOM PRINTER DRIVER FOR BASIC
By Trucr Naron

Processor Technology's long awaited Extended Basic has finally made it out. This is an excellent Basic and has built-in functions to use the SIMOS pseudo-ports.

I have an Exiion EX-600 printer which requires a short output driver to handle timing and to provide CRT output to console with the printer. It seemed like a waste of time to have to re-enter this driver each time I loaded the Basic so I modified the Basic as shown.

This program can easily be modified to also preload an input driver and custom programs. To use, load the original Basic but do NOT execute it. Now load the the given program modified with your own driver. Then store the entire program on tape and use this tape for all further work. Once the program is initiated the printer is identical to FTC's original.

Warning: Resetting via UpperCase/DEL also resets Co,Cl,Co

0000 0210 * LOADER FOR FTC EXTENDED BASIC BY P NAROW
0000 0915 * THIS PROGRAM MODIFIES EXTENDED BASIC TO LOAD
0000 0920 * AN OUTPUT DRIVER INTO MEMORY STARTING AT
0000 0925 * LOCATION 9E9H, IFM BYTES LONG, THE DRIVER
0000 0930 * ORIGINALLY RESIDES AT 9E6H.
0000 0935 ORG 5
0000 C3 06 3F 0040 JMP 9E4H
0003 0045 ORG 9E6H
3F06 BS 0050 PUSH H
3F07 11 02 00 0055 LXI D,0002H
3F08 19 0060 DAD D
3F0B 0065 * THIS IS THE SAME AS "SET DP"
3F0E 36 00 0070 MVI H,ADDR
3F0F 23 0075 INX H
3F1E 36 00 0080 MVI H,ADDR
3F19 0085 **********
Read Procedures

1. Load Extended Basic
2. Load Read program
3. SET 1000 00 then run program from line 1000
4. EENT (0000 00 00 10) This skips the next LIST
5. EENT EENT 42 20 00 00 60 This will return to EOLOG
   at the end of the listing.
6. EEND 0
7. SET 1000 Program will now list itself then returns to EOLOG
8. EEND 0
9. Display the program on ordinary and OK
10. Repeat from 2 as necessary

This whole process can be done as we would have done with one
    line debugging and reprogramming for the basic program.

Some of the areas that require modification are:
1. PIC does not support 2 letter variables
2. Formatting is different
3. PIC does not have a @ element in an array
4. String manipulation is different and string arrays are not
   permitted.
5. PIC will not take a negative number as an integral power
   or 8R (8)
6. PMX will usually require a @ argument while MITE means
   a positive not zero number.
7. INPUT statements require a comma after a string such as:
8. If print statements commas or semicolons must be used
   both before and after strings

It may sound like a hassle but I have found that it is worth
the trouble.

Write procedures:
1. Load mic Basic
2. Load Write program
3. Exec old Basic
4. SET (LOAD ) first program to be transcribed
5. Return to EOLOG (via Upper Case STOP if necessary)
6. SET CO C000, SET 0=3
7. EENT 0 LIST Return to EOLOG
8. As ASCII listing of the program is now in high memory
9. DUMP C000-C1000 This is the top end of the program
10. SAVE C000-C1000 C000
11. EENT C000, 00 00 00
12. Repeat from step 3. entire all programs are on tape
Computers and the Stock Market

This letter is to call attention to an important development in the field of computer hardware and its implications for the stock market. The new chip technology, which allows for high-speed data processing, promises to revolutionize the way information is analyzed and acted upon by investors.

The development of these chips has led to the creation of new software applications that are specifically designed for the financial industry. These applications can process vast amounts of data in real-time, enabling traders to make more informed decisions.

This is particularly significant for small investors who may not have access to the same level of resources as large financial institutions. The new technology could level the playing field, allowing even individual investors to benefit from sophisticated market analysis.

To get the most out of this development, it is important to stay informed about the latest developments in both computer hardware and software. By doing so, investors can better understand how these new tools are being used to shape the stock market.

The following paragraphs will provide an overview of the new technology and its potential impact on the markets.

1. Introduction to the new chip technology
2. How the technology is being used in the financial industry
3. The implications for individual investors
4. Future developments and trends

This information is provided for educational purposes only and is not intended as investment advice. Always consult with a financial advisor before making investment decisions.

FOR MORE INFORMATION, PLEASE CONTACT:
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Address newsletter correspondence to the Editor. Send all other correspondence to The Sol Users' Society, P.O. Box 23471, San Jose, California 95153. Subscriptions are available through membership in Solus. Individual dues are $10 (U.S. currency) in USA, Canada, and Mexico; $15 elsewhere. Dealer memberships ($25) and manufacturer memberships ($50) also include extra services. Membership expires at the end of each calendar year. New members will receive back issues for current year.

SOLUS SOFTWARE LIBRARY TO MAKE FIRST TAPES

Our latest "David" to take on the "Goliath" task of producing a library of public-domain programs has collected almost enough programs in three dialects of BASIC to fill one C-60 cassette. He also has about 2/3 of a cassette of music for the Software Technology music system and is beginning a third volume on assembly language programs. If you have any public-domain programs to contribute, please contact the Solus Librarian thru our P.O. Box. To obtain a copy of the library tapes at cost, a member will have to submit a new program, so early contributors will be the first to qualify. Our librarian will get permission for the programs' sources before distributing programs copied from magazines or books, so be sure to give the full reference if you were not the author of 100% of the program.

WHEN YOU WRITE TO SOLUS NEWS

To make life simpler for us here at Solus News, we have changed the format of our newsletter (beginning with the last issue) so that we can reprint the letters and articles we receive, essentially as is. When you write to us, please type your letters within a 6½ inch column (65 characters at 10 per inch). We will cut and paste the letter to fit our layout page. Two of these pages are laid side by side and photos are reduced to become the printed page you see. The camera doesn't see light blue, so be sure to use a dark ribbon. Corrections can be made invisibly with opaque correction fluid ("liquid paper"). Thanks for helping to share the load.

CLASSIFIED ADS

After several requests, we have begun a classified ad section in this issue. The ad space is free to Solus members for ads of a non-profit nature, which includes the resale of equipment you no longer want. Ads for a business pursuit and ads from non-members will require payment of $1.50 per line. Send your ad typed exactly as it is to appear, since we will process the ad like any other submission to Solus News. Payment must accompany the camera-ready copy, if payment is required. Confine your typing to a 6 ½/2 inch line, and limit your free ads to 5 lines or less.

HELIOS/PTDOS WORKSHOP WILL BE TOPIC OF SEPTEMBER S.F. BAY MEETING

Processor Technology Corporation will present a workshop on their floppy disk system at the September 17 meeting of the San Francisco Peninsula chapter of Solus. They will have a Sol+ Helios system on hand to demonstrate new business software and their new graphics accessory. In addition they will discuss topics of interest to Helios owners, including questions on the PTDOS system. Send us your suggestions for topics you would like covered. For example, are there any features of PTDOS you want explained better than the Helios manual does? Everyone is welcome, so invite a friend. Members outside of the area can send us suggestions and read about the resulting discussion in Solus News.

HELIUM FOR HELIOS USERS

Helium, the Helios users' organization formed by PTC, has begun operation. It is organized by Ian Kettleborough, who has authored some of PTC's software. PTC has announced that Helium will be the official outlet for software correction updates to their disk-based system, so membership in Helium will be essential for maintaining your system. To join, write to: HELIUM, c/o Ian Kettleborough, P.O. Box 9269, College Station, TX 77840.

SOLUS will continue to offer articles and other support to the Sol users who have Helios systems, because we feel that a truly independent and unified users group is in the best interest of the independent software manufacturers. We offered our help to Helium and suggested that some sort of joint effort would be best for everyone, but to date we have received no reply.

IF YOU MUST CALL PTC...

Nothing irks me more than wasting a long distance call. If you're like me, you will be glad to know that Processor Technology has established office hours when their technicians will be available to answer technical questions by phone. If you can't get the answer to your question from your nearby dealer of PTC equipment, PTC will help during these hours only:

Monday through Friday, 9 - 12 am -- Sol and other hardware (CUTS, 3PS, 16KRA, etc.)
A MICROCOMPUTER CONSTRUCTION COURSE

BY
Paul Sadler and Jack Crandall

MARINER I, the student built computer at Sehome High School, Bellingham, WA is a Processor Technology SOL-20 microcomputer utilizing an 8080A processor chip. Twenty-seven students, selected by two instructors, built the computer from a kit this fall quarter as part of a "Computer Design and Construction" class. The students ranged in math ability from Practical Mathematics through Calculus and in age from freshman to senior. The selection criteria was motivation, ability in electronics, and achievement in Computer Science courses. Two instructors were required by the necessity for attention to detail, need for expertise in electronics, and knowledge in the computer science field. Jack Crandall teaches Physics and has developed an intensive digital electronics course. Paul Sadler teaches a computer literacy course and computer programming courses in a variety of languages.

The Computer Design and Construction Class met M, W, F for 2 hours after the regular school day to eliminate conflicts with other elective courses. Our immediate objectives were to teach electronics, construction techniques, and soldering skills. Students worked in groups of 3 to learn the theory of operation and construct an 8 transistor radio kit. Soldering skills were perfected during this first phase and the quality of the finished computer and lack of construction errors proved this time was well spent.

Phase 2 contained three concurrent sessions: 1. digital electronics utilizing a circuit designer, 2. actual construction of the computer components, and 3. machine language (hexadecimal) programming. The three groups rotated each 2 weeks to allow all students to build a portion of the computer. All construction work took place in teams of 3 students. One student would read the instructions, a second student did the soldering, and a third student would inspect the results. This team work and double checking prevented any construction errors. The only problem was an error in the construction manual by the manufacturer. After several frustrating days a long distance phone call to the factory corrected the situation.

The computer was operational 2 weeks before the end of the quarter and the remainder of the time was spent writing machine language programs in hexadecimal code. Additionally, a music system board was purchased and several of the musically oriented students programmed songs to include the school Alma Mater.

The Computer Design and Construction Class was a big success with the entire faculty and student body taking pride in our accomplishments. Our plans are to have as many students as possible use the computer and to DO IT AGAIN next year!

--Jack invites requests for information about the project. Please address correspondence to him at Sehome Computer Club, 2700 College Park Way, Bellingham, Washington 98225
Being "spoiled" users of full graphics on a Tektronix 4010/PDP-10, we've had more than a passing interest in implementing high-res graphics on our Sol. Well aware of the typical costs and memory burdens of such capabilities and having heard favorable comments about the $50 GraphicAdd, we eagerly placed an order for one of these with our friendly local computer store in December. It finally arrived in early April, and we had it running in about an hour. Since neither of us could be classified as experienced electronics types, that in itself speaks well for the product.

Construction is easy and rapid - a thoroughly enjoyable project. The PC board is of excellent quality and clearly marked. Soldered components include four connectors, two (or three) resistors, and seven DIP sockets in addition to twenty three-pin plugs that allow the board to plug into the Sol (or VDM). Installing these pins properly is undoubtedly the most difficult part of construction; the method of alignment recommended by KEA works quite well, however. In general, the instructions supplied with the kit were quite adequate - complete with PC layout and schematic.

Installation of the device is somewhat more troublesome because the safest way to implement the necessary mods to the Sol PC board is to jumper wire on the solder side and this requires disassembly of the Sol. We used the #1 and #2-2 options (3 jumpers and a trace cut) that allow programmable graphics enable (as opposed to fixed graphics or switch-selectable enable). Mod #1 is necessary for all options as it provides access to data bit 8 of the video display memory. After these mods, there was no apparent effect on the normal operation of the Sol with GraphicAdd installed or removed. Again, the supplied instructions (with alternate instructions for the Proc. Tech. VDM board) were entirely adequate - complete with Sol PC (and VDM) mod diagrams and modified schematics.

GraphicAdd comes with five IC's; the additional IC's are from the Sol and plug into the remaining two DIP sockets. The 'piggy back' board then plugs into the two DIP sockets on the Sol PC left vacant by the two-chip transfer. On the Sol PC this plug in area is comprised of the sockets labeled U41 and U25 (under the front left of the keyboard). To provide the keyboard from exerting undue pressure on the 'piggy back' board, we used the recommended standoff washers under each mounting screw to elevate the keyboard slightly. This worked fine, but we would prefer something like two fiber plates with properly placed holes and a sticky backing. This would allow more convenient future removal and re-installation of the keyboard as well as providing better support (manipulating 8 fiber washers in addition to 4 lock washers is clumsy to say the least).

GraphicAdd provides a modest, but very useful, expansion of the capabilities of the character generation portion of the VDM display section. It functions by replacing a portion of the inverse video ASCII character set by bit-mapped graphic cells. In effect, it provides a 6-fold increase in graphics resolution (120x148) since the normal 9 by 13 dot pattern is divided into six independent portions. Vertically, each character matrix is divided in half and horizontally the 13 dot column is divided 4, 5, 4, 4, 5, 4. Thus "minicursors" are made up of either a 4 x 5 or 5 x 5 dot pattern. The resulting 20% difference in cell heights depending upon scan location was not significantly noticeable in our judgement.

Only a limited amount of software came with our kit; however, this gave a good general indication of the capabilities. The graphics driver routine (provided on cassette) loads in the Sol scratchpad RAM (CB80H).

It allows simultaneous display of graphics and normal ASCII characters. We were able to use this driver rather easily in North Star Basic via the machine language subroutine CALL function which passes the address and position to the B and E registers. Thus we were able to implement "Spiral" (provided as a program listing for BASIC 5) in North Star Basic and saw it and the graphics driver on diskette.

The graphics version of "Life" (also provided on cassette) is a very interesting variation and provides the ability to easily "draw" with the higher resolution. A BASIC 5 graphics implementation, including its own copy of the graphics driver, is provided on cassette. It resides at the end of BASIC 5 and adds a .75K extension with self-patching. A cassette program called EXONE demonstrates graph plotting capabilities.

In general, diagonals and curves are plotted rather neatly as solid lines - though obviously "stopping" remains prominent at this resolution (whaddaya expect for 50 bucks?!)

All in all, we were quite pleased with GraphicAdd and would recommend it as a worthwhile and rather impressive accessory for expansion of Sol/VDM graphics capabilities at very modest price with a minimum amount of effort and with minimal memory requirements. Reportedly, software patches for more convenient use of the system with North Star Disk Basic and Processor Tech. Extended Cassette Basic are under development.

GraphicAdd is a product of KEA Micro Design, Toronto, Ontario, Canada. It is supplied as a kit consisting of a 3½ by 3 inch PC board and all necessary components with a 29 page manual and a cassette tape. It is intended for the Sol and other systems using the Processor Technology VDM board and 8K or more of memory.

PTC NEW PRODUCT SHIPPING DATES

As of their May 25 newsletter to their dealers, PTC has made the following release schedule:

NEW PRODUCT UPDATES

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</tr>
<tr>
<td>EDIT, Advanced 8080 Editor</td>
<td>week of June 26</td>
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You want it when?!
All audio cassette decks used for digital work suffer from a case of phase shift. The severity of the problem varies considerably, but is especially severe in the Processor Technology's CUTS system. This comes about from the use of a 600 Hz tone for the space condition.

The low frequency response of the typical mediocre quality cassette deck causes severe phase shift, which has the effect of smearing the data signal. The effect is analogous to an old telegraph phenomenon known as fortuitous distortion.

This phase shift may be corrected by a lead network, which is incorporated in both CUTS and SOL. However, the phase correction introduced by the lead network is inadequate, as there is a lack of 600 Hz level. A Wein Bridge filter installed between the cassette deck and the computer input jack corrects the problem.

Figure 1 shows the relevant waveforms. Observation of waveforms A and B on a dual-trace scope are most interesting. The output of the recorder is placed on the A trace, and the output of the lead network (R7 in CUTS, R40 in SOL) is placed on the B trace. Sync to the B trace.

The output of the cassette will be jittery, with very unstable zero crossings. The output of the lead network will be very stable. The important thing is that the instantaneous zero crossing rate of change will exceed the speed change limits of the system.

Both CUTS and SOL have a design error in the transition detector. The transition detector pulses are extremely narrow, and cause clock recovery problems. Relocating C22 in CUTS (C49 in SOL) from pins 2 and 3 of the Exclusive OR to pins 1 and 2 will stretch the transition outputs from a measured 100 nS or so to 20 uS, resulting in very solid clock recovery.

The Wein Bridge filter must be tuned to your recorder, and this needs a scope. The waveform at the output of the lead network should have two equal peaks, and these may be balanced by adjusting R1 and R2 of the bridge.

Not all recorders have very bad low frequency phase shift. HI-FI decks will record and playback an almost perfect square wave. Any deck with a monitor jack that bypasses the output stage will probably work without any filter or lead network.

In some cases, tapes recorded by the user will exhibit different waveforms than mass produced, and different equalization will be required. A scope tells all.

Another problem that is quite prevalent is that of head alignment. The head should be aligned with an alignment tape, such as TDK. A quite acceptable substitution is any commercially duplicated tape by AMPEX, GRT, etc. Adjust the head for best high frequency response. Remember that data density on the tape is about 1 mil/bit, and a very small error can cream data.

A lot of noise has been made regarding the required frequency response characteristics of analog data systems. If telegraph technology is applied, the HF response must be 3X the baud rate, and the LF response must be 1/3 the baud rate. Thus CUTS and SOL need a deck with a flat response from 400 Hz to 3600 Hz to recover the third harmonic, and to prevent unstable zero crossings.
The Tarbell Floppy Disk Interface has been described in these pages before. The interface is an S-100 board containing a 1771 LSI disk formatter/controller chip for full-size soft sectored diskettes. It is commonly used as a controller for the disk operating system CP/M from Digital Research. In the standard form of the interface, the 1771 controls the loading of the head against the surface of the diskette. Once the head is loaded, it remains loaded until the third index pulse following the last operation which used the read/write head. For full-size disks, this is about one-half second. At that time, the head is unloaded from the diskette. It is quite common for another disk command to almost immediately follow the unloading of the head, causing the head load relays to go click-click-click.

The following modification to the board greatly reduces the number of times the head loads and unloads but keeps the head unloaded during periods of inactivity so wear on the disk head and diskette surface is minimized. The head load signal (HLD) goes to jumper point E51 on the Tarbell board. E51 is normally jumpered to E53 (or E55) which drives gates to control the disk unit. The Tarbell board also contains an undedicated one-shot timer U-41 pins 1-3 and 13-15. The PC board also contains positions for the RC network, R34 and C24, to control the timing. This one-shot is connected between E51 and E53 (or E55) so that the head remains loaded for a period of time after the 1771 releases the head. In my case, a time period of one second seemed optimum. The head remains loaded during assemblies, loads, etc.

The mods to the board are shown in the figure and described below. An unused OR gate, U27 pins 1-3, is used to OR the head load signal HLD with the output of the one-shot. On the solder side of the board, connect jumpers from U41-13 (E35) to U27-2, from E51 to U27-1, and from U27-3 to either E53 or E55 as required for your disk. Install a jumper from E37 to E36 so the clear and B input to the one-shot are high. Install another jumper from E51 to E36 so the A input of the one-shot is triggered when HLD falls. Install R34 and C24 for the RC network. I used values of 33k and 100uf to give a second time period. It may be necessary to cut the trace which leaves U41-13 on the solder side of the board as not all 7L5LS123s work with pin 13 (Gext) grounded.

With this mod, your disks will perform more quietly and may require less maintenance.

The Dytron 32K Static Memory Board

Another 32K static S-100 memory board has come on the scene. I discovered it through a small notice in the April 3rd issue of Electronic Engineering Times. The announcement said the board had been tested in all major S-100 systems, used TMS-4000 chips with access times of 330 ns, required 8V only at 20mA for each 4K and was priced at $75 in quantities of 1 to 10. Not having heard of Dytron, Inc. before, I called them and talked to John Dubois. John was very informative and helpful and gave me the names of several stores who had used the board. I received only 8K images in the 68K system, which had already been loaded by the board's controllers. To my surprise, nine days after I sent them my order, UPS delivered it to me. I immediately plugged it into my Sol and ran memory tests and the Helios disk test for several hours. All tests were perfect. The four heat sinks on the right side of the board were hardly warm to the touch (my bus voltage is 7.6 volts and I have added a fan to the back panel on the Sol).

The board is configured as eight independent 4K segments and can be purchased loaded with 8, 16, 24 and 32K of chips. It comes assembled, tested, and burned-in on a very clean looking solder masked P.C. board. All the address and data lines are buffered with LS TTL devices on the address lines and 74374s on the data input and output lines. Low profile sockets are provided on all ICs. Any 4K block can be addressed on any 4K boundary or disabled completely. The addressing provision uses a 24 pin socket on the lower left corner of the board. A jumper is provided for soldered address jumpers or solid #24 or #26 jumper wires may be inserted directly into the socket. Eight of the positions on the socket correspond to the eight 4K segments while the remaining sixteen positions correspond to the sixteen 4K blocks. A jumper is provided for memory bank selection. If a 4K bank is not jumpered it is effective out of the system and that address is available for other memory boards or memory mapped I/O. A jumper provision for "Phantom" is included but not needed by the Sol.

The board came with TMS-4044-30 memory chips giving an access time of 300 ns. The board draws about 4 amps fully populated. I plan to put this board in a box for testing but have already room to replace it with a second 8K board. The Sol runs noticeably cooler with the 32K board than it did with the two 8K boards even though the total current load is the same (4). Dytron states that the bus supply voltage must be at least 7.5 volts DC and should not exceed 9 volts unless forced air ventilation is provided. I ran the board with the extra fan off and the regulators got quite warm (but not excessively so).

Dytron, Inc. is located at 241 Crescent Street, Waltham, Mass. 02154, telephone (617) 891-9029. The company is eight years old and is primarily in the industrial process control equipment business. They got into microprocessors first for in-house users and later for parts of control systems. The also have an I/O control board available which was described in the proceedings of last year's West Coast Computer Faire on rare 32Ks, a real time tracking system for amateur radio satellite communication antennas (OSCAR).

I would give the Dytron board a very high recommendation. It has worked well with both the Helios II DMA disk controller and the Tarbell disk controller.
THE MICROBYTE 32K STATIC RAM BOARD
BY STAN SOKOLOW

Here's yet another 32K board using the TMS 4044 static RAM chip. Although I'm only in the market for 16K more ram now, I decided it makes sense to get a 32K board populated with 8 chips. That way I can easily expand later with out taking up another slot. This particular board was discovered in a Byte magazine ad by JADE COMPUTER PRODUCTS, 5351 West 144th Street, Lawndale, CA 90260.

The Microbyte board sounds quite similar to the Dytron board Ron Parsons describes in this issue, except that the Microbyte has two extra address bits to allow bank selection and nine-count-encoder regulators.

Don Smith at Jade told me that the big problem with most 32K static boards is heat dissipation. Therefore, the board has been designed with a huge heat sink which runs the full length of the board. This may help keep each regulator cooler than in boards with fewer regulators, especially in systems where the +5V supply is too high (common in Sol's). The same amount of heat will be created in boards with fewer regulators, but it will hopefully dissipate better. That's the theory, but in my system where I've lowered the +5V supply to just under +5V with diodes, the extra regulators don't seem to make any difference. Using my high-technology thermal measuring device (my thumb to be exact), I can't tell the difference between the operating temperature of the Microbyte's regulators and those of the Artec 32K static board, which uses TMS 4044 chips and only 4 regulators. So the difference may only be important in overvolting situations.

Another feature of the board is its use of very wide power and ground traces to act a bus bars. These, I'm told, help minimise noise on the board.

The two extra address lines are implemented thru jumpers to the S-100 bus pins adjacent to the Phantom pin 67. That is, A16=pin 68 and A17=pin 69. With the jumpers out, the board acts like an ordinary non-bank selected board. Other jumpers allow selection of the bank with 256K address space in banks of 64K each. Phantom is also optional with a jumper. By comparison, the Artec board has the Cromemco-style bank selection using an I/O port to enable the bank and jumpers on the board to select the bank address to which the supplied vpp=3.5 V is connected. This is a more complex type fast enough for the Microbyte, but it doesn't require memory management hardware to put the signals on the bus. This may account for some of the price difference between the two boards.

The board is laid out so that each column of 8 chips corresponds to a 4K address block. Prefabricated jumpers are provided to select the address to which each column responds, using a dip socket. The documentation illustrates the chip layout and jumper installation.

As with the Dytron board, the so-called 450 ns board actually uses 4800 chips. That's not an error. For 4 Mhz 8080 systems, but fast enough for Sol. A 250 ns chip option is available. The board runs warm, but not as warm as some of the chips on the board. I don't have an extra fan on my Sol, but I have punched some one-inch-diameter holes in the back cover, farthest from the existing fan. This helps a lot with airflow thru the card cage in the Sol. I borrowed the punch from an electrician.

The Microbyte 32K static board appears to be a quality product. It comes fully assembled, with sockets for all IC's. It sells for $775 plus tax and shipping. The 250 ns version is $850. I've tested it with Helios and found it reliable. It has my recommendation.

EXTENSYS BREAKS THE HELIOS BARRIER
BY STAN SOKOLOW

On May 22, a technician from Extensys Corporation brought the latest version of their 64K dynamic RAM board to my computer for testing on my Helios. As you may know, the Helios controller in a Sol has been murder on dynamic memory boards that weren't designed with it in mind. The timing of the dynamic board's hidden refresh often conflicts with the DMA timing of the Helios. Processor Tech's dynamic boards are designed to coordinate with the Helios, but other manufacturers haven't been so fortunate.

Extensys has redesigned their 64K board to overcome many speed and timing and noise problems they previously encountered in the various S-100 systems on the market. The board I saw was a production version labeled "Extensys RAM-650 250 ns Serial 11262." We first tried it in the Sol without the Helios controller on the bus. Everything seemed to work except that Solos would occasionally give a question mark response to a valid command. Realizing that the full 64K board overlaps with the Sol's internal RAM and ROM space, the technician disabled the C000+D000 block of the Extensys board. Then the system became reliable. The Sol is supposed to ignore the S-100 bus when addressing the internal memory, but in this case something didn't work quite right.

Next we ran a routine from cassette, which worked as it should. We then installed the Helios controller boards, loaded the disk test program from cassette, and ran the test. Although we didn't have time for an extensive run, we did like the automatic test go for 100 full iterations, which it did without error. Finally we booted PTOLOS and ran a few programs, again without error. So it looks like this version of the board can handle Helios.

The 64K dynamic board has the advantages of slot conservation and low power consumption. Both of these features are important in Sol, where heat dissipation and slot scarcity are problems. Moreover, it runs at 250 ns, which provides a hedge against obsolescence when the time comes to trade the Sol for a system which can use the extra speed. Power consumption is about 1 amp for 64K.

On the negative side is the extra complication of a dynamic memory board. My engineering friends are down on dynamics in general. They feel that they are hard to get to work the first time in a new system configuration, hard to maintain, and in general not worth the risk of future incompatibility. Static memories are much more tolerant in these regards. Consider the problem you might have if the manufacturer of your board went out of business and you couldn't find anyone to maintain it for you. After weighing the pros and cons, if you decide to get a dynamic, be sure to get the guarantee that you'll get your money back if it won't work in your particular system. And be prepared to do the same each time you add a new component to your system.
THE EXTENSYS RM650 MEMORY BOARD FEATURES....

1. Expandable Memory: The RM650 memory board comes in three sizes: 32K, 48K & 64K. The 32K and 48K versions are fully socketed with monolithic bypass capacitors for expansion to 64K by simply adding memory chips. We provide badged and tested memory chips as "Upgrade Kits" (8K & 16K).

2. More Reliability: All of the address and control lines are loop filtered...on a R/C network and with Schmitt inverters. Data lines also contain Schmitt circuitry to reduce noise sensitivity. The R/C network filters high frequency noise spikes and the Schmitt gates provide twice the noise immunity of TTL gates to guard against false triggering.

3. Multi-layer Construction: The RM650 contains separate power and ground planes for added noise rejection and protection of signal integrity.

4. Extra Fast Memory Chips: The RM650 uses Intel 2109 chips at 200ns. It provides 2-80 speed compatibility as well as an extra margin of safety for 8080 & 8085 systems to guard against bit-dropping from propagation delays and signal skewing on bus lines.

5. Co-existing Addresses: It is easy to have ROMs & the RM650 RAM co-exist in overlapping address spaces. The board contains an INH line that inhibits READ and WRITE inputs, tri-states the outputs, and maintains refresh. This feature makes the RM650 exceptionally easy to use with ROMs, memory-mapped I/O, and operating systems that have conflicting addresses where otherwise a problem.

6. More than 64K: Even though 8-bit microprocessors can only address 64K, it is very easy to add more than 64K to a system. Realistically, up to one megabyte in 8K increments! What's needed is a simple chip manager board, an 'I/O' port software routine and a memory board with programmable bank-switching capability. The RM650 incorporates this bank-switching feature...and as many as sixteen RM650 boards can be installed in the same system.

7. Compatibility: The RM650 is compatible with many S-100 systems. We publish a list to assure end-users of technical compatibility. See attached list.

COMPATIBILITY GUIDE
FOR EXTENSYS RM650 MEMORY BOARDS

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NOTE #1 - Parasitic Engineering has made available to owners of the Equinox 100 computer an upgrade kit incorporating several modifications - one of which is necessary for the operation of the Extensys RM650. Currently delivered machines already incorporate the modifications.

NOTE #2 - SMU & PWAIT must be available on the bus to enable proper refresh of the RM650. PHLD must be disabled on the RM650. (Documentation available on request from Parasitic or Extensys.)

NOTE #3 - "Cycle-Stealing" DMA device represents a departure from the typical S-100 bus operation. We do not recommend the use of the RM650 boards for systems with cycle-stealing.

NOTE #4 - ALS-8 Compatibility: To insure proper operation of ALS-8 on SOL-20, connect US5-10 on the SOL Board to Pin 59 of the S-100 bus. This modification utilizes the RM650 'inhibit' signal to eliminate any bus contention between the SOL video RAM space and Extensys RM650 RAM between addresses C000 and DFFF. Using the inhibit line rather than the bank select switch allows use of address space D000-DFFF by the ALS-8 operating system.

7
THE TARBELL FLOPPY DISK INTERFACE
BY JAY BELL

REPRINTED FROM: PRINT-OUT Journal of the Central Texas Computer Association

The TARBELL Floppy Disk Interface, TARBELL Electronics 20620 South Leawood Ave., Suite P, Carson, CA 90746 Kit $190, Assembled $265.

Finally it has arrived -- floppies for the masses. Don TARBELL has created a board using standard components and what has become the standard LSI disk controller chip, the Western Digital 1771 (second-sourced by National). That in itself is not particularly noteworthy, since others have used the chip to drive their favorite disk drive. What TARBELL gives you is the ability to drive YOUR favorite disk drive. No longer need you buy a complete system from someone who has packaged it in an expensive box, with an expensive controller that can only be bought with their particular drive up at their particularly set-up price.

TARBELL takes the 1771 chip and interfaces it with the Altair bus on one side, and sticks all the necessary logic an high-powered drivers on the other side so that you jumper the signals to the appropriate pins of a 3M-type connector for direct connection to almost any drive. This face-it, there are certain signals that all drives need, such as head load, drive select, write enable, data and out, etc. What seems to be most different among all the drives is the particular pin-out on the connector and what that tells you determines the pin-out and some of the permutations of the signals above to drive just about anything. The instruction manual is extensive, mostly well-written, and even gives all of the proper jumper connections for such drives as the CDC BR603A, the Persci 270, Shugart 800, Innovent 210/220 and 410, and the GSI 110. It's not difficult to look at the jumpers for these drives and figure out the differences for some drive you may come up with. I interfaced the board to an 1400's of CalComp that were originally hooked up to the infamous IMSAI controller. I also connected it to the Pertec FD4000 as configured by Altair. Both worked the first time.

The hardware test procedures and debugging steps are extremely detailed and will be appreciated by those with meager hardware experience. However, those with an organized, logical mind will wonder what fit of lunacy Tarbell must have been in when he numbered the 50-some jumper points. They are just everywhere! And beware of the silk screen. Finding the correct resistor pads is often a matter of finding the largest hole. And there are two E23 jumper pads on the silk screened legend. Check the manual to find out which one is really E33.

While TARBELL doesn't sell systems as such, he does supply his dealers with some of the standard drivers so that they can configure a system for you. What you would normally want to get in the bare bones operation is the drive, power supply, the controller board and cables. You can probably put all this into some metalware if you can afford the going price for aluminum these days -- about $100 - $150 for a disk sized box. Or, if you're like me, you can junk a dud controller and step up the performance of your existing system with a reliable single board.

A hardware (and software) standout the 1771 does all the work. For those of you not familiar with the chip, it is essentially a microprocessor dedicated to the control of a disk drive. As such you can program it with certain instructions to accomplish a physical task. For example, you can tell it to seek track 33, and it does all the stepping of the head motor, loading of the head, and all the other steps for that track. It is indeed track 33. When it has so positioned the head, it lets you know, and give you its next task, such as write a sector or whatever. Note that you don't have to write the software that counts tracks, steps the head, waits for the head to settle after loading, etc. etc. So, the chip takes a big software burden off you (as well as about 60 TTL gates worth of head stepped and latches, and on gates and off gates and reg gates).

The chip is most often used as an IBM compatible system's controller with all of the esoterica pertaining thereunto (26 sectors per track of 128 bytes per sector and 77 tracks). But, it allows you to set the sector length and format under software control so you can do your own thing (such as work with full sectors of 124 bytes, which are not IBM compatible diskettes). We'll delve into the mini-floppies and the TARBELL board in a bit.

The controller board comes with a bootstrap ROM that can be enabled on power-up or on reset to boot up the sector of an IBM-type diskette. The 32-byte ROM is cleverly set up as phantom ROM that takes up no address space in your computer. When it's activated, the processor reads from ROM starting at address 0, but directs memory writes to RAM. This ROM is really intended to boot CP/M, a very comprehensive disk operating system by Digital Research. What is significant about the ROM is that you can easily boot in a sector with only 32 bytes! Try that with most of the other controllers on the market -- it shows how easy it is to use the 1771.

Well, it seems as if everything's good about the TARBELL board. You and I know that microprocessors were designed with the sole intention of totally frustrating the user. So here comes the bad news about the TARBELL board. It doesn't work with dynamic memory. A more correct way to state the problem is that dynamic memories don't work with the TARBELL controller. After all, it is the memory's responsibility to remember data. Most dynamic memory cards seem to get bored during WAIT states, and decide to drop a few bits for fun. You have to use a nifty hardware trick so that the processor can synchronize itself with the data that is coming in from the disk at a rate of 250,000 bits per second. With a CPU like the 8080 and even the Z-80 it is none too easy to plant a byte of data in the middle of every microsecond with a programmed ready-busy loop and a 2 MHz clock. TARBELL uses the PRDY line to stall the CPU until the next data byte from the disk arrives, or the controller completes execution of the current command. Normally the PRDY line is used to put the CPU into a WAIT state for slow memory (usually about a microsecond or so). The program does an input instruction to a particular device which causes PRDY to be asserted. The CPU does not complete execution of this input instruction until PRDY is released. The CPU monitors the state of PRDY every 500 nanoseconds. The fastest 8080 program can only monitor the 'read status of the controller about every 19 microseconds. In essence, the microcode of the 8080 is doing the ready-busy loop for the CPU. This is most of the instruction. It's a great trick. It's been used by others (North Star, etc.) with good success.

The unfortunate consequence of using the PRDY line is that the controller is generating long WAIT states at precise 32 microsecond intervals, which happens to be close to the refresh frequency of most dynamic memory boards. And it plays hell with dynamic memory cards that don't expect long wait states. They either neglect to refresh memory at all, or give the CPU a couple of microseconds and then start refreshing. Those particular refreshes are not occurring during the "transparent" part of the refresh when the TARBELL board lets go of the
All in all, this is about the bestest and mostest controller board on the market for the price. It gets a three-and-a-half star rating. All dynamic memories that don't work with it get zip. *** 1/2

The Matrox... (continued from the page to the right)

The Matrox... (continued from the page to the right)
THE ELECTRIC PENCIL
SOLUS SOFTWARE REVIEW
by
E. A. Tea

Another problem is that if I/O drivers are needed (such as
the aforementioned Selectric driver program), they cannot be
placed in memory contiguous with that occupied by The Electric
Pencil because it will size and initialize memory and destroy the
driver in the process. A provision such as provided by Altair
Basic to enter a smaller memory size would solve this problem.

Other problems which have been encountered:

The print function assumes that one is using roll or fanfeed
paper. There is no provision for automatically stopping at the
end of each page and allowing the user to insert a new sheet of
paper (which seems the obvious way a text processor would be used
for multi-page letters or reports).

The scrolling operation takes quite a long time. This can
cause 10 or more characters to be lost if the keyboard operator
is a fast typist, as is this reviewer. The use of a report
function on cursor up and cursor down keys causes the cursor not
to be visible during periods when the screen image is scrolling.

Other features which one might reasonably expect at this
price, but which are lacking include:

1. Provision for automatic centering of lines.
2. Provision to allow embedded control functions so
   printer could switch back and forth from justified to not
   justified.
3. Provision for allowing required spaces and other
   characters.
4. Provision for allowing justified indented paragraphs
   (indented on both margins).

We strongly recommend to prospective purchasers that, if at
all possible, they try this program out at their local dealer's
in the exact hardware configuration (especially the printer) they
plan to use. Give some thought ahead of time to the functions
you need to do your particular job. You may find, despite all
the drawbacks we have found, that The Electric Pencil is just the
program you need.

NEW TEXT FORMATTER FOR CP/M
REPRINTED FROM CP/M NEWSLETTER #4

Digital Research is pleased to announce that the TEX Text Formatter
is available for shipment on June 1 at a cost of $75 for the TEX diskette
and manual ($10 manual only, $75 diskette only). This newsletter was
prepared using TEX, as was the SID Symbolic Instruction Debugger manual.
TEX provides powerful text formatting capabilities using ED (the CP/M
context editor) and a printer device. There is complete control over
vertical and horizontal spacing, left and right margin justification,
and pagination with optional heading and automatic page numbering. TEX
provides commands to paragraph, center, literal copy, and multiple space.
The TEX manual includes a description of how to use CP/M oriented towards
the novice user, with explanations of the editor, pip and command processor
to facilitate the use of TEX by non-computer oriented personnel.
BASIC BUGS
BY RON CARDINALE

Processor Technology has some strange and unfortunate bugs in both BASIC 5 and EXTENDED CASSETTE BASIC. BASIC 5 will sometimes give the wrong answer to arithmetic problems in direct execution. Here is an example:

\[ .000752^{\times}43.47826,1.73-5/.023/.023 \]

The answers displayed will be:

\[ .03270495 \quad 0.00665 \]

The answer to the first part is correct but the answer to the second part is wrong. When this problem is solved in a program both answers are correct:

\[ 10 \ P. \ .000752^{\times}43.47826,1.73-5/.023/.023 \]

RUN this and the answers will be:

\[ .03270495 \quad .03270321 \]

Both are correct. The correct answers always result if this problem is solved as a program.

Extended Basic has some problems that are more serious. It doesn't always know what to do with numbers in scientific notation because it always inserts a space. This problem results whether direct mode or a program is used. Here's an example:

\[ X=1E22 \]
\[ P.X \]
\[ 1+ 22 \]
\[ X=N STR(X) \]
\[ P.XS \]
\[ 1+ 22 \]
\[ X=VAL(XS) \]

IN ERROR (or TV ERROR) will result. This makes it impossible to simply read scientific notation numbers from files, although they can be written to files without any problems. The only way to get around this that I know of is to read the number as a string and put the string through a function to search for and remove the space, since it is the space that causes this error. This problem also shows up with scientific numbers as a response to an INPUT statement in either direct mode or in a program:

\[ IN.X \]
\[ INPUT ERROR, RETURN \]
\[ IN.X \]
\[ INPUT ERROR, RETURN \]

A space anywhere, with or without the "\"", will cause this error.
(Basic 5 has never caused any problems for me when dealing with scientific notation.)

The POS(0) function will sometimes return the wrong number. Consider the following program:

\[ 10 \ P."K"; \]
\[ 20 \ IN.,(1,0)="X, \]
\[ 30 \ POS(522)+POS(0),65 \]
\[ 40 \ G.20 \]

RUN this program and the expected result would be this (you type the "0" and the program puts the "A" on the display):

\[ 00000000000000000000000000000000 \text{ etc.} \]
\[ AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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The problem is that the line length is initially set to 63. SET L=64 and this will happen:

There will be a blank line in the middle. When Basic gets to the 64th column it generates a carriage return/line feed....but so does the video display. I can (almost) understand why this is done but the (presumed) reasoning is somewhat invalid. At any rate, it would be nice if it were possible to SET L=0 to allow Basic to ignore line length. Does anybody know how to do this or how to eliminate the "RETURN" when the line length is reached without causing other problems? The only way I know around this is to SET L=65 then when the 64th column is reached print P,"RM," (Basic 5 doesn't suffer from this problem). Unfortunately, POS() can't always be relied on to return the correct column number.

Both Basic 5 and Extended Basic can do a couple of things that I have not seen in any of the documentation. They will recognize the "TAB" character provided it is preceded by an "ESCAPE" and followed by another ASCII character. For example:

10 P."88" "ES8IFHello"
When this program is run, "Hello" will be printed starting with column number 6 (the 7th column actually, because the columns start with 0).

Also, both Basic 5 can easily print a quotation mark, something which is either a nuisance or impossible in other Basic. This program will print a quotation mark:

10 P."88"

At the New Jersey Computer Faire in Atlantic City last August, I attended a session in which a debugging program called DDS (Dynamic Debugging System) was demonstrated. I was quite impressed with its capabilities and decided to buy it. This sort of program should be of interest to anyone who has struggled to get an obstructive program to work on a SOL with no front panel and no single step capability. DDS has these capabilities and much more; it is a WINDOW into the 8080 computer system.

Before describing some of its capabilities, I will describe my experiences loading it. The program is available in several versions for SOL/VDU, POLY 88, and for ADP terminals with cursor control. The SOL version comes on a CUTE tape at 1200 baud for $30.00 and is the first and only program for the SOL which is completely self-contained.

A very short bootstrap routine (26 bytes) must be key in which specifies the load address and address of the tape read routine. I had the program loaded and running at the upper end of the RAM in half an hour. I have since relocated it a couple of times. This relocatable feature is an excellent one which I would like to see in all good software.

But what does the program do? DDS allows continuous monitor and control of a target program and continuously displays all register contents, user selected memory contents, and contents of the stack as well as the instructions being executed. The program uses the memory mapped display features of the SOL to very effectively display the results of instructions just as it happens right before your eyes. The upper half of the screen displays a return address stack, the entire stack, the contents of all the 8080 registers and the contents of memory locations pointed to by the register data, and the next six instructions to be executed in 8080 mnemonics. Yes, it has a built in disassembler. As each instruction is executed in single step mode, the instructions move up as the program counter increments and all registers and memory contents are updated on the screen. The lower half of the screen is used to display either 6 lines of 16 bytes of memory in ASCII on the right or optionally, instruction mnemonics can be displayed. The memory display is very flexible in that each of the six lines can be a different portion of memory. In addition, the number of steps to be executed with each step command can be specified for rapid stepping through program loops. Some of the commands which are fully explained in the user's manual are: FILL, FIND, MOVE, GO, ENTER BYTE, ENTER CHARACTERS, BREAKPOINT, ADDRESS, STOP, VALUE STOP, OP CODE STOP, STACK RANGE, CLEAR SCREEN, ENTER WORDS, ENTER REGISTER, ENTER REGISTER PAIR, POP, PUSH, RETURN, and others.

DDS controls the target program by inserting an RST 7 instruction after the current instruction being executed and saving the byte being replaced (breakpoint technique). Thus, the RST 7 location (0038H) is used by DDS to place a vector to its breakpoint service routine. This can be a problem in some programs and may have to be patched around while debugging. In addition, if the program being debugged expects keyboard input or outputs to the display, the breakpoint facility must be used in order to avoid conflict with DDS operation.

In summary, DDS is a very worthwhile program tool for debugging assembly language programs and is also a very good way to learn how an 8080 works. I have used it as a teaching aid in a microprocessor class with good success. It has been a great timesaver in debugging and modifying several programs on the SOL. The program is well worth the $30.00 which it costs and is available from Computer Part of New Jersey, 501 route 27, Iselin, N.J., 08830.
STATEMENT TRACE ROUTINE FOR EXTENDED CASSETTE BASIC
BY JOHN OSUDAR, Homewood, IL

TRACe is a statement trace routine for Extended Cassette BASIC.
It is designed to be used with SOLOS/CUTER, as listed below, it
is assembled into the user area of SOLOS/CUTER system.
Once EC BASIC is initialized, and TRACe is in memory, BASIC must
be patched by executing the commands: FOKE 1420,160 and
FOKE 1421,202 which insert B4 CA (hex) at 5BC and 5BD.
Now, the trace may be turned on by: 52027,1 and turned off by:
52027,0

Notes: SOUT (defined in line 1, referenced in line 74 at CB29 hex)
is set to CO9B, which is a SOLO output routine that allows
inverse video output. For CUTER, this should be set to COBE, and
for generality (but without inverse video) this can be set to CO19.
Assembled by ALS80, trace source without comments is 1496 (decimal)
bytes long; the generated code is 145 bytes plus 10 bytes storage.

```
0098  001 SOUT EQU 0098H
0597  002 BAKIN EQU 597H
251E  003 LNTPR EQU 251EH
2537  006 START EQU 2537H
CAB4  005 P5 EQU 005H
CAB5  3A 3B CB 0007 LDA TPLG
CAB8  37 0006 ORA A
CAB9  37 37 CB 0008 JZ JRENT
CABC  0009 PUSH B
CABD  0010 00 00 PUS D
CAEB  02 00 00 LDA H, BUFFER
CAG2  24 49 CB 0013 XCHG H, B
CAG5  24 36 CB 0013 XCHG H, PWRT
CAG8  24 51 DE 0016 XCHG H, LNPR
CAGE  0017 XCHG
CAGF  2A 57 2E 0018 XCHG H, PWRT
CAG2  0019 LOOP PUS H
CABE  0020 MOV C,M
CABD  06 00 00 MOV B,O
CADD  02 22 DAD B
CABD  78 02 MOV A,E
CABD  93 00 SUB L
CADD  0A 26 MOV A,D
CADD  0C 02 SBB H
CADD  0E 2A MOV E,M
CADD  0F 02 MOV H,M
CABD  0F 02 MOV A,M
CABD  3D 2A 00 JMP LOOP
CAEB  0030 FOUND POP H
CAE1  0033 INX H
CAE5  0036 MOV E,M
CAE5  0037 INX H
CAE5  0038 MOV H,M
CAE6  0039 MOV D,M
CAB7  2A 45 CB 0035 CLOOP LMDL PWRT
CABG  45 00 MOV C,M
CAEB  0037 INX H
CABE  0038 MOV B,M
CABF  0039 INX H
CAE1  0042 MOV A,C
CAE2  0044 MOV A,D
CAE3  0045 MOV A,E
CAE1  0046 MOV H,M
CAE1  0047 MOV B,M
CAE1  0048 MOV D,M
CAE1  0049 MOV A,D
CAE1  004A MOV A,E
CAE2  004B MOV A,C
CAE2  004C MOV A,D
CAE2  004D MOV A,E
CAE2  004E MOV A,E
CAE2  004F MOV B,M
CAE2  0050 MOV B,M
```

```
SOLos output routine addr
Reentry for EC BASIC
Current statement ptr addr
Start-of-program ptr addr
Save BASIC A, flags
Get trace flag
Test it
If trace off, reenter
Save BASIC's other regs
Initialize buffer ptr
Initialize powers ptr
Get current statement addr
Put it into DE
Get program start addr
Save in case it's the one
Get length of line into EC
Add to get next line's addr
Compare (DE) with (HL)
If it is, carry will be set
Jump if correct line found
Discard stacked address
and keep looking
Restore line's start addr
Point to line number
Move line number into DE
Get ptr to -powers of 10
CARA power for converting
next digit or line number
into BC
Increment to point to next
```

```
CAE1  0051 CKLB 0052
CAE1  0053 CSUB 0054
CAE1  0055 CMVB 0056
CAE1  0057 CMST 0058
CAE1  0059 CKLB 005A
CAE1  005B CSUB 005C
CAE1  005D CMVB 005E
CAE1  005F CMST 0060
CAE1  0061 CKLB 0062
CAE1  0063 CSUB 0064
CAE1  0065 CMVB 0066
CAE1  0067 CMST 0068
CAE1  0069 CKLB 006A
CAE1  006B CSUB 006C
CAE1  006D CMVB 006E
CAE1  0070 CMST 0071
CAE1  0072 CKLB 0073
CAE1  0074 CSUB 0075
CAE1  0076 CMVB 0077
CAE1  0078 CMST 0079
CAE1  007A CKLB 007B
CAE1  007C CSUB 007D
CAE1  007E CMVB 007F
CAE1  0080 CMST 0081
CAE1  0082 CKLB 0083
CAE1  0084 CSUB 0085
CAE1  0086 CMVB 0087
CAE1  0088 CMST 0089
CAE1  008A CKLB 008B
CAE1  008C CSUB 008D
CAE1  008E CMVB 008F
CAE1  0090 CMST 0091
CAE1  0092 CKLB 0093
CAE1  0094 CSUB 0095
CAE1  0096 CMVB 0097
CAE1  0098 CMST 0099
```

```
SLHD PWRT
Get low-order byte
Test for zero terminator
If zero, no more powers
Clear for digit counter
Easier than NIP ILOOP+1
Move number into DE
Get negative power into
HL for subtraction
Increment current digit
Get number-power of 10
Loop until "negative"
Get buffer ptr
Take off extra one, test
If nonzero, put into buffer
Save pointer before test
Get value for leading 0 test
See if lead 0 insertion
Increment buffer ptr
Save buffer ptr
Loop for other digits
Get buffer ptr
Get value of ones digit
Form inverse video digit
Put it into buffer
Increment buffer ptr
Get a character for output
Save buffer ptr before call
Output one character
Restore buffer ptr
Get character again
Increment buffer ptr
Get character for end mark
Loop if not yet end
Restore BASIC's registers
```

 Comes here when trace is off
 Go back to BASIC
 Trace flag, initially off
 Negative powers of ten table
 for statement number value
 conversion to characters

 Table's zero terminator byte
 Pointer to powers of ten
 Pointer to output buffer
 Output buffer
### Comparison of Micropolis and North Star Basics

#### Category

<table>
<thead>
<tr>
<th></th>
<th>North Star Version 6 Release 3</th>
<th>Micropolis Basic 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Length (Chars)</td>
<td>132</td>
<td>250</td>
</tr>
<tr>
<td>Maximum Line Number</td>
<td>65535</td>
<td>65529</td>
</tr>
<tr>
<td>Line Cancellation Character</td>
<td>&quot;G&quot;</td>
<td>CTRL-X</td>
</tr>
<tr>
<td>Multiple Statements per Line</td>
<td>YES (......)</td>
<td>YES (......)</td>
</tr>
<tr>
<td>Dynamically Allocated Files</td>
<td>NO</td>
<td>YES (AUTOMATIC)</td>
</tr>
<tr>
<td>Load Named File from Disk</td>
<td>YES (LOAD)</td>
<td>YES (LOAD)</td>
</tr>
<tr>
<td>Save Named File on Disk</td>
<td>YES (SAVE)</td>
<td>YES (SAVE)</td>
</tr>
<tr>
<td>Kill Named File from Disk</td>
<td>NO</td>
<td>YES (SCRATCH)</td>
</tr>
<tr>
<td>Create New File on Disk</td>
<td>NO</td>
<td>YES (SAVE N:)</td>
</tr>
<tr>
<td>Clear Program Buffer</td>
<td>YES (SCR)</td>
<td>YES (DELETE)</td>
</tr>
<tr>
<td>Print Disk Directory</td>
<td>NO</td>
<td>YES (DELETE)</td>
</tr>
<tr>
<td>Interrupt Program Character</td>
<td>CTRL-C</td>
<td>CTRL-C</td>
</tr>
<tr>
<td>Continue Interrupted Program</td>
<td>YES (CONT)</td>
<td>YES (CONT)</td>
</tr>
<tr>
<td>Program Trace Functions</td>
<td>NO</td>
<td>YES (FLOW)</td>
</tr>
</tbody>
</table>

#### Strings

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integer Data Types</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Floating Point Types</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>True String Arrays</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Scientific Notation</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Max. String Size</td>
<td>LIMITED BY MEMORY</td>
<td>LIMITED BY MEMORY</td>
</tr>
</tbody>
</table>

#### Operators

<table>
<thead>
<tr>
<th></th>
<th>YES (+)</th>
<th>YES (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtraction</td>
<td>YES (-)</td>
<td>YES (-)</td>
</tr>
<tr>
<td>Multiplication</td>
<td>YES (*)</td>
<td>YES (*)</td>
</tr>
<tr>
<td>Division</td>
<td>YES (/)</td>
<td>YES (/)</td>
</tr>
<tr>
<td>Integer Division</td>
<td>NO</td>
<td>YES (%)</td>
</tr>
<tr>
<td>Exponentiation</td>
<td>YES (^)</td>
<td>YES (^)</td>
</tr>
<tr>
<td>Less Than</td>
<td>YES (&lt;)</td>
<td>YES (&lt;)</td>
</tr>
<tr>
<td>Greater Than</td>
<td>YES (&gt;)</td>
<td>YES (&gt;)</td>
</tr>
<tr>
<td>Equal To</td>
<td>YES (=)</td>
<td>YES (=)</td>
</tr>
<tr>
<td>Less Than or Equal To</td>
<td>YES (&lt;=)</td>
<td>YES (&lt;=)</td>
</tr>
<tr>
<td>Greater Than or Equal To</td>
<td>YES (&gt;=)</td>
<td>YES (&gt;=)</td>
</tr>
<tr>
<td>Not Equal To</td>
<td>YES (&lt;&gt;</td>
<td>YES (&lt;&gt;</td>
</tr>
<tr>
<td>AND</td>
<td>YES (AND)</td>
<td>YES (AND)</td>
</tr>
<tr>
<td>OR</td>
<td>YES (OR)</td>
<td>YES (OR)</td>
</tr>
<tr>
<td>NOT</td>
<td>YES (NOT)</td>
<td>YES (NOT)</td>
</tr>
</tbody>
</table>

#### String Functions:

| ASCII Code of Char, in String | YES (ASC) | YES (ASC) |
| Return a Left Most Character | NO | YES (LEFTS) |
| Return a Right Most Character | NO | YES (RIGHTS) |
| Return a Middle Most Character | NO | YES (MIDS) |
| Return Smaller String on Compare | NO | YES (MIN) |
| Return Larger String on Compare | NO | YES (MAX) |
| Return Numeric Value of String | YES (VAL) | YES (VAL) |
| Return Length of String | YES (LEN) | YES (LEN) |
| Return String of Value X | YES (STRX) | YES (STRX) |
| Return String of Specified Char. | YES (CHRS) | YES (CHRS) |
| Repeat Char. n Times into String | NO | YES (REPEATS) |
| Determine if X$ is a substring of Y$ | NO | YES (VERIFY) |
| Format Value X into String Y$ | YES (PRINT) | YES (PRINT) |
| Return Position of X$ in Y$ | NO | YES (INDEX) |

#### Files:

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random Access</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Sequential Access</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Error Trapping</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>End of File Control Transfer</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Dynamic Allocation</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Create and Delete Under Prog.</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Change End of File</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Rename File</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Change Attributes</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Number of Tracks</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Size (in Records)</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Space Left on Diskette</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Read-After-Write</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

#### Special Functions:

<table>
<thead>
<tr>
<th></th>
<th>YES (CHAIN)</th>
<th>YES (CHAIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execute String as Prog. Statement</td>
<td>NO</td>
<td>YES (EXEC)</td>
</tr>
<tr>
<td>Set End of Memory</td>
<td>NO</td>
<td>YES (MEMEND)</td>
</tr>
<tr>
<td>8080 In Instruction</td>
<td>YES (IN)</td>
<td>YES (IN)</td>
</tr>
<tr>
<td>8080 Out Instruction</td>
<td>YES (OUT)</td>
<td>YES (OUT)</td>
</tr>
<tr>
<td>Examine Memory</td>
<td>YES (EXAM)</td>
<td>YES (FEEK)</td>
</tr>
<tr>
<td>Replace Memory</td>
<td>YES (POKE)</td>
<td>YES (SZIES)</td>
</tr>
<tr>
<td>Change Variable Default Precision</td>
<td>NO</td>
<td>YES (STRING)</td>
</tr>
<tr>
<td>Change String Delimiter</td>
<td>NO</td>
<td>YES (STRING)</td>
</tr>
</tbody>
</table>

#### Miscellaneous:

<table>
<thead>
<tr>
<th></th>
<th>14 Digits (spec. order)</th>
<th>60 Digits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Variable Precision</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Max. Trigonometric Func. Prec.</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Minimum System Damian</td>
<td>12K Bytes</td>
<td>24K bytes</td>
</tr>
<tr>
<td>Machine Language Link</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>User Defined Functions</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

![Thank you MINI MICRO MART](image-url)

#### Note:

Processor Technology has issued rewritten Sol and Helios manuals to their dealers. The new manuals are now being packaged in new systems delivered. From what I've read about them, the new manuals don't make the old ones obsolete. The rewrites incorporate easier construction drawings, better identification of parts on parts lists and assembly drawings, and clarified introductory sections. The most major change is in the section of Operations section in the Helios manual. This section is now 68 pages long, instead of the token 2 pages in the original release. In addition to information on the workings of the hardware, the section gives enough data to figure out how to program your own I/O without PTDS. One notable fact is that the controller uses IO ports F0 thru F7. Therefore, adding other boards to your system be sure they don't need these ports for other purposes. I don't know if PTC plans to make the new section available to the earlier purchasers. Perhaps some arrangement will be made through Helium.
NEW PTC SOFTWARE

The following descriptions of software that is soon to be released appeared in the March 1979 issue of The Personal Computer Retailer, published by Processor Technology Corporation for its dealers. Don't believe the release dates, but the other information may be credible.

FORTRAN

Processor Technology FORTRAN will be available on disk ($50) before the end of March. The cassette version will be available mid-year.

The disk version is particularly noteworthy because it interfaces so well with PT DOS, our disk operating system. Disk FORTRAN supports most of the functions available from the PT DOS entry port area, thereby taking full advantage of the disk's mass storage capabilities. Information access is very quick. For example, in only one disk access the user can read any variable from any file.

The FORTRAN, a very good implementation of the language, includes the following functions:

* Very explicit run time error comments during compilation and at run time
* Eight significant digits of precision
* String manipulation
* Cursor functions
* Hexadecimal constants
* Direct in-line 8080 assembly language mnemonics accepted by the compiler

Except for the extensions, this FORTRAN is identical to FORTRAN IV but does not include COMMON or Double Precision statements.

PILOT

Processor Technology PILOT will be available in mid-1978 on both disk (approximately $50) and cassettes (approximately $25.)

PILOT is a string-oriented, interactive language particularly well suited to computer aided instruction (CAI). The original version was developed by Dr. John Snell of the University of California Medical Center in San Francisco. Dr. Starkweather has custom tailored our PILOT to run on the Sol utilizing SQLOS I/O with direct screen cursor positioning and program & data files among the more notable features.

PILOT is a powerful language, very easy to learn and easy to use. It should be of interest to educators, educational institutions, psychologists and anyone developing testing programs or programs introducing computers to children.

8080 CHESS

The 8080 CHESS program, developed by Robert Arinstein of Houston, Texas, competed in the Eighth North American Computer Chess Championship in Seattle last October as part of the A.C.M. Annual Conference. Running in a Sol computer, it was the only participant running in a machine that was actually on the premises.

This was the first microprocessor-based chess program to compete in the annual match. We thought of it as David versus Goliath, the Sol against a giant Amdahl computer. Unfortunately, the Sol's pebble missed Amdahl's forehead but maybe next year!

Considering that the 8080 CHESS program is only eight months old (a mere infant) and was competing against some programs which have been in development for 6 to 8 years, it put in an excellent showing.

Meanwhile, Processor Technology will be distributing the program as a regular software package in cassette form complete with manual. It will retail for $24.50. We hope to start shipping by May.
Dear Stan,

Driver and hardware change to allow an Integral Data Systems ID-125 impact printer to operate with SOL.

This routine allows the printer to operate at any speed up to 1200 baud. I enter it at C900. It also allows the TV monitor to display the information as the printer is operating:

```
EN C900:
  DB F8 2F 8E A0 C2 00 C9 78 D3 F9 CD 54 C0 C9
  SET COUT C900
  SET 0 = 3
```

The hardware changes made are as follows: use the "ACKNOWLEDGE" signal from the printer instead of the "CLEAR TO SEND." This requires disconnecting the CTS signal at the connector and running a short wire from the acknowledge tie point to the same pin as the CTS was tied to. On the SOL, tie the incoming acknowledge signal (which is at TTL level) to pin 2 of U37 after disabling pin 3 of U38 (I simply pulled U38 and bent pin 3 out of the socket).

--Doug Snyder

April 1, 1978

Dear Stan,

Do you know of anyone who uses MCA BASIC with a SOL? I have had several problems with it. It does not seem to read or write programs or files as indicated in the skimpy documentation, and it does not seem to have any provision for switching of output ports from basic. Aside from these drawbacks, it seems to be pretty good. For one thing it offers an alternative to the way in which PF EB handles strings.

Has anyone written an alphabetization program for PF EB?

Regards,

Gerald Harwood

P.S. Has anyone modified a SOL to produce a 72 or 80 character screen image?

---

Dear Stan,

For those people with BASICS, there is an error in the demo program "LIVAH" in addition to the misspellings in MACHS. Line 930 reads "GOSUB 800: IF I=0 THEN 860." This error causes problems if the ship is climbing as a result of too high a burn rate.

The article on parallel memory was very interesting. However, if the appropriate 4K banks are chosen, the mod can be even simpler. If the two banks differ by only one bit then this bit can be tied high (or low depending on the select logic). This "don't care" the selecting logic. For example, to use either ALS-8 or software no. 1, a block of RAM is needed from 0000 to DFFF which is very hard to use for anything else, but "don't caring" a single bit this bank can be parallel with either 5000-5FFF or 9000-9FFF. Since I have 40K of RAM, the 9000 block is ideal. On the PTC16KHA board this mod involves lifting pin 11 of U41. This has no effect on the refresh circuitry.

For anyone interested in tweaking the PAUSE and INPUT delays in EXTENDED BASIC, because of a different clock rate, etc., the loop rate is set by a constant at locations 1288 and 1289 hex, low order first. This constant can be changed with a POKE statement after the program is running. If the change is to be permanent, it will be necessary to modify the initialization routine to get through the checksum test. The theoretical checksum is stored at 3F81-3F82 prior to initialization and can be changed consistent with the time constant change or the checksum test can be deleted (which will make other changes easier) by changing 3C4C to C3.

I would like to suggest that when someone gives a hardware mod, they list the revision level the mod is for. I bought my SOL in January of 1977 and it has a D revision for the main board. I know that they are at least up to E. While I try to keep my board up to date, PTC refuses to provide the necessary information. For example, SOL MANUAL ADDENDUM NO. 2 dated 7/77 states that the Revision E boards have added C74, R155 and R156, but don't give their values. With the particular recorder I'm using, the resistors are required to prevent intermittent relay operation. I have written PTC four times for the values and gotten no answer. By trial and error I went to 10 ohms. I don't know about the reference cap. So much for their customer service department.

For the analytical types, I suggest not using the random number generator included within EXTENDED BASIC; it's not very evenly distributed. I sorted the first million numbers and got the following results:

<table>
<thead>
<tr>
<th>0.0</th>
<th>0.1 110207</th>
<th>0.2 110796</th>
<th>0.3 105965</th>
<th>0.4 107966</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.1 0.2</td>
<td>0.0 0.5</td>
<td>0.6 0.7</td>
<td>0.2 0.8</td>
</tr>
<tr>
<td>0.0</td>
<td>0.1 0.2</td>
<td>0.0 0.5</td>
<td>0.6 0.7</td>
<td>0.2 0.8</td>
</tr>
<tr>
<td>0.0</td>
<td>0.1 0.2</td>
<td>0.0 0.5</td>
<td>0.6 0.7</td>
<td>0.2 0.8</td>
</tr>
<tr>
<td>0.0</td>
<td>0.1 0.2</td>
<td>0.0 0.5</td>
<td>0.6 0.7</td>
<td>0.2 0.8</td>
</tr>
</tbody>
</table>

The same distribution can be seen in samples as small as 100.

While the distribution is OK for games, I would advise writing your own subroutine for serious mathematical analysis (e.g., working out blackjack systems).

I am currently working with a CD1802 processor at work -- both hardware design and programing. Does anyone have a program to do 1802 ASSEMBLY on a SOL? If not, would anyone have use for one if I wrote it? Due to the totally different architectures involved, it probably isn't feasible to write a translator but straight assembly isn't bad.

--Bruce Barron
214R Jackson Drive  
Bremerton, Washington 98310  
3 June 1978

Dr. Stan Sokolaw  
1698 Woodside Road #219  
Redwood City, California 94063

Dear Stan,

I talked to you a few weeks ago, and got some information. I still haven't received a copy of SOLUS NEWS after Vol.1, No.3, but that may be expected. I am leaving for three weeks to Ohio, and wanted to write before going.

I tried to look up Dr. New, but didn't find him listed with the American Society of Anesthesiologists. Perhaps you could send me his name.

I am sending a copy of a letter to ProTec about the trouble I am having with the Sol going down during times of a little overheating. I am one who doesn't like heat at all, and I try to make sure that things are as cool as possible...but the Sol is even less accepting than I. I think that it is a little too itchy, and want to see if I can get more reliability.

By the way...I don't know whether you have had a problem with them, but I have noticed that the people who staff computer stores are generally inattentive and stupid. I have actually spoken to one at a store in Seattle whose conversation was limited to "Oh Wow" and, when I finally convinced him to sell a DOS and BASIC to another man, couldn't load it onto the disk.

The real problem is that people like me are buying our equipment from people like that. I think that ProTec should make more of an issue of telling purchasers that there is a SOLUS and even about their own "access," which I just discovered.

Is there a chapter in the Puget Sound area? If so, please let me know about it. If not, I might consider getting something together...but I haven't anywhere near the time nor dedication that you have...so it would have to be a slight contribution...but I have a fine mailing label program, and I would be capable of working that.

You might look into what has happened to my membership, in the event that there has been a new SOLUS NEWS published. Otherwise, I will be in touch, and sending little bits of advice and encouragement, as well as things that I have found that I can do with my SOL-16 combo. Sooner or later, a book on how to do things is needed, and we can all give you ideas for that.

With all best wishes,

Chuck Bollinger

3 June 1978

Processor Technology Corporation  
7188 Johnson Industrial Drive  
Pleasanton, California 94566

Gentlemen:

I am writing to get some information about what might be making my SOL quit on me at times. I have spoken to the people who sold it to me (the Retail Computer Store in Seattle, and they mention something called a "probe")...though further questioning revealed nothing.

The first time I noticed it, it was on a warm evening in March. I had just returned from California (where I visited your factory). I was using the SOL and the CRT suddenly went blank...into an amorphous pattern of soft waves. The lights on the UPPER CASE and LOCAL keys were out, and no amount of keying would make it better. I turned it off and, after several minutes, I was able to use it again. My equipment at the time was the SOL-28/32 with a W controller board. Since that time, I have added a Seattle Computer Products 16K static board, but that didn't seem to cause additional trouble. In fact, I was trouble free during the cooler weather and have only had two incidents lately. BUT, I don't have one of my 16 KDA boards in it (it being repaired, hopefully, by you).

I have also air-conditioned the room...but even when I am reasonably comfortable I find that this will occur.

I will appreciate any information you can give me. A copy of this letter, for information purposes, is being sent to SOLUS.

Yours truly,
Charles W. Bollinger

17
Gentlemen:

I recently purchased a Sol to see if I couldn't learn enough about it to set it up for data gathering and processing in a small business my wife has. As one who had an application for the machine, I was not at all aware of various equipment considerations, but I am learning fast...the hard way.

Realizing that I would benefit from the rapidity of disc loading, I purchased a North Star single drive. I also purchased an ALS-8 cassette, because I actually was getting into machine language programming a little.

From what the software man at ProcTech told me when he gave me your address, I have probably told you enough for you to understand my problem: The N° boots where the ALS-8 is supposed to work and, because of the memory map configuration of the firmware N° 6424, I cannot even work around it and load with cassette to memory assigned in that area.

ProcTech does not want to get into customizing ALS-8, and point out that the bulky location of the boot and the dos in the N° system will cause trouble forever unless it is corrected. I have to agree with them on that point.

I imagine that, for the Sol, the best place for the SOL DOS would be $A59F to $BFFF, and the boot just above that from $B0FF to $B0F. That would cram it all under SOLOS, leaving $A5FF free for everything.

I am writing in the hope that you can give me the benefit of your experience. Most folks like Sol hardware types, but haven't much real use for a computer, and, while they are sympathetic, give me the impression that they somehow don't understand the fix I'm in.

I will be looking forward to hearing from you.

Yours truly,
Chuck Bollinger
Charles W. Bollinger
Bremerton, Washington

(ED.: WE SENT CHUCK THE APRIL 1978 ISSUE, WHICH ANSWERED SO MANY OF HIS QUESTIONS HE CALLED TO THANK US.)

Perhaps I hold the record for the most far-flung SOL-20? New Delhi. Interest here hasn't picked up but as soon as I'm a little better organized, I hope to start a club, which should go over big as there are a lot of excellent programmers/computer experts here.

I would be interested in receiving cassettes with the software that's published in Byte, Creative Computing, KiloBaud, and that will run with 5K or Extended Basic, both of which I have. I find I'm not good enough to covert MITS programs to Sol, yet, and of course, typing in is a drag if the dang things won't work, afterwards. In return, I'll send cassettes with the Text 'typed on but that may or may not work, but which could be loaded in by the recipient and adjusted to work, saving him/her all the typing. I don't know if anyone would be interested but I hope so. Of course, I'd always be good for the price of the cassette and postage, also.

Once I can get the club going, I'm sure Indians will import chips and build the rigs in rapid and rabid fashion, and I look forward to that stage. We need a place to meet, and that also will be a bottleneck.

Finally, I brought an IBM PC/RT back with me from the states, I'm just getting ready to convert it to 220V/50Hz; has anyone done something on exactly how to go from CED 20 port to the 50 pin IBM jack and work? (Is there Reproducer which is thick and years and into later ultimate)

Enclosed is my $4 for the news, of course I don't expect you to answer my questions but if members come up with something in these areas, would you kindly pass it along?

Sincerely yours,

George G. Warner
New Delhi Id
Department of State
Washington, D.C. 20520

Enclosed is the additional $6, per Vol 1, No 3, I sent only $4 before as printed in KiloBaud. Please do send the back issues for this year, I really find what your doing useful... for example, I already blew my power supply because I didn't have the note in No 3 about the + 5 & 16V at 2 & 3211; also, I want to buy a floppy and your notes are helping me decide which way to go in a rather confusing world of claims and statements that mean nothing to me.

My Sol 20 is down now as I had to return the keyboard to PT, so I'm watching the mail daily for its return. Once here, I hope to form a SOLUS club in India, but I'll have to look into the import problem first. There are a lot of highly talented, under employed software experts here and I hope to meet some of them.

Keep up the good work.
Sincerely yours,

George G. Warner
New Delhi Id
Department of State
Washington, D.C. 20520

PS You can print my address on this and my first letter, if you want.

I am enclosing a copy of the article on the bugs in Processor Technology's basics that I discussed with you at the Homebrew Computer Club meeting on April 12. I am also sending a copy of this to Processor Technology. If they seem to me a response of any significance, I will let you know. I hope that you will find this of some use. I want to send you another note in a couple of weeks detailing some algorithms for finding roots that may be also of interest.

sincerely,
Ron Cardinali
South San Francisco, CA

(SEE RON'S ARTICLE IN THIS ISSUE, THANKS RON, AND DO LET US KNOW WHAT PTC SAYS.)
I've just managed to convince my electric terminal that it should talk thru my Sol Computer to Michael Shreiner's The Electric Pencil... who should I write to...

I've had my Sol since the first of the year. With some very good support from the guys at The Computer Mart of New Jersey, I got the beast working in a little over two weeks. Oh upper-case repeat, thy sting bites into the quick of my lower case heart. The assembly of the kit went quickly and I would rave about it except for the errors in the manual. Errors in power supply connectors and prints are unforgivable, especially for a kit aimed at laymen. Tune for minimum smoke.

We all are aware of the five slot monstrosity of a board and I can recommend Extensa 8664 memory board as a cure. $64 in one slot and it works every time.

My North Star Disc has eaten a regulator or two thanks to the well-known heat problem in the Sol. I think I cured it by blocking off the keyboard side of the power supply causing the fan to draw its air thru the card file and into the power supply thru the card guides. So far, after three months, no more heat failures. The North Star Disc, along with the Sol, has been working like a charm. The assembly was easy. In fact, I did it in one sitting in a hotel room in Virginia. I travel a lot and have never been able to put the night hours to work before.

My IBM Selectric Terminal is my most recent hardware addition thanks to the Alkin Model 188 Selectric Interface. This device translates the parallel port output, ASCII code, to the EBCD code the selectrics use, all inside the Sol Computer.

Now if I could only teach The Electric Pencil and my Sol to correct my spelling.

My pet peeve is SOFTWARE. I have wasted hours upon hours, typing in dozens of worthless programs from many books that claim to work any basic. The worst offender has got to be The Software Library carried by most computer stores. The publisher advertises that the programs run on any micro-computer. After shelling out your hard earned money you find that "it ain't so." The books are full of basic commands that don't exist on micros and yes, even a collection of miss spelled words.

Hurray for PT's new 87 k basic. Where were you when we needed you? Another non-standard disc system not using CP/M, PT you're not paying attention.

On the positive side, for you students of North Star with filet of Sol, AJA Software has been advertising a tutorial lesson on a floppy disc. I have my copy and a quick glance answered several questions left by the slim basic manual from North Star.

I've taken enough of your space so let me close up shop.

Your last issue, in the new format, was page for page, the best publication in the microcomputer field. Please, please keep up the good work.

Stuart M. Rudick
110 Manhattan Court
Jericho, New York 11753
I have enclosed a cheque for $12.00 (U.S.) as enrolment in the SOL Users group. I am currently running a SOL 20 with 32k and the HELIOS disk system. I have seen a copy of the Newsletter and all I can say is keep up the good work!! I am really looking forward to getting my own copy.

Can you please let me know if anything like this is planned for HELIOS owners? I would also appreciate knowing of any move to produce CP/M to run with the HELIOS. There is so much system software designed to run under CP/M it seems a pity to lose out.

How about getting PASCAL running on the SOL. We really need some language other than BASIC to get some decent software running. Alternatively, Yourdon's "C" Compiler would be another good bet. I'm looking forward to hearing from you.

Yours truly,
Andrew Bates
Vancouver, B.C.

(Editor: Thanks for the compliments. The excellent contributors of articles and letters really deserve the credit for the quality of this newsletter.)

With regard to HELIOS users, let me say this. I know that Processor Technology is sponsoring a users' group called HELIUM, which is being organized by Ian Kettleborough, the author of some of Processor Tech's software. PTC plans to make HELIUM its outlet for software updates to its disk software, so membership in HELIUM will probably be essential for HELIOS owners. However, the close association between HELIUM and PTC will most likely be reflected in the policies of HELIUM. Consequently, I plan to encourage and support HELIOS users in SOLOS. Indeed, it makes much more sense for PTC to have a unified users group, since in most cases their software will be tailored for their own product line, SOL+HELIOS. So, yes in the future you will be reading more and more HELIOS articles. PTC plans to continue its policy of cooperation with and independence from the manufacturers.

I am planning a software interface to let CP/M application programs run under PTDOCS, while thinking that they are talking to CP/M. This would let us transport the CP/M library over to HELIOS. If anyone else is working on this, please contact me.)

Hi Stan,

15 April 1978

I received the "SOLUS NEWS" today and am impressed by the amount of information and correspondence available in this issue. I vote for the new format.

I wonder how many SOL/MICROPOLIS users there are among the group?

I would also like to take this opportunity to say that I have the highest regard for the MICROPOLIS dural drive disk system and especially the people who make up the MICROPOLIS company. They have been the most cooperative and concerned people I have had the pleasure of dealing with and I would recommend them without reservation.

If any of the MICROPOLIS users are having trouble with array indexing errors or string insertion statements for a program such as the BIOLOGRHYME CHART PLOTTING PROGRAM, the indexing error can be solved by placing a SIZES statement at the first statement in the program. I use "XXX SIZES(5,3,51)" ahead of the DIM statement.

To insert a character into a string:

XXX OS="";

This statement designates the length of the string and XXX is the hex address.

XXX X:ALGOSYMM TO GENERATE Position OF CHARACTER TO BE INSERTED.

XXX $=LEFT$(OS, X-1) $R$MIGHT$(OS, LEN = LEN $=LEN$(X) -1)

XXX OS=LS6"P"+S$1 WHERE "P" IS CHARACTER TO BE INSERTED.

If you are still using BASIC VER. 2.0 and would like upper and lower case you can enable the automatic lower to upper case conversion by typing in 2 immediate commands after loading basic:

(1) POKES (165456)+16RC; (CR) + CARRIAGE RETURN
(2) POKES (16546)+16RF; (CR) + CARRIAGE RETURN

This changes 8542H FROM 2E TO C9 AND 1582H FROM 60H TO 7F.
YOU WILL NOW HAVE UPPER AND LOWER CASE BUT NOTE THAT ALL BASIC STATEMENTS AND COMMANDS OTHER THAN STRING CONSTANTS MUST STILL BE ENTERED IN UPPER CASE ONLY. FILES MUST STILL BE SAVED IN UPPER CASE.

The above information was supplied by courtesy of the MICROPOLIS CORP. INCIDENTLY IF YOU DON'T SUBSCRIBE TO THE MICROPOLIS SOFTWARE UPDATE SERVICE DO SO, IT IS THE BEST BARGAIN IN TOWN.

Update regarding MICROPOLIS Handling of Peripherals

On page 3 of Dec. 77 issue I complained about the lack of provisions for support of peripherals by the MICROPOLIS system. THIS WAS THEIR EXT. DISK BASIC VERSION 1.1. UNFORTUNATELY, DUE TO THE TIME LAG BETWEEN THE LETTER AND PUBLISHING DATE IN THE SOLUS NEWS, I received MICROPOLIS EXT. BASIC VER. 2.0 WHICH INCORPORATED A PRINTER HANDLER PROGRAM WHICH COULD BE CONFIGURED TO SUIT YOUR PARTICULAR PRINTER REQUIREMENTS AND WAS UP AND FLYING SHORTLY AFTER THE ISSUE WAS PUBLISHED. I HAD BBS IN THE PRINTER THAT HAD TO BE WORKED OUT AND CAUSED considerable delays in getting on line. NOW TO THE GOOD THINGS.

I have received the new MICROPOLIS "PROGRAM DEVELOPMENT SYSTEM VERSION 3.0" and this is a tremendous improvement, with DOS, ASSEMBLER, BASIC VER. 3.0 ETC. ELEVEN DEVELOPMENT AND OPERATING PROGRAMS IN THE SYSTEM PLUS THE PRINTER HANDLER AND UPPER AND LOWER CASE.

I now need an "OS SIDE ASSEMBLER AND A PROGRAM RELOCATOR COMPATIBLE WITH THE SOL/MICROPOLIS AND THEN I CAN GET DOWN TO BUSINESS.

I am very much interested in the dense graphics add on for the SOL being developed by PTC. NOTE PTC'S SILENCE. COMMENDABLE!

Jerry Lenz and I have been corresponding and it has been interesting and informative. I would be glad to hear of any tricks other SOL/MICROPOLIS users have developed, such as random access to files for read and write.

If you've done it lets hear it, if you want it done lets hear it...

Vol. 1 No. 3 Great issue Stan, keep up the good work.

Eldred Lord
I am very interested in learning more about the SOL User Group and its activities. I am a (proud?) owner of a SOL 20 computer, and am currently using the SOL and my peripherals in my private business.

My current system includes:

1. SOL 20 Terminal Computer/with 16K RAM (soon to be 32K)
2. Superscope cassette recorder
3. Sony 12 BM TV with homebrew RF input
4. 2 Northstar Minifloppy Drives/Controller Board/etc.
5. Diablo HYTerm Terminal Printer

My major software includes (to date):

1. Northstar Disk Operating System personalized for SOL
2. Northstar Disk Basic
3. The Electric Pencil word processing software by Michael Shayer (I am using it to compose, edit, and print this letter)
4. Processor Technology Extended Cassette Basic

I really do like my SOL but I have certainly had my fill of Processor Technology from time to time. Fool that I was, I got in at the beginning - February of 1977 - I paid cash in advance! I'm sure you can fill in the rest of that absurd tragedy! Needless to say I was extremely disappointed. I waited 4 months for my SOL (even though the brochure said delivery-stocked to 30 days) and I am still waiting for some of the software OVER A YEAR LATER!!

I would love to use the PT 8K Extended Basic since it seems to be truly superior in form and function to Northstar's Disk Basic. Northstar's Basic has considerably fewer functions and the documentation is cryptic. Unfortunately, using the cassette for file storage makes the system far too slow. I will be the first to admit that the PT Basic documentation was fairly impressive. It would, no doubt, be too much to ask that they provide listings that would enable patches to be made to Northstar's DOS.

I would be interested in hearing from anyone with similar equipment and problems. Anyone have Northstar compatible software for business or home applications? Do you know of anyone who has tailored ProTech's 8K Cassette Basic to the Northstar DOS? I am no computer wiz, but if I can possibly be of service to anyone in the Users Group (especially in the Ohio - Cleveland area) just let me know.

Well, I guess that ought to do it for now. Enclosed please find a check for the SOLUS Newsletter. I am looking forward to receiving more information on the users group and its services and activities.

Sincerely,

Jared F. Harrison

Jared F. Harrison
5046 Taylor Road
Bedford Heights, Ohio 44126
(Cleveland)
DEAR STAN:

HERE'S THE SIX BUCKS I OWE ON MY SUBSCRIPTION. FOUR WAS RIDICULOUS I NOW REALIZE. HAVING READ SOLUS, THE ENCLOSED LITTLE PROGRAM IS A HELIOS TO CENTRONIX-PRINTER DRIVER. ONE OF THE MOST DIFFICULT TO WRITE AS ANY HELIOS USER KNOWS. MORE ABOUT LATER. I MUST TELL YOU A STORY, A HEARTENING ONE I THINK, ABOUT A COMPANY THAT CARES ABOUT ITS CLIENTELE. WE RECENTLY BOUGHT TWO HELIOS II'S TO GIVE OUR SOL-20'S THE CAPACITY, SPEED, AND FLEXIBILITY THEY NEEDED FOR OUR LARGE FILE OPERATIONS. WE HAVE BECOME SO USED TO THE TYPICAL COMPUTER STORE TREATMENT (COME TO A CUSTOMER AND PLEASE TAKE YOUR PROBLEMS ELSEWHERE) THAT WHAT WE EXPERIENCED REGARDING PROBLEMS WITH THE HELIOS DESERVES TELLING. ALTHOUGH THE PROBLEMS HERE MINDED OUR DEALER AND OTHERS THAT WE CONTACTED DIDN'T UNDERSTAND THE HARDWARE OR THE SOFTWARE. I WAS RELUCTANT TO LET THEM DO "EXPLORATORY SURGERY," SO I CALLED PROC TECH. BOB GROPPO (THE HELIOS EXPERT) LISTENED TO MY STORY AND SINCE WE WERE TO BE IN THE AREA SUGGESTED WE BRING THE UNITS IN SO THAT THEY COULD EYE-TEST THEM RATHER THAN TRY TO DIAGNOSE BY PHONE. WE DID. HE DID. AND WHAT A SURPRISE! IN THE PLEASANT SURROUNDINGS OF THEIR NEW LOCATION WE FOUND OUTSTANDING COURTESY AND UNDERSTANDING. WHILE WE WENT ABOUT OUR BUSINESS THEY RAN THEIR TESTS. DID SOME MINOR ADJUSTMENTS. RAN THE UNITS ON THE EXERCISER FOR 18 HOURS. TWO DAYS LATER THEY DELIVERED THE UNITS ERROR FREE, REPAIRED FOR THE TRIP HOME, AND GAVE ME A DETAILED ACCOUNT OF WHAT HAD BEEN DONE. NO CHARGE BUT LOTS MORE OF THE CHEERFUL COURTESY AND ENCOURAGEMENT. WELL THAT'S IT, NOT THAT I FEEL THAT ALL PROC TECH PRODUCTS ARE PERFECT, BUT SINCE WE ARE ALL COMMITTED SOMEWHAT TO THEM I FEEL THAT COMPLEMENTS AS WELL AS PANICING IS DUE WHEN APPROPRIATE.

ABOUT THE DRIVER SIMPLY ASSEMBLE IT TO A BINARY FILE, RE-TYPE IT "D," AND IT'S READY TO COPY TO LOCATED IN THE SOLOS USER AREA. IT'S NOT THE CASE THAT THE DOS BUFFER CAN WRITE FOR DOUBLE WIDTH CHARACTERS TYPE **"** AT THE END OF A LINE. FOR TOP-OF-FORM IF ONE HAS IT, TYPE A "W" AS THE LAST LINE.

NOW WHO CAN HELP ME? I WOULD LIKE TO SEE WHAT SOMEONE ELSE HAS DONE ABOUT INCREASING THE COOLING ON THE BEAST. FIVE FULL SLOTS WITH THAT CONTROLLER IS GOING TO COOK THE WORK TO RUIN. AND THAT PATHETIC BACK-PLANE. THERE IS ROOM IN HELIOS, HAS ALSO DONE A LOT OF LATER. BUT IT ALL IS TRUE AND I HOPE HELPFUL.

SINCERELY,
EARTH DUHAN
LA HABRA, 5/11/78

I am writing to pose some questions about my SOL Terminal Computer using extended cassette Basic. If the answers are not immediately available from some obvious source, I would appreciate your printing these questions in hopes that some of the readers might have solutions:

1. Does anyone know of a software patch or some other means by which I may be able to acquire a double precision capability?
2. Is there any way I can make modifications to permit me to read and write in Tarbell format?
3. What adjustments are needed in order to use Tarbell at 800 bits per second?

Sincerely,
John W. Shortall III, NA Holiday, Florida, 33590

Some information on my Digital Group printer. (Ref Oct. SOLUS) After an exasperating time and much cursing, I finally gave up trying to get it to work with my SOL and turned the whine over to my 15 year old son. He promptly wrote the necessary software driver for printing both upper and lower case (as you can see by this letter) and is now working on a driver for bidirectional printing. Since, apparently, a few SOL owners have bought this printer or are thinking about it, a few comments are offered.

The print mechanism (manufactured by Practical Automation) is basically good. It's the interface by Digital Group which is the real kludger. I agree with Ken Yovino's appraisal that the board is a mess. It is full of unused holes, leftover connector pads and mysterious markings. It looks like something which was salvaged from a junk heap. The documentation provided by DG for assembly and checkout can be described in one word - terrible. For example, there were three correction sheets for wiring the power supply, none of which were dated as to which came first or last and - ALL THREE WERE WRONG!

SOLUS owners take heart. Once you overcome the obstacles thrown at you by DG the printer works well with the SOL. It doesn't quite make the 120 cpm claimed by DG (with an 80 column line spaced on an 8.5 in. page it's more like 80) but it's still the best full width printer available for the money. I had to add one IC to the circuit to take care of an annoying tendency for it to print two dots at the end of each line. I'll be glad to contribute a copy of my corrections and software to the SOLUS library for those who are interested.

QUESTION: I am using this with Michael Shriver's Electric Pencil. Could you provide a copy of the text or does tape can you use it to format for possible printing in SOLUS News? How about an ASCII text file?

THINGS I'VE DISCOVERED ABOUT THE SOL:

I can't jump from my Northstar DOS to PT software using the JP command without a crash. Anyone know why? If I use memory boards totalling more than 20 watts heat dissipation, the SOL fan can't hack it. The temperature rises inside the cabinet to the point where the memory goes flaky. Extra fans mounted on the back cover will take care of it.

NOTE TO PTC: Just about offering an optional cover with holes already cut and extra fans for us hard users. I hear that the Helios boards run hot too.

I'm looking for patches to the Extended Cassette Basic to be able to save and load programs on my Northstar disk.

I've seen your comments about the 16K RAM boards from Seattle Computer Products. I haven't tried them but I have tried the ones from Base 2 of Los Angeles. In my opinion they are good quality and work well in the SOL. They use the same chip (CRS 4844) and include such features as software protection, battery back up and power on clear. I've heard they will give a price discount on orders of 5 or more boards. Price: $380.00 each for the 256 ns version at the 5 quantity level. Order 16K52 from:

Base 2 Inc.
PO Box 9941
Marina Del Rey, CA. 90291

Sincerely,
JOMOGURI
1-72 Horinouchi
Yokohama, Japan 233
The new format for SOLUS NEWS is just fine, and the contents are improving with every issue. I think that SOLUS NEWS could be published every six or eight weeks, and still be valuable to SOLUS members. Maybe that would make it easier on you?

Is there anything new regarding those "rumors" from Processor Tech? I notice that they are no longer advertising their FORTRAN and FILOX software (I still don't have my FOCUSL!) I've written to PT several times, but outside of being thanked for my interest, I haven't been able to get a thing from them. They won't even send me their current price list!

Enclosed with this letter is a two-page description and listing of one of my recent efforts. I've been using PT's Extended Cassette BASIC for a while now, and I'm impressed with its power. However, this BASIC does not have one feature that is available on several lesser interpreters—the "statement trace", which displays the line number of each statement as it is executed. After wishing for such a feature for several programming sessions, I have finally spent some time going through BASIC to find an appropriate location to patch in a trace routine call. I succeeded, and the results of my efforts are presented in the stuff enclosed. Maybe other SOLUS members would be interested.

Thank you for your time and efforts spent on behalf of SOLUS.

Yours truly,
John Osadar

HELIO8 NOTES

Since my last letter, I have received my Helios system. The first item which comes to mind is that a marriage between SOLUS and Helios (Helios Users : membership) is clearly indicated. There is just too much potential for the hardware to have separate user groups. There can be separate people involved but only one publication.

My first reaction to Helios is favorable. It seems to be a very powerful system — if I ever get to understand it fully! My pre-ownership anticipation of bliss seems in comparison to my foorthref, however, just a bit disheartening. In fact, some operations seem slower than the RS. I know some are going to say that you can't enucleate the two systems but I don't agree. True, the RS is PDOS-based, but I don't think people can do as much as in the RS. I can't evaluate it against Helios but I would like to hear from someone who has. Is Helios really worth more than three times the price?

Some problems I've had with Helios I never had with my RS. After about a week of operation I suddenly started getting many read and write errors. It turned out to be dust or dirt on the heads. It seems the Fercel drive is rather intolerant in this regard and now I find I must clean the heads every few weeks which is not just a few minute job.

A bug in the system seems to be present when using disk BASIC. At times, when saving Basic programs, PDOS scans full protection on the file making it useless. In other words all the attributes are enabled making it impossible to read, write, kill or change the file in any way. It's just too bad, the disk taking up space for the security that if I send them the disk they will kill the files for me but they refused to tell me how to defeat the attribute protection. I consider this to be a serious handicap and one of the items I am eagerly waiting to read in Helios/Solus News.

Other goodies gleaned from my conversation with FTC:

The DI which appears in place of track number 19 when using the RECOVER command is not a bug. It's there to tell you that that is the file directory track and is recovered protected.

There is no way to format a blank disk under PDOS 1.4. The required procedure is to copy another formatted disk with the DISKCOPY command. This requires that you keep a spare pristine formatted disk on hand just for this purpose, a waste. I was told that PDOS 1.5 will have a format command when it appears.

The file RESIDENT which is on the system disk and has full attribute protection is not a leftover from system development but in fact PDOS. You cannot read it but the system can on bootstrap. Since PDOS is resident in RAM after bootup and can be examined with the Solos DUMP command, it is a mystery why FTC has read protected the file. Oh well!

The reason for no physical write protection capability on the disk was explained by noting that PDOS uses overlay techniques. In other words, the system is constantly reading and writing back and forth onto the disk during normal operation and a write protection tab would not permit this. (Unlike the RS, the disks in Helios are constantly turning during normal operation) I was assured that the software protection was entirely adequate to prevent inadvertent writing on the disk but within three days of this pronouncement I had a memory failure in the PDOS RAM area which caused the disk to garbage up two or three files before I could shut it off. My advice is to make backup copies of everything and in some cases backup the backups!

OTHER NOTES

I notice that the INTeger function in extended Basic does not work correctly for negative numbers. FTC notes that INT only truncates in their change notice but that doesn't fix the problem. Any help?

There are mistakes in the memory test programs given in the 16K RAM and the 32K RAM manuals. If you have the newly printed manual, the one with machine age typeface, then read on. The old ones are OK. In the 16K RAM manual, where it describes the long test, it says to load and execute the program at C900 but in fact, the program is shown assembled to run at zero. The 32K RAM mistake is more serious. If you faithfully type in the code for the long test as shown it won't work. The problem is that several pages are misplaced in the manual. When typing in the code, carefully note the addresses. You will notice that you must jump check a few pages then back up one or two. If you don't get lost in the process the program will work when executed. I was told that this was a printers layout error. Don't hold FTC responsible for everything!

I like the new newsletter layout. I sometimes have to get out my 10 power magnifier but I like the increased number of tidbits. Keep up the good work.

Sincerely,
Joe Murray
WHAT IS FORTH?

Forth is a unique threaded-tree language ideally suited for microcomputers. Some features:

(A) Extremely compact programs. E.g., the Forth system for microcomputers typically takes 5X bytes (of which 4X is written in Forth). This 5X is the complete operating system including floppy and other I/O drivers, the interactive Forth compiler, a text editor, virtual memory, plus an assembler (optionally used to optimize critical routines). And it all runs in the same 5X, with no overlays, swapping, or use of any other memory except for buffers and storage of source programs.

(B) All the convenience of interactive interpreters, but with execution overhead of 20 to 30 percent for 16-bit machines, 70 to 100 percent for micros (before any optimization in assembly).

(C) Structured, modular programming (there is no GOTO), user-defined variable types, exceptionally convenient debugging, and re-entrant object code suitable for FRNM.

(D) Software development times cut by half or much more over assembly language.

FORTH TODAY

We have found that where Forth is available it almost totally replaces assembly language for applications where assembly would have been used — and often replaces Fortran or other higher-level languages. Today Forth is in use at probably more than a hundred installations.

But most computer people have never heard of Forth. It is fairly new, and from 1970 to 1974 was available only through educational institutions. Since 1974 it has been available as a software product from Forth Inc. (Manhattan Beach, Ca.) for some machines. Currently it is also available through DECUS for the FDP-11 and FDP-10. Another factor delaying general use is that the system takes some getting accustomed to, because programming is very different from any other language.

We are starting the Forth Interest Group because we believe that this language is ready to take off in the industry, and will greatly increase the usefulness of small computers. The Forth Interest Group is non-profit and not connected with any vendor or other company. We share information on how to get access to Forth or implement it oneself, and we hold occasional seminars.

To get on our mailing list, send your name and address and preferably something about your interests or what you would like to do to

Forth Interest Group
787 Old County Road
San Carlos, Ca. 94070

JOB OPENINGS

TECHNICAL WRITER for data sheets and technical articles. Prefer someone actively involved with Sol or other small computer. Knowledge of both hardware and software. Additional duties in our Marketing Department will include copy editing for ACCESS, participation in trade shows, and development of user manuals. Job can be designed around your interests and abilities. Excellent salary. Contact Elizabeth Fairchild at (415) 829-2600. PROCESSOR TECHNOLOGY CORPORATION, 7100 Johnson Industrial Drive, Pleasanton, California 94566.

H & H is a search firm devoted solely to the location of individuals earning $20,000 or more in the areas of science and engineering. As an executive search organization, we are entirely employer retained. The opening we would like announced in your newsletter is as follows:

BS OR MS/EE - N. CALIF. LOCATION - MIN. 2 YRS. EXP. IN SOFTWARE SYSTEMS APPLICATION. MUST BE ABLE TO WORK WITH CIRCUITY DESIGN & INTERFACE W. SOFTWARE. SCIENTIFIC APPLICATIONS EXP. A PLUS. COMPANY WILL PAY RELOCATION. SALARY RANGE 20-30K. CONTACT M. GRAEBNER - HUMBERGER & HUMBERGER, 701 WELCH RD., SUITE 208, PALO ALTO, CALIFORNIA 94304 — (415) 327-5245.

COMPUTER ARTICLES WANTED

Popular Electronics
ONE PARK AVENUE, NEW YORK 10016 (212)725-1500 3564

STAFF:

FE is looking for articles — both construction and tutorial, from any of you guys out there in sunny CA.

Can you pass the word out to the SOL Users Group, Homebrew Club, Joe's Bar and Grill, etc.

Have interested writers contact me at above address; if they have a phone, they can call me at above number.

Payment is indecently high, fame is assured, movie contracts available, get to meet famous people, and we give green stamps.

cordially

Lee Colonon
LOCAL CHAPTERS

Atlanta, GA: George Reeves, 5002 Grove Drive, Smyrna, Ga, 30080
Tel: B 404/881-8800, Ext. 325; H 404/436-0718

Austin, TX: Ron Parsons, 9001 Laurel Grove Drive, Austin, TX, 78758
Tel:

Barstow, CA: James Buckstuhl, P.O. Box 1271, Barstow, CA, 92311
Tel:

Bellingham, WA: Seattle Computer Club, 2700 College Pkwy, Bellingham, WA, 98225

Chicago, IL: Thomas A. Digate, 1366 S. Finley Road, Apt. 3S, Lombard, IL, 60148

Dallas/Ft. Worth, TX: Ron Jones, P.O. Box T, Sherman, TX, 75090

Evansville, IN: Robert Heerdink, P.O. Box 3835, Evansville, IN, 47737

Gurnee, IL: Vic Wiseman, 7960 Grand Oaks Court, Gurnee, IL, 60031

Limerpool, CA: George Bush, 442 Fontonett Avenue, Livermore, CA, 94550

Montgomery, AL: Harold Drake, 759 Mulzer Blvd., Maxwell AFB, AL, 36113

Oakland, CA: Richard Deal, 6957 Sarcon, Oakland, CA, 94611
Tel: 415/339-1111

Oconomowoc, WI: Joe Szymason, Box 628, Oconomowoc, WI, 53066

Princeton, NJ: Rod Montgomery, 52 Birch Avenue, Princeton, NJ, 08540

Redding, CA: Darrel Rawlings, 3075 Churn Creek Road, Redding, CA, 96001

Sonoma County, CA: Earl Herr, 17 Spring Hill Drive, Cazadero, CA, 95421

Ottawa, Canada: Barrie Ridsdale, 31 Ivy Crescent, Ottawa, Ontario, Canada, K1M-1Y1

Saskatchewan, Canada: Bob Stek, Regina Mental Health Clinic, 1942 Hamilton St., Regina, Saskatchewan, Canada, S4W 0S7

San Francisco Peninsula: SOLUS, Box 23471, San Jose, Ca, 95153

Washington, D.C.: Jim Loogan, 6817 Melrose Drive, McLean, VA, 22101
Tel: 703/356-1068

Los Angeles Area: George Pond, 14919 S. Normandie Ave., Apt. 28, Gardena, Ca, 90247

Rochester, NY: Warren Harkness, 32 Larchwood Drive, Pittsford, NY, 14534

Tampa, Fl: H. J. Kelemen, 1901 Cattlemen Road, Sarasota, Fl, 33522
Tel: 813/371-2486

Tallahassee, Fl: Mitch McCann, Rt. 7, Box M.L.C., Tallahassee, Fl, 32301

New York: Stanley Weit, Computer Mart of N.Y., 113 Madison Avenue, New York, NY, 10016


Sacramento, CA: Dick Smith, 5519 Valhalla Dr., Carmichael, CA 95608.

TO JOIN A LOCAL CHAPTER, CONTACT THE CHAPTER’S COORDINATOR LISTED ABOVE. TO FORM YOUR OWN CHAPTER, CONTACT SOLUS AT OUR P.O. BOX AND GIVE US YOUR CHAPTER’S AREA AND YOUR CONTACT ADDRESS; PHONE NUMBER IS OPTIONAL.

PCNET NEWS
REPRINTED FROM HOMEBREW COMPUTER CLUB NEWSLETTER

PCNET News Dave Caukins

This is the first in what we hope (schedule and our queue length permitting) will be a regular series on the activities of The Personal Computer Network (PCNET) Committee. This first column is on Ward and Randy’s Community Bulletin Board System (WRCBBS).

The WRCBBS is an electronic mail type community bulletin board system. The system can be used by anyone with a 110 or 300 baud Bell 103A type modem equipped terminal or computer. Operation is simple — suppose Tom wants to send a message to Mary; he calls the WRCBBS (it operates unattended 24 hours/day) and as soon as the connection is established sends several carriage returns, which the system uses to figure out whether he is 110 or 300 baud. From this point on the system is self-teaching; even naive users should find it hard to get confused or in trouble. Tom invokes the functions he needs and types in his message to Mary, and then logs off. Some time later (which may be anywhere from minutes to weeks) Mary calls the system, reviews the list of messages, and retrieves the one from Tom. She can, if she wants, leave an answering message for Tom.

The WRCBBS was built from concept to operation in 30 days for $1500 (plus some donated equipment) by two CACHE and PCNET members, Ward Christensen and Randy Sues.

The system consists of the following equipment: An IMSAI 8080 with 24KB of static RAM, an INOVA 410 soft sectored floppy drive with a Tarbell controller, and a D.C. Hayes 80-103A modem. The WRCBBS has excellent human factors, comparing favorably with message systems like MSG and HERMES which run on PDP-10 size machines and are substantially more expensive.

The system commands are all single character. Experienced users can concatenate strings of them with the delimiter ‘;’ to eliminate unwanted ‘Help’ information. String searches can be made of the TO, FROM, SUBJECT and DATE fields of the message headers. There is a lot of other neat stuff.

The best way to get the flavor of the WRCBBS is to try it. The WRCBBS number is 312-528-7141; between 11 PM and 8 AM and on weekends the rate (from Mountain View) is $2.00 for the first 3 minutes and $.15 for each additional minute.

The PCNET Committee is actively working to set up one or more WRCBBS systems in the Bay Area; watch this space for more details.

Homebrew Computer Club NEWSLETTER
P.O. Box 626, Mountain View, CA 94042

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IMPORTANT ITEM

If you're like me, I'm sure you'll find this issue better than ever. The quality and quantity of Solus News has progressed far beyond my expectations and I want to thank all of our contributors who make this possible.

As editor, I've really been a one-man production staff, with professional help in the typing, printing, and mailing, but still a lot of work falls on my shoulders. The time has come when I can no longer devote as much time to the production of Solus News, but I still want to participate in the editing and management. Consequently, I will be contacting the people who have offered help in the past and who are in the San Francisco Bay area, to set up a newsletter committee. The committee will get together once every other month to put together the contributions, write news items, and produce the camera-ready copy.

I would like to see the scope of SOLUS expand so that we can foster special-interest groups, such as business data processing, medical/dental/health care, engineering, education, etc. I also would like to produce a periodic directory of Sol compatible products. Moreover, I would like some time to write several useful programs for our library and some tutorial articles.

If you would like to see Solus News remain viable and continue the excellent growth it has begun, please contact me to serve on our committee. If we have enough participants, the load on each of us will be easy. I'm sure you'll find the project rewarding since it gives you access to inside information, new products, and interesting people.

Please contact me at my address shown on the front page.
Remember, this is for a committee in the local San Francisco Bay area.

Thanks,

Stan Sokolow
SEPTEMBER MEETING TO FEATURE PTC SOL SOFTWARE

As we mentioned in the last issue, Processor Technology will send a representative to our next meeting to discuss the PTDOS operating system and other software topics. The meeting will be Sunday, September 17, at the usual place—the Varian Physics Building auditorium on the Stanford University campus, Palo Alto, CA. See the enclosed map for details.

If you can't attend but have some burning (or stinging) questions for PTC about their software, especially PTDOS please send them to me at my editorial address above. I'll do my best to get answers for you and publish them.

OOPS! LAST ISSUE HAD PRINTER'S GCOF;

I must apologize for the printing error in the last issue which forced the reader to turn the pages in a very unconventional way. The printer put a new man on our job and he didn't quite understand what I thought I said. Hopefully this issue will be more convenient.

SOLUS SOFTWARE DIRECTORY: CALL FOR LISTINGS

SOLUS News has undertaken the job of producing a directory of Sol/Ellos software. The following letter was sent to all PTC dealers and anyone else who produces software that I thought might have something to list in the directory. The directory will be sent to all SOLUS members at no charge as part of the newsletter. If you know of some nice piece of software that should be in the directory, let us know the name and address of the author or original distributor so we can send him a listing form. If you want to sell one of your programs, ask us for a form. The deadline for receipt of the forms is the end of September, so hustle.

NOMINATIONS ARE OPEN

SOLUS has been in operation for over 1 year now. The present officers have been active for more than that time, since they operated as the organizing committee as well. We feel the time has come for an election of new officers. The next issue will have a ballot. Nominations are now open for President, President-elect, Secretary, Treasurer, Librarian, and Editor. If you would like to serve in any of these capacities, let us know.

EDITORIAL: THE FUTURE OF SOLUS NEWS

As you may recall, the "Important Item" in the last SOLUS News issue was a call for volunteers in my vicinity to become members of an editorial board. I was contacted by one person, Bob McLean, whose heroism is appreciated by yours truly. Also the regular contributions of Ron Parsons and other authors have been invaluable. The assistance of Ben Milander, our treasurer, has been a continuing lifesaver.

However, the overwhelming amount of work still falls on my desk. The enthusiastic praise of our readers and the lack of volunteers forces me to make a compromise in my desire to keep SOLUS independent of the manufacturers. I plan to maintain editorial control, but turn over the nuts and bolts of producing the newsletter to the publications department of Processor Technology. I'll send them the manuscripts ready for typing or layout, and they'll take it from there. Bob Harsh, V.P. of PTC, has offered this assistance and has always been very willing to support SOLUS. I don't anticipate any problems with the new arrangement, although it does violate my principle of independence. I don't think there will be any effort to influence the content of the newsletter, in spite of the barbs we now and then hurl at PTC. Bob has expressed satisfaction with the operation of SOLUS and realizes that the criticism is often justified ("...we are our own worst enemy...").

I'm going to give the new arrangement a try, and if it doesn't work out we'll try something else.
INSTRUCTIONS FOR SOLUS DIRECTORY LISTINGS

1. PROGRAM NAME: Give the mnemonic name for the program or package.

2. CATEGORY: Select one or more from the following:
   If your program doesn't fit any of these categories, please make up one to suit your type of program.

3. DESCRIPTION: Briefly describe what your program does.

4. MINIMUM HARDWARE REQUIRED: Describe the smallest system on which your program will run without severely restricted capability. Give the bytes of RAM needed, making it clear whether this includes the operating system's RAM or not. Mention the peripherals needed, such as type of disk, a special terminal, etc. Mention the recommended amount of RAM if the program can be adapted by the user to take advantage of more RAM than the minimum. For example, PTC's Extended Disk BASIC needs 16K plus 4K or more for program space plus 12K for PDOS.

5. SOFTWARE REQUIRED: This refers to the operating system or programming language processor which the product also requires but which is not provided in the package being described.
   Common examples: SOLOS/CUTER, PTOS, CP/M, NORTHSTAR DOS, PTC EC/BASIC, PTC EDBASIC, PTC BASEC/5, PTC PILOT, etc.

6. RESTRICTIONS: Mention anything that isn't obvious.

7. DOCUMENTATION: What supporting documents are provided in the standard price? What documents are available for an additional amount?

8. MEDIA: On what recording media is the program available? Examples: Hollerith diskette, CP/M diskette, Northstar diskette, SOL/CUTS cassette, etc. We envision the SOL/CUTS cassette as the least common factor among all SOLUS members, so cassettes may be a convenient interchange medium, even if the software on them runs under a disk operating system. For example, standard CP/M (8") and mini-disk CP/M users can both read the cassette and copy the file to their disk.

9. CURRENT VERSION HAS RELEASED: This will alert present users of the product to see when an improved version is available.

10. WARRENTY: How many days will you allow for exchange of a defective copy of the software? For how many days will you repair program bugs or documentation errors? (*Repair* means providing machine readable patches to the program or replacement pages for the documents.) For how many days will you notify the buyer that the errors exist and how they may fix them? Example, "10 day exchange, 90 day repair/replace, 6 months' notification."

11. PRICE: Also mention any additional charges, such as postage, handling, or taxes. Credit cards?

12. ORDER FROM: Give mail-order address. Also mention if product is available through retail dealers.

13. REMARKS: Mention anything that hasn't been covered.

Remember that these forms will be reproduced as received, so be sure you make them camera-ready. Use clean dark type. Corrections made with opaque correction fluid (*"liquid-paper") will be invisible. Please confine your typing to the space provided.

See the example enclosed.

Thank you.
A Soft-sector Disk Controller for the Helios

By Ron Parsons

In the April 1978 issue of SOLOS NEWS, I outlined a method by which I use the Helios II disk drives with a Tarbell floppy disk controller board. The Tarbell board provides an interface between the S-100 bus and a variety of disk drives using soft-sector diskettes. Adding soft-sectored capability to the Helios opens access to the CP/M operating system from Digital Research and the software from the CP/M users' group. The U.C.S.D. Pascal system is also configured to run on soft-sector diskettes. And best of all, adding soft-sector capability requires absolutely no changes to the CP/M controller/formatter boards or the Helios disk drives.

The Tarbell board is designed to operate with a number of different types of disk drives by allowing the owner to customize the board with a number of jumpers. There are also four 10-pin prototyping sockets on the board for jumpers to each pin. The board has provision for two 50-pin ribbon cable connectors.

I wanted to be able to have both the Helios and Tarbell controllers in the system at the same time so I could exchange files between PDOS and CP/M (or Pascal) via memory. I also wanted to be able to switch between the Helios controller and the Tarbell controller under software control.

To do this I use two unused gates and two unused inverters on the Tarbell board to build an R-S flip-flop which drives a multiplexer consisting of 12 tri-state buffers. These buffers are installed in the four prototyping sockets. Short wire-wrap pins are placed in the lands next to the prototyping sockets, and jumper lands. All additional wiring is done on the component side of the board using the wire-wrap pins except for the R-S flip-flop where I use jumper wires on the back of the board.

A short 50-wire ribbon cable connects the drive connector on the Helios to the J2 on the Tarbell board. Signal lines from the Helios drive to the controllers go to both controllers at all times. The ten output signal lines from the Helios controller go to one set of inputs of the tri-state multiplexer buffers. The ten output signal lines from the Tarbell controller go to the inputs of the other set of tri-state multiplexer buffers. The output of these buffers are connected to each other in pairs and one buffer of each pair is enabled by the R-S flip-flop. The state of the flip-flop is set by unused outputs of U-56 on the Tarbell board. The Helios disk drive is connected to J1 on the Tarbell board.

The figure shows all necessary additional wiring and components. I added a 2.2k resistor to 5V on U28-10 since noise on bus line 5W (EKTOR) caused erratic operation of the interface with the bus line floating. The head-load timer was discussed in the June 1975 issue of SOLUS NEWS. Resistors R4, R5, and R12 are deleted because only one line from the disk for Index, track 0, and data is available. Gates U42, U61, and 74LS00s by 74LS00s as the high drive 7499s are not needed to drive the multiplexer. I also removed U18, U19, U23, and U37 and disabled the on-board bootstrap, putting the bootstrap in the SOLOS proms.

Only two lines from the Helios disk drive behave differently depending on whether soft- or hard-sector diskettes are used. As the PerSci drives in the Helios are configured, output line 8 is separated for index and line 20 is the separated sector when a hard-sector diskette is used. With a soft-sector diskette, the index pulse is on line 20 and no signal is on line 8.

The Tarbell or Helios controller is selected by sending certain binary data to the Tarbell command port (X8 or X4 hex). A boot command for SOLOS is shown in the listing. The boot allows the user to select either PDOS or a soft-sector system (in my case, CP/M or Pascal) with the commands 'BOOT PDOS' or 'BOOT CP/M' respectively. The binary data sent to the Tarbell command port has the following meanings:

<table>
<thead>
<tr>
<th>Data</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Negative pulse at E22</td>
</tr>
<tr>
<td>0001</td>
<td>Negative pulse at E21 (fast seek) (see below) Set high on POC</td>
</tr>
<tr>
<td>0100</td>
<td>Selects Tarbell controller</td>
</tr>
<tr>
<td>1000</td>
<td>Selects Helios controller</td>
</tr>
</tbody>
</table>

Explanations:

- x don't care
- a high - enables DRQ/INTRQ interrupt
- b low - enables seek complete interrupt
- c high - nothing
- d low - slow restore to track 0
- e high - selects drive 1
- f low - selects drive 2
- g high - selects disk 0
- h low - selects disk 1

The Tarbell jumpers I used were:

- R3 R4
- R7 R8
- R11 R12
- E46 E48 connect XRDO
- E1 E13 direction select
- E11 pull up
- E10 pull up
- E7 E14 fast seek pulse
- E29 E31 on-board drive mux
- E37 E38 restore
- E40 pull up
- E41 pull up
- E30 E38 ground E38
- E44 ready
- E58 E55 disk select
- E51 E53 (or use head-load timer)

This same multiplexer technique can be used with slight modifications with other hard-sector controllers. These revisions were made on Tarbell model 1011A and on Helios controller Rev. B.
You want it when?!

<table>
<thead>
<tr>
<th>Item</th>
<th>Shipment Begins</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSM, Advanced 8080 Assembler</td>
<td>week of August 7th</td>
<td>moved back one week</td>
</tr>
<tr>
<td>8080 Chess Cassette</td>
<td>week of August 14th</td>
<td>moved back two weeks</td>
</tr>
<tr>
<td>Gamepac 2</td>
<td>week of August 14th</td>
<td>on schedule</td>
</tr>
<tr>
<td>Debug, Advanced 8080 Debugger</td>
<td>week of September 4th</td>
<td>on schedule</td>
</tr>
</tbody>
</table>

NOTE: Math Pack Video Calculator has been cancelled as a product. In a recent marketing session, the consensus was that our Extended BASIC offers far more to the user than the Math Pack program. Please advise customers who have asked for this software of this cancellation.

New extended BASIC option

A recent letter to all Processor Technology dealers announced the new family of BASIC's. Included is an option which converts any Extended BASIC disk (currently 8-digit precision) to 6, 10, 12, 14 or 16 digits of precision. This option is available to all authorized Processor Technology dealers.

Dealers can customize the level of precision at the time of sale or retroactively for Sol users who would now like the advantages of greater precision, particularly for accounting applications.

Programs written in the original version of Extended BASIC will be fully compatible after the conversion.

HyType manual correction

Please make the following correction in your Hytype II manual, Section 5, page 5-2, Table 5-2, "U13 Decoder Truth Table."

Reverse the headings of column 5, "Paper S" and column 6, "Carriage S." The table should read:

Table 5-2. U13 Decoder Truth Table

<table>
<thead>
<tr>
<th>ISSUE'S</th>
<th>POD4</th>
<th>POD5</th>
<th>RESTORE</th>
<th>CARRIAGE'S</th>
<th>PAPER'S</th>
<th>CHAR'S</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>1</td>
<td>1</td>
<td>active</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>2</td>
<td>---</td>
<td>active</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>3</td>
<td>---</td>
<td>---</td>
<td>active</td>
<td>active</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>4</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Press release from P.T. to dealers

New SOLOS/CUTER Manual Benefits All SOL Users

A greatly expanded second edition of the SOLOS/CUTER manual is now being shipped with all SOLs.

After looking it over I'm sure you'll agree with us that all SOL users, old and new, will benefit from the useful additional information contained in this new edition. Therefore, we encourage you to notify your customers of the availability of the new manual.

These manuals are available for immediate shipment. The suggested retail price is $5.00.

The new issue of ACCAT will also carry an article on the new edition. Manuals will be available for end-user purchase directly from the factory for $5.00. We will, however, make it clear that these manuals are also available through the local dealers.

Key Changes in the Manual:

1. All command descriptions are expanded and clarified.
2. Procedures for the use of the cassette recorder controls are now integrated with the command procedures.
3. The use of typesetting allows for easier reading. Quicker reference also is possible because of a special "monospace" typeface which is used to denote all dialogue with SOLOR.

Several important new sections have been added:
1. Section 1.6. Deals with enterline commands. Describes various functions in SOLOS and how they may be edited and used.
2. Section 5, System Interfacing. Instructs the user on how to call SOLOR sub-routines from other programs.
4. Appendix II. Contains a complete chart of ASCII Codes.

Stan:

Below you will find my "publishable" address and phone number. I'd like to form a "Valley Forge" Chapter as opposed to the "Philadelphia" Chapter mentioned in your note. Also, if you get any inquiries from anyone else in my area (suburban Philadelphia), I would appreciate it if you would put them in contact with me so we can get things "rolling" on this end.
Thanks.

Stan H. Blank
202 Ross Road
King of Prussia, PA 19406
(215) 265-0828
Digital Research once more congratulates the CP/M User's Group on doing an excellent job of collecting and distributing contributed software. They presently have 24 volumes (diskettes) of programs, which are available for $8.00 each (this includes the cost of the diskette and the shipping). To get on their mailing list, send $4.00 to:

CP/M Users Group
164 West 83rd St.
New York, NY 10024

The CP/M User's Group also distributes Microsoft FORTRAN-88 and BASIC at discounted prices.

Software Support Representative

Digital Research has a full-time software support representative, John Pierce, available to answer telephone calls regarding Digital Research software. You may call him at (408)-649-3896 if you have technical questions or need assistance with Digital Research software.

Two New Printer Interfaces Announced

Two new printer interfaces for the Sol Computer have been announced by Processor Technology Corporation. Both increase the hard copy capability of the Sol Computer.

Sol Hytype I mounts inside any Diablo Series 1200 Printer connecting it directly to the back of the Sol. Similarly, the Sol Hytype II Printer Interface works with the Diablo Series 1200 Printer. The installation package includes the fully assembled, tested and burned-in printed circuit board, software, all cables and mounting hardware. No modification to the Sol is necessary. No holes need be drilled in the printer. The printer can be restored to its original condition if required.

Hytype driver software is included on CUTS cassette along with a source listing. The user may modify the driver software to suit a particular application. Suggested retail price for both the Hytype I and Hytype II is $150. Delivery is stock to 30 days.

For more information, see your Sol dealer, or if more convenient, address Processor Technology Corporation, 7100 Johnson Industrial Drive, Pleasanton CA 94566. (415) 829-2600.

Diablo and Hytype are TMs of the Xerox Corporation.

Solos News

July 17, 1978

I'm not too sure how it works, but an article on how "CP:" is utilized (memory map) would be nice. Also there are common entry points to be used by "CP:" and UCSD Pascal, couldn't Processor Tech modify their non-standard system? Perhaps Pascal will just replace both.

Tom Wilson
APO San Francisco

DSAT: A Descriptive Statistics Program

by Stan Sokolow

Here's a simple program to compute some basic statistics on a list of numbers. It's written in PTC Extended Disk Basic. (I assume it will run on Extended Cassette Basic too, with the possible exception of the error trapping commands in lines 65 and 71).

DSAT: DESCRIPTIVE STATISTICS

10 LET S=0: LET N=0
20 LET S=S+0
30 PRINT "DESCRIPTIVE STATISTICS: ENTER A LIST OF NUMBERS,"
35 PRINT "ONE NUMBER PER LINE,"
40 PRINT "ENTER 'END' AT END OF DATA"
50 INPUT Y
59 IF Y="END" THEN GOTO 200
60 ERASE 900
70 LET X=VAL(Y)
71 ERASE
75 IF N=0 THEN LET L=X: LET L=X
80 LET S=S+X
90 LET S=S+X*X
100 LET N=N+1
110 IF X>U THEN LET L=X
120 IF X<L THEN LET L=X
199 GOTO 50
200 IF N=0 THEN END
205 PRINT "COUNT=",N
210 PRINT "MEAN=",S/N
220 PRINT "SUM OF SQUARES=",S
225 IF N=1 THEN GOTO 250
230 LET V=(S2-(S/S/N))/(N-1)
240 PRINT "VARIANCE=",V
250 PRINT "STD. DEVIATION=",SQR(V)
260 PRINT "MINIMUM=",L
270 PRINT "MAXIMUM=",U
280 END
900 PRINT "INPUT ERROR. TRY AGAIN"
910 GOTO 50
8/1/78

SOLUS NEWS
San Jose, California 95153

Dear Editor:

I was lucky enough to get one of the first copies of Cassette PILOT to arrive in Atlanta. I would like to begin my comments by saying that PILOT did an outstanding job on this program. (They should have -- it took them long enough.)

The file-handling and editing capabilities are particularly good. In looking over the PILOT program, I noticed a few interesting things I wanted to pass on to our members.

First, a funny thing happened to me the first time I used the EDITOR -- I couldn't get out of the EDITOR and back to PILOT. I was running on an Altair using CUIEA in ROM. The SOL "MODE" key causes an editor exit, but I don't have a mode key and shift-y had no effect. To make a long story short, other CUIEA users can fix this problem by making these changes:

```plaintext
>EN 1841 (cr)
;#66 66 66 66 (cr)
>EN 1846 (cr)
;#66 / (cr)
```

(This is the character recognized to exit)

Another problem I found was the lack of a backslash key (\). This is needed to return to the restart point from a PILOT program. A little searching revealed that the character used to accomplish this is stored at 1642H. I changed this to \ (\047), but other characters could be used as well.

I noticed that memory locations 9-14FH are used only for the stack. Since I sometimes like to use a hardware reset to get back into the program, I entered a jump to PILOT restart at 9-14FH. This is just a quick timesaver.

Finally, I noticed something very interesting. PILOT itself does not have any particular provisions for handling immediate commands, so the crafty folks at PILOT wrote a short program in PILOT language to accept keyboard input and branch to the proper routine. You can examine this program, which begins at location 13DAH, using the SOLUS/CUER dump command, or an ASCII dump routine if you have one. The benefit of knowing this is that you can alter the commands accepted in the immediate mode. For instance, you can cause R to be accepted in place of RUN, & lot edit, etc. As of now, you have to enter the changes in hex through SOLUS/CUMA, but I bet someone out there can figure out just how to load a command module. We also need to know how and where PILOT stores the beginning-of-user-text pointer so that we can make it longer as well as shorter. Let's hear from you out there.

PILOT has a checksum routine, so its best to create your new program this way: Load PILOT, execute at 100 to deactivate the checksum routine, exit PILOT with the BYE command, make your changes by SOLUS/CUER, then save U-1FFF.

Another possible suggestion: You might want to change the immediate mode handler for custom versions of PILOT which are preloaded with programs for students. By eliminating some commands, you can make these special versions tool-resistant. (Nothing is foolproof, since fools are so ingenious) Here is an example:

```plaintext
$F 1:
T: THIS PROGRAM TEACHES ABOUT AREAS AND VOLUMES
T:
T: TYPE 'RUN' TO BEGIN
T: TYPE 'LIST' TO VIEW THE PROGRAM ITSELF
T: TYPE 'END' WHEN YOU ARE THROUGH
T:
A:
M: RUN
I: EFP
I: LIST
I: LISTS
M: EDIT
I: END
M:
M: EDIT
I: DON'T UNDERSTAND YOU. READ THE DIRECTIONS AGAIN.
FV: IN:
J:
```

Here are a few things I think we all could use: Someone or some company who would accept CUTS - format tapes and use them to program 2708 or 2716 ROMS. A set of several utility programs which could be loaded into SOLUS/CUER or custom commands to test memory, move blocks of memory, relocate programs, etc. And, how about some PILOT programs.

Best regards,

Lewis Moseley, Jr.
2314 Glenwood Court NE
Conyers, Georgia 30017
Dear Editor:

Since writing last, I have figured a way to use the SOLFOR editor to edit the SOLFOR Immediate Handler. The only thing, however, is that the function buttons are not working. There is usually a better way to use the editor than this, but it is a great convenience. It is probably a better way to use the editor than this, but it is a great convenience.

Some way est you would want to change the handler. First, because it's there! Also, some useful improvements can be made. In addition to allowing single character Immediate commands (x for TUX, L, S, etc.), you might want to add new statements. Now, if you enter an invalid Immediate command, you might not know it. But, if you add these statements at the end of the handler, after the @PES; and before the @H; there will be no doubt:

TIME: MATT
FROWN:

Anyway, here's how to do it:

`>SOL FOR (cr)  by SOL FOR/CER
>SX 100 (cr)  To disable checksum
>SY 100 (cr)  To exit SOLFOR
>SX 101 (cr)  PILR's begin-of-proc-buffer address
>SS 10Y (cr)  Set to start of imm-mode-hdlr
>SX 10Y (cr)  PILR restart (INVARIM = 30 NOT SX 100)
>SX 10Y (cr)  (Now, make any changes using the SOLFOR commands. Notice the label above that point, see the note below. Scan the handler with CTRL-L and CTRL-C to check your work.)

Go a HARDWARE RESET to SOLOR/CER. IMPORTANT DO NOT attempt to exit the editor with the (EOF) key.

Use SOLOR/CER DUMP or an ASCII dump to locate the end of the modified handler. It will end with several (cr)'s (0DH), followed by a (01H). Note the address of the second 0DH.

IF YOU MOVED THE %. Also note the address of the new location of the %.

>SX 10Y (cr)
(Here, enter the new ending address you noted above, low-order byte first) / (cr)

IF YOU MOVED THE %, do the following two steps:

>SS 427 (cr)
(Here, enter the new address of the %, low-order-byte first) / (cr)

>SA 100 (cr)
SY 100 (cr)
SAVILUF (ADDR)

WHAT AN EFFORT but, it works.

Lewis Moseley, Jr.
Conyers, GA

Microtopia Corporation
7559 Deering Avenue
Canoga Park, California 91304

Gentlemen:

I am one of a large and constantly growing group of users of Processor Technology's SOL computer (and of other 6800 computers using FTGCS's video and tape boards and CUREX software). Although the SOL units are quite powerful, as tape based computers go, we still have a need for a compatible disc unit. Few of us can afford $2000 for a SOL Helios, but many can afford a smaller amount for a Mini-Disc.

At the present time, your disc units and those sold by North Star appear to be the principal Mini-Disc units. Judging from magazine articles and ads, it seems to have a considerable lead, which is somewhat surprising to me. Your DOS and BASIC both seem to be better than North Star's, your discs hold twice as much, and your price is less.

I have a suggestion which may help you to gain an edge on their. In addition to hardware compatibility, SOL users need a few special touches in software for a product to have maximum utility. Assuming you have, or have available, the source code for your software, it should take only a few man-hours to prepare versions of your DOS and BASIC "customized" for SOLOR/CER and users. The following is an outline of the special features. If you are interested, other SOL users and I can provide details.

INPUT-OUTPUT

SOLOR provides standard routines for input and output. Four different routines are available for input and four for output, but there is a common subroutine entry point for each group of four. Your software should do input and output by calls to these entry points.

EXTRA COMMANDS

The following commands should be available from DOS, as Immediate BASIC commands, and as BASIC program statements. They set various parameters used by I-O by SOLOR. Each involves storing a single byte of data in the SOLOR RAM area.

SIR = stores a byte, with a value between 0 and 3, which selects which of the four input routines will be used.

2514 Glendale Ct.
Conyers, Georgia 30097
August 5, 1978
161) J = as above, but for output
162) S = sets the number of nulls to follow a (cr)
163) \( \text{FF} \) sets the speed of the video display, between 0 and FF, with 0 the fastest

**FAP3 BACKUP**

CLOAD and CLOAD should be available as BASIC commands to allow backup copies on tape of programs created under BASIC. These can rely on block save and block load routines in SOLOS. BASIC would only have to build or read a tape header block in SOLOS, and appropriately set its own internal pointers. The header contains file name, load address, block size, and file type byte. It would also be nice to have tape backup of editor-assembler files.

**203 ADDRESS**

SOLOS and the VMS display use the 4K block between 0000 and 3FFF. Most PC20 programs (games, etc) load at A, so the area from 4-3FFF (minimum) should be avoided. Ideally, the user should be able to select the 300 address at load time, but an area in non-reserved, say 3000 - 3FFF could be used. Longer term, you could probably arrange to put 4K on your controller board. The above applies to your resident and 3000 video-BASIC and the utility programs can load at A.

A customized product like this would greatly benefit SOL users, and would give you a competitive advantage in selling to them. If you are interested, let me know and I will try to provide you with more details.

sincerely,

Lewis Moseley, Jr.

---

August 8, 1978
2040

Lewis Moseley, Jr.
2514 Glendale Ct.
Conyers, Georgia 30097

Dear Mr. Moseley:

Thank you for your letter of August 5th and your positive comments about our floppy disk systems. We presently offer our software with an internal configurator for the Processor Technology SOL-20 microcomputer system. All I/O is directed to the SOL-20 monitor and many of your suggested alterations are possible with minor changes to these drivers.

We also offer reassembled versions of our software located at 2000H and 4000H. These packages would allow the SOL-20 user to execute existing application software while utilizing the Micropolis disk systems.

I have submitted your letter to Software Engineering and would like to again thank you for your suggestions.

Sincerely,

James R. Molenda
Product Support Specialist

cc -- B. Roffman

---

Micropolis Corporation
1509 Darwin Avenue
Canoga Park, California 91304
(213) 703-1121
Mr. James Molenda  
Micropolis Corporation  
7999 Deering Avenue  
Canoga Park, CA 91304

Dear Mr. Molenda:

Thank you for your prompt reply to my recent letter regarding customizing your hardware/software product for SOLUS/CINTER users. In these days of horror stories about vendor neglect, it is good to hear from a company which seems to care!

In considering my suggestions, please keep two things in mind: 1) Your company has the source code, and therefore can make the changes with (relatively) small effort. 2) You only have to do it once, and many users can benefit from your effort. Otherwise, many people have to repeat the same effort, and they still end up with a butchered product.

One last suggestion (and one which will probably greatly upset your men who keep the keys to the software locker): Make a copy of your source code on disc available to our user's group (SOLUS, P.O. Box 2347, San Jose, CA 95133), with suitable agreements to protect your product, and allow the group to make the necessary source modifications. The resulting software could then be distributed either by the group for use on your hardware, or returned to you so that you could provide it.

Again, with source code it's easy; without it's a real job.

Thanks again for your consideration.

Best regards,

Lewis Mosesley, Jr.
August, 1978

OPEN LETTER TO SOLUS MEMBERS

One of the principle benefits of an organization such as ours is the ability to exert mass pressure on vendors, etc., to obtain favorable treatment. Enclosed are copies of letters I exchanged with the Micropolis Corporation, in which I explained in brief the special software features which would benefit our members. Their reply seems encouraging, even though they made no commitment. If everyone reading this would also write to them in support of my proposal, they might well agree to provide us with this useful hardware/software combination.

If this works out, we might well consider running a LETTER-of-the-MONTH to other vendors to request their support. We might even write a few to good ol' FTCO. about their refusal to provide source code any longer.

Best regards,

Lewis Mosesley, Jr.
Conyers, Ga.

May 22, 1978

I have a Cromexco "Bytesaver" and would like to put last 6K of ALS-8 from cassette tape in PROM in the Bytesaver. This would leave the 4K RAM containing the system symbol table, IGDR, host command table, and DP-80 stuff to load from cassette tape. I have been unable to get ALS-8 to run in this manner. Is there any modifications required to ALS-8 to do this?

Regards,

Charles C. Josey  
210 Lewis Street  
Montgomery, Ga. 31063

Dear Stan:

Greetings from Colorado! I really enjoyed the last issue, lots of good letters and reviews. Here is my contribution for the next issue.

Has anyone out there in SOLUS land patched the FTC Ext. Cassette Basic to North Star DOS in order to save files on disk? How about it someone - (Gordon French are you listening)?

The N.S. DOS will not function properly with the S.D. Computer Products "Expandoram" Dynamic memory board, if it is addressed at 38880H. However, it can be addressed at a higher location, say where BASIC runs without any problems. It also runs super cool with 16K filled. It is well worth the initial $151.00 in my estimation. A full review is in the works.

The Denver Amateur Computer Society (DACS) is off to a new start with a mini show being planned for November.

Also, the Denver SOLUS Chapter has been formed. If interested, see my "open Letter" elsewhere in this issue.

Time to go, Stan. I would really like to see this published once a month if possible.

Very truly yours,

Rick Downs
RE: SOLUS CHAPTER

Dear Denver Area SOL Users:

Another SOLUS Chapter has been formed! This is the first one in the Denver area that we know of.

At present only one meeting has been held with future meetings being planned. If you are interested in participating in this SOLUS Chapter, we would like to hear from you.

Please feel free to contact me at the phone numbers or address listed below.

We would like to hear from everyone interested in the Denver area. You do not have to own a SOL Computer to join.

Sincerely,

Rick
R. Downs, Jr.
Chapter Coordinator

9995 E. Harvard Avenue
Denver, CO 80231
(303) 758-7283 (Home)
(303) 758-1122 (Ext. 3768) (Office)

July 12, 1978

Stan Sokolow, Editor
SOLUS News
1690 Woodside Rd., #219
Redwood City, CA 94061

Dear Stan:

Excuse me for bothering you again, but I haven't heard from SOLUS since the April issue of SOLUS News. Have you been busy, or have you lost/forgotten me? I saw the notice in the April issue that those who haven't paid their $10 down won't receive any more issues, but I paid mine, in the same envelope with the letter you printed in April on page 24 (it even says so in the letter!) if it's just a matter of being busy, I understand perfectly--I haven't even had time to turn on my SOL for about two weeks now. Thanks for your time, and hope to be hearing from you and SOLUS soon.

One more thing: does anybody have any information or experiences with regard to the Dynabyte 32K static memory board and a SOL system? I would like to see something about this if anyone has tried this combination.

Sincerely,

John Osadar

July 12, 1978

2140 Jackson Drive
Bremerton, WA 98310
30 July 1978

Dear Stan,

I was surprised to have my letters to you featured in SOLUS News. That is what happens when you write to an editor. Some of my comments were somewhat harsh, but deserved, and they apply as well to the Bay Area (the Fountainhead) which I visited last March.

But I am smarter now, and this is for publication, in 82-character (12/inch) format...same as 65 @ 10/inch.

First of all, I am writing this letter on a little cheap text editor that I built for SOL users. It does a nice job making letters look nice, and has tabulators and things like that, and I am going to sell it for $35 with tape/disk and documentation supplied. I am sending you a complimentary copy for review (editors really make out..like critics). But it has really helped me type letters that look good, and I won't use a typewriter anymore.

ITEM: I did relocate my 8k boot - to 2000. My original idea to put both the boot and DOS in the same 4K was defeated when I realized that the DOS needs 2.5K above it for things like initializing disks, etc., and changing all the other stuff, like the W Basic, would be a bother.

So my DOS is still at 800, and other programs still start at 2000. But now that the boot is tucked under SOLUS, I have the top 12k for ALGOL, and that is one neat assembler. It is so good, that I will offer to assemble this text editor to any location free to those who refer to this letter in SOLUS (even stop doing business!)

ITEM: I bought a Seattle Computer Products board and double-addressed it according to the directions given by Rod Brack in his article in the 4/78 issue of SOLUS. It has worked like a charm, and is the thing to do for all SOL/8k users. It is too late to buy it at the $325 price, but even at $375 it is a whole lot of a bargain. I am still having trouble with a 16K RAM board that ProceTec wired all over the place and still uploads my program occasionally. The Seattle board that the Retail Computer Store lent me worked fine, and I'm sorry to have my more expensive 16K RAM back.

ITEM: I have finally ripped off my cover, placed a small fan behind the works, and that way keep from overheating. Eventually I will buy a little whisper fan to put in the back panel. I think better if ProceTec would not act as though there weren't any problem at all. My letter to them was published in the last issue of SOLUS, and I wish I had saved their reply: it was written by a secretary who said that the engineer (had told her) that I should check my power supply because I might need a bucking transformer. I have never before dealt with a company that advertised its products for commercial use (ProceTec does...in Interface Age, at least) where I had to deal with second-hand word-of-mouth correspondence. I hope that company shapes up, because the SOL is too good a machine to be let die because of idiot management. These people have to realize that they, and many like them, are out of the high-speed shop era, and they will be expected to perform and compete with the biggies... As important as intelligence and invention are, they won't cover the lack of sense in the front office.

Enough of my and my soapbox. Along with my little editor, I am sending for publication, a copy of my program "HANGPERSON" in W Basic. It is fun and harmless, and non-sexist, too.

Meanwhile, best wishes to you all. I cannot take time to start a Seattle Branch club, but anyone who wants to can give me a call at (206) 479-3553.

Best wishes,

[Signed]
10 REM PROGRAM NAME: HANGPERSON
20 REM FUNCTION: Provides skill-testing game for two
30 REM players, along the lines of "Hangman"
40 REM
50 REM WRITTEN IN NORTH STAR BASIC
60 REM
70 REM 80 PRINT CHR$(11)
80 PRINT TAB(25), "HANGPERSON"
90 PRINT TAB(25), "For two players ----"
100 PRINT TAB(50), "COPYRIGHT 1978"
110 PRINT TAB(44), "Charles W. Bollinger"
120 PRINT PRINT
130 PRINT
140 DIM W$(15),A$(15),X$(15),Y$(15),C$(15)
150 REM
160 DIM W$(15),A$(15),X$(15),Y$(15),C$(15)
170 REM RESTART HERE
180 PRINT "First player input word of 15 letters or less"
190 PRINT "(Screen will blank when carriage return is pushed)"
200 PRINT
210 C$="*"$**"$C$"
220 INPUT W$(15)
230 PRINT CHR$(11)
240 FOR X=1 TO LEN (W$(15))
250 A$(X)=""
260 NEXT
270 PRINT A$(15)
280 REM "AGAIN" IS HERE!
290 INPUT "Give a letter: ",L$
300 F$="C"
310 FOR X=1 TO LEN (W$(15))
320 IF L$=A$(X) THEN GO TO 430
330 IF L$=" basically THEN 350
340 A$(X)=L$&"X"
350 NEXT
360 G$=""
370 FOR X=1 TO LEN(A$(15))
380 IF A$(X)="X" THEN 460
390 G$=G$&L$
400 NEXT
410 IF G$=" THEN 700
420 GOTO 440
430 PRINT "You have used that, try again\GOTO 290"
440 IF F$=" THEN 480
450 PRINT C$(15)=""
460 L=LEN(M$)+1
470 GOTO 590,599,600,601,620,630,640,650,660,670
480 REM THIS IS "RITE!"
490 PRINT "GOOD!",A$&"PRINT"
500 INPUT "Do you know the word? ",Y$
510 PRINT PRINT
520 IF Y$=" THEN 290
530 PRINT
540 INPUT "What is the word?",E$
550 IF E$=" THEN 700
560 PRINT "Sorry, that's not it."
570 GOTO 290
580 IF C$="NO\GOTO 850"
590 IF C$="NO\GOTO 850"
600 IF C$="NO\GOTO 850"
610 IF C$="NO\GOTO 850"
620 IF C$="NO\GOTO 850"
630 IF C$="NO\GOTO 850"
640 IF C$="NO\GOTO 850"
650 IF C$="NO\GOTO 850"
660 IF C$="NO\GOTO 850"
670 IF C$="NO\GOTO 850"
680 PRINT CHR$(11)
690 FOR Y$=TO 0
700 PRINT TAB(28),H$
710 NEXT
720 F=F+1 IF F$<15 THEN 720 ELSE 730
730 PRINT PRINT PRINT
740 PRINT "The word was ",W$PRINT
750 A$=""
760 INPUT "Do you want to try again? ",Y$
770 IF Y$=" THEN 170 ELSE 920
780 IF L$=" THEN 800
790 IF L$=" THEN 800
800 IF L$=" THEN 800
810 IF L$=" THEN 800
820 IF L$=" THEN 800
830 IF L$=" THEN 800
840 GOTO 890
850 PRINT CHR$(11)
860 PRINT "Now that's not in there",TAB(45),H$
870 IF C$="NO\GOTO 890"
880 PRINT PRINT PRINT
890 REM THIS IS "REVEAL"
900 PRINT PRINT
910 GOTO 720
920 GOTO 720
930 PRINT
940 PRINT "Thank you......so long!"
950 END
DEAR SOLOS:

I HAVE HAD MY SOL-20 FOR ABOUT A YEAR NOW. DURING THIS TIME IT HAS GIVEN ME VERY GOOD SERVICE. BESIDES A SUPERSCOPE C-104 CASSETTE RECORDER (ON WHICH I FIND MAXELL UD WORKS VERY WELL), A SANYO VM 4092 9" MONITOR, AND A LA-36 DECWRITER; I HAVE A SPACEBYTE 16K STATIC MEMORY BOARD INSTALLED. I FOUND A PATTERN SENSITIVE SMS-404 CHIP ON THE SPACEBYTE BOARD. IT HAS BEEN REPLACED, AND NOW STORAGE IS SOLID AS A ROCK. ONCE I BLEW A SET OF 8797 BUS DRIVERS BECAUSE THE SPACEBYTE BOARD DID NOT SEAT FAR ENOUGH INTO THE BACKPLANE SOCKET TO BE SELF-ALIGNING. THE MALE EDGE CONNECTOR WAS ABOUT 1/8" SHORTER THAN MANY OTHER 8-100 TYPE BOARDS. I FILED THE FILLETS OUT OF THE CORNERS WHERE THE BODY OF THE BOARD MEETS THE EDGE CONNECTOR AND NOW THE BOARD SEATS VERY WELL.

TROUBLE WAS ENCOUNTERED WHEN THE LA-36 WAS TIED TO THE SOL-20 SERIAL INTERFACE. THE PLUG ON THE DECWRITER MUST BE CHANGED AND THERE IS NO WIRING INFORMATION IN THE LA-36/35 USER MANUAL. PHONE CALLS WERE MADE TO THE DISTRIBUTOR AND THE BYTE SHOP OF LAW ENABE (WHERE I BOUGHT MY SOL-20). EACH GAVE A DIFFERENT FUNCTION FOR THE FOUR COLOR CODED WIRES, IT TURNED OUT THAT THE BYTE SHOP WAS RIGHT!! EVEN THEN THE INPUT CHANNEL DID NOT FUNCTION ALTHOUGH THE OUTPUT TO THE PRINTER WAS FLAWLESS AT 300 BAUD. SOME CONSIDERABLE TIME LATER THE PROBLEM WAS TRACED TO THE VALUE OF R29 (10K). THIS IS TO HIGH TO SUPPLY THE INPUT CURRENT REQUIREMENTS OF THE 1489A USED AS USB. BY THE PINOUTS FOR THE 1489A ON PAGE AV-1 (APPENDIX V) ARE ALL WRONG. THE SCHEMATIC PINOUTS ARE CORRECT. HOWEVER, R29 MUST BE LOWERED ENOUGH TO PULL THE VOLTAGE DURING A SPACE ABOVE THE R-232 POSITIVE THRESHOLD OF APPROX. +3.0V. I FOUND THE EASIEST WAY TO DO THIS WITHOUT CHANGING THE LOAD AS SEEN BY A R-232 DEVICE CONNECTED TO THE SERIAL CHANNEL WITH THE LA-36 DISCONNECTED WAS TO WIRE A 3.3K 1/8W RESISTOR BETWEEN PIN 20 AND PIN 3 OF THE MALE PLUG CONNECTING THE DECWRITER TO J-1. TO SUMMARIZE THE P-1 CONNECTIONS FROM A LA-36 DECWRITER THE FOLLOWING ARE NEEDED:

| L | WHITE | KB NEG. | 12 | 5 |
| A | BLACK | KB POS. | 10 | 1 |
| | CURRENT | PRINT POS. | 11 | L |
| | | PRINT NEG. | 7 | 7 |
| 5 | JUMPER | 23 | 2 |
| | JUMPER | 13 | 0 |
| | [3.3K] | | 20 |
| | 1/8W | | 3 |

NOW TO THE SOFTWARE WHICH IS THE REAL REASON FOR MY WRITING. I TRIED RATHER EARLY WHILE WAITING FOR PROCESSOR TECH TO GET THE SOLO3 VERSION OF ALS-0 OUT. THEREFORE I BOUGHT THE PAPER TAPe VERSION OF THE TYCHON CO-RESIDENT EDITOR ASSEMBLER. A FRIEND LOANED THE USE OF A SOL-20/ASR-33 COMBO AND I SOON HAD A CUES CASSETTE OF THE TEA TYCHON'S DOCUMENTATION DESCRIBES THEIR 1/0 REQUIREMENTS SO THAT I WAS ABLE TO MAKE EVERYTHING SOLO3 COMPATIBLE.

THE MOST DIFFICULT PART WAS THE USE OF THE SOLO3 BYTE READ AND WRITE SUBROUTINES TO OPEN AND CLOSE CASSETTE RECORDS SO THE TYCHON PROGRAMS THOUGHT IT WAS WORKING WITH AN ASR-33 PUNCH AND READER. THIS LETTER IS BEING WRITTEN OVER SEVERAL SESSIONS USING THE FINAL RESULTS. I ALSO MAINTAIN A 220 NAME MAILING LIST FOR MY CHURCH USING THE SAME PROGRAM. OBIVIOUSLY I ALSO USE IT FOR MACHINE LANGUAGE ASSEMBLY WORK.

MY IMPATIENCE WITH PROCESSOR TECH TO OVER THE DELAY IN GETTING AN EXTENDED BASIC LED TO A SIMILAR PROBLEM. I BROUGHT A COPY OF MSA BASIC. THIS PROGRAM HAD ALMOST ALL THE FEATURES I WANTED. IN FACT IT HAS ONLY TWO DEFECTS OF ANY CONSEQUENCE. FIRST, IT DOES NOT SUPPORT A "BYE" COMMAND. I SOLVED THIS BY THE FOLLOWING PATCH:

EN 55C
SPE 18 CA 04 CO

THE RESULT IS THAT THE "ESC" KEY IS RECOGNIZED AS "BYE" WHENEVER THE KEYBOARD IS ACTIVE. OBVIOUSLY YOU CAN USE A KEYBOARD RESET (UPPERCASE & REPEAT) TO RETURN TO SOLOS COMMAND MODE.

ARE:

PROGRAM NAME ? QUBIC
PROGRAM NAME ? WUMPS
PROGRAM NAME ? IE
PROGRAM NAME ? CAPITAL

THE LAST ONE WILL APPEAR ON THE TAPE AS CAPIT. REMEMBER ALSO
THAT THE LETTER SURROUNDED BY QUOTES (I.E. "W" OR "Q" ETC.)
MUST STILL BE A PART OF THE SAVE AND LOAD COMMANDS, WHICHEVER
LETTER IS USED ON SAVE MUST BE USED ON LOAD AS WELL AS THE
SAME PROGRAM NAME.

ALTHOUGH SOMEONE ELSE MIGHT WRITE A SIMPLER PROGRAM,
AT LEAST THIS ONE WORKS. USING MSA BASIC IS NOW A JOY. IT HAS
ALMOST ALL OF THE FUNCTIONS (WITH THE EXCEPTION OF THE MAT
FUNCTIONS) OF THE NEW PROCESSOR TECH BASIC AND IT ONLY NEEDS
4.2K OF STORAGE!! MY 16K SPACEBYTE BOARD HOLDS FAIRLY
COMPLEX BASIC PROGRAMS WITH NO TROUBLE AT ALL.

I AM NOW AT THE CIRCUIT DEBUG STAGE IN THE DESIGN
OF AN INTERFACE BOARD TO CONNECT THE 5-100 BUS TO A NATIONAL
MULTIPLEX 3M CASSETTE DRIVE. WHEN THAT IS DONE, I'LL
SEND SOLUS A SCHEMATIC.

IN THE MEANTIME, HAPPY COMPUTING AND KEEP THE
NEWSLETTER COMING.

YOURS TRULY,

MELVIN M. DALTON
PLAYA DEL REY, CA. 90291

CC:
THE BYTE SHOP OF LAWNLAND

Ps. Deep not work on arrays. There is no token to indicate
end of array data.

A.M.D.
TYCHON EDITOR-ASSEMBLER V-2

TYCHON EDITOR-ASSEMBLER V-2

CA DD FE CPI /CR IS END OF NAME
CA DE 00 00H /GET MORE OF NAME
CA DF C2 JNZ /NAMEHD
CA E0 D1 NAMEHD
CA E1 CA 0 /NAMEHD
CA E2 C0 CALL /XEN CR LF
CA E3 F9 CR LF
CA E4 C2 0
CA E5 E1 POPH /GET START OF HEADER IN HL
CA E6 01 LXIH /BC POINTS TO NAME IN DISPLAY MEMORY
CA E7 0F NAMDIS
CA E8 CC 0 /D SEEZ FIRST FIVE CHAR. TO HEADER
CA E9 16 OSW
CA EA 05 OSH
CA EB 0A HEAD1, LDA XH /GET CHAR.
CA EC 77 MODA /PUT IT IN HEADER
CA ED 23 INXH /BUMP TO
CA EE 03 INXH /NEXT CHAR.
CA EF 15 DCRD /COUNT D
CA F0 C2 JNZ /DOWN TO ZERO
CA F1 EB HEAD1
CA F2 C6 0
CA F3 3E MUIA /POINT TO TAPE 1
CA F4 01 O1H /POINT TO BEGINNING OF HEADER
CA F5 21 LXIH /PUT TO STARTING OF HEADER
CA F6 6C HEAD
CA F7 CB 0
CA F8 CD CALL /CALL, FILE OPEN TO SOLS
CA F9 07 POPEN
CA FA C0 0
CA FB CB RET

/HIS SUBROUTINE RECORDS ONE BYTE FROM MSA BASIC AND RETURNS.
CA FC C5 10F, PUSHD /SAVE
CA FD B5 PUSHD /ALL
CA FE E5 PUSHP /REGS
CA FF F5 PUSHPWS /AND FLAGS
CA 00 3A LDA /CHK. IF FILE OPEN?
CA 01 55 FCB1 /TAPE UNIT ONE
CA 02 C0 0
CA 03 A7 ANAA /SET FLAGS
CA 04 C0 CZ /GET NAME & OPEN FILE
CA 05 C1 PNAME
CA 06 CA 0
CA 07 F1 POPPSW /GET CHAR BACK
CA 08 F5 PUSHPWS /SAVE IT AGAIN
CA 09 B7 ORAA /SET PSW
CA 0A C4 CNZ /SET FLAG IF NON-ZERO
CA 0B 2C SETFLG
CA 0C CB 0
CA 0D F1 POPPSW /GET CHAR.
CA 0E F5 PUSHPWS /AND SAVE
CA 0F 47 MOVBA /BYTE IN B FOR SOL

CB 10 3E MUIA /POINT TO FILE1
CB 11 01 O1H /POINT TO FILE1
CB 12 CD CALL /WRITE BYTE TO FILE
CB 13 10 WBYTE
CB 14 C0 0
CB 15 0A JC /ERROR ??
CB 16 4F ERR2
CB 17 CB 0
CB 18 F1 POPPSW /GET CHAR.
CB 19 F5 PUSHPWS /AND CHECK FOR
CB 1A A7 ANAA /ZERO ?
CB 1B CC CZ /DECURRENT FLAG
CB 1C 32 DECFLG
CB 1D CB 0
CB 1E C3 JMP
CB 1F 27 RET1
CB 20 CB 0
CB 21 F1 CLOS1, POPPSW /REALIGN STACK
CB 22 3E MUIA /POINT TO TAPE 1
CB 23 C1 O1H
CB 24 C0 CALL /CLOSE FILE
CB 25 0A FCLOS
CB 26 C0 0
CB 27 F1 RET1, POPPSW /GET
CB 28 E1 POPSH /REGS
CB 29 D1 POPD /BACK
CB 2A CB 0
CB 2B C9 RET
CB 2C 3E SETFLG; MUIA /SET FLAG1 TO "3" WHEN-TEA SENDS "CO"
CB 2D 03 O1H
CB 2E 32 STA /RECORD IT!
CB 2F C0 FLAG1
CB 30 C4 0
CB 31 CB RET
CB 32 3A DECFLG; LDA /GET
CB 33 C0 FLAG1 /FLAG
CB 34 CB 0
CB 35 3D DCRA /DOWN BY ONE
CB 36 32 STA /PUT IT BACK
CB 37 C0 FLAG1
CB 38 CA 0
CB 39 C0 RIZ /RETURN IF NOT 3RD ZERO
CB 3A 3A LDA /CHECK IF
CB 3B 55 FCB1 /READ OR WRITE
CB 3C CB 0 /FCB1-FF DURING WRITE & FF DURING READ
CB 3D 3C INRA /COUNT UP TO ZERO
CB 3E C2 JNZ /EXIT WHEN WRITE
CB 3F 21 CLOS1
CB 40 CB 0
CB 41 3E RCLOS, MUIA /POINT TO FILE 1
CB 42 C0 O1H
CB 43 CD CALL /CONTINUE
CB 44 0D RBYTE /READING
CB 45 C0 0

---

15
TYCHON EDITOR-ASSEMBLER V-2

CR 96 DA  JR /EXIT ON EOF (OR ERROR)
CR 97 4C  ERR1
CR 98 CD  0
CR 99 C3  JMP /REPEAT AS NEEDED
CR A4 41  RCLOS
CR A6 EA  0
CR A4 FA  ERR1, JM /EOF
CR A6 E9  CLOS1
CR A6 ED  0
CR A6 06  ERR2, MUIB
CR A0 43  'E'
CR A1 AF  XPAK /CRT PORT
CR A2 CD  CALL /SOL OUTPUT
CR A3 EC  AOUT
CR A4 CO  0
CR A5 31  LXISP /POINT TO SOL STACK
CR A6 ED  SOLDP
CR A7 CB  0
CR A8 C3  JMP /GE TO SOLOS
CR A9 04  RETRAN
CR A9 CO  0

/THIS IS THE PROMPT MESSAGE IN ASCII
CR 58 OR  MESS1+ 00H /CLR SCREEN AND HOME CURSOR
CR 5C 50  50H
CR 5D 52  52H
CR 5E 4F  4FH
CR 5F 47  47H
CR 60 92  92H
CR 61 41  41H
CR 62 40  40H /PROGRAM
CR 63 2D  2DH
CR 64 4E  4EH
CR 65 41  41H
CR 66 44  44H
CR 67 45  45H
CR 68 20  20H
CR 69 3F  3FH /*
CR 6A 2D  2DH
CR 6B FF  FFH /END OF MESS1

/THE NEXT SIXTEEN BYTES ARE RESERVED FOR THE HEADER FOR SOLOS.

CB 6C 00  HEAD+  0
CB 6D 00  0
CB 6E 00  0
CB 6F 00  0
CB 70 00  0
CB 71 00  0
CB 72 C2  C2H / "B" + 80H
CB 73 00  0
CB 74 00  0
CB 75 00  0

CB 76 00  0
CB 77 00  0
CB 78 00  0
CB 79 00  0
CB 7A 00  0
CB 7B 00  0

/THIS SUBROUTINE READS ONE BYTE FROM CASSETTE AND SENDS IT TO MSA
CB 7C C5  IOR, PUSHB /SAVE
CB 7D D5  PUSHB /REG.'S
CB 7E E5  FUSHH /FOR TEA
CB 7F 3A  LDA /TEST
CB 80 55  FCB1 /IF FILE
CB 81 C8  0 /OPEN
CB 82 47  ANAA /SET FLAGS
CB 83 CC  CZ /IF ZERO
CB 84 C1  FNMA /THEN
CB 85 CA  0 /OPEN
CB 86 3E  MUIA /POINT
CB 87 01  OIH /TO FILE ONE
CB 88 CD  CALL /GET BYTE
CB 89 09  RBYTE
CB 8A CO  0
CB 8B DA  JC /READ ERROR OR EDF
CB 8C 4C  ERR1
CB 8D CB  0
CB 8E F5  FUSHFSW /SAVE CHAR.
CB 8F C4  CNZ /PREPARE TO LOOK FOR THREE ZEROS
CB 90 2C  SETFLG
CB 91 C8  0
CB 92 F1  POPFSW /GET CHAR, BACK
CB 93 F5  FUSHFSW /AND SAVE FOR RETURN
CB 94 CC  CZ /COUNT ZEROS
CB 95 32  DECF0
CB 96 CB  0
CB 97 C2  JMP /RETURN
CB 98 27  RET1
CB 99 CB  0
Dear Stan:

I've contacted P.I. via "ACCESS" about the following problems, and have also submitted the following programs. First the bus. If you are running Extended Cassette BASIC and have elected to delete the Matrix and Extended functions, the following things have happened:

1. Although the manual says you cannot use the SUB(r) function you still can set to the address of the routine, however your program is probably resident there so CRASH!
2. Although the manual does not state it, you lose the "1" function.
3. The RND(r) function comes up with a unique bus in that the number generated will sometimes contain a punctuation mark of varying type.

The revised initialization routine covers problem 1. No more SUB(r), and problem 2. is simply a pen and ink change to the manual. As for bus 3. I have left that to P.I. to find, after all they aren't paying me to repair their software.

Keep up the good work.

T.T.

---

Dear Stan:

This letter is a follow up to my previous letter. Eureka! I found it. The bus in Extended Cassette Basic that is. I've called P.I. to pass along what I have found and outlined how I intended to get around the bus. A true fix will probably require a major revision and reassembly. My fix works and causes the loss of 9 bytes in maximum line length (128 vice 137) but it is better that having the bus. I have enclosed the latest revision of the initialization routine with both object and source code this time.

To correct the bus you must do the following:

1. Load Basic but do not execute it.
2. Load or enter the revised initialization routine.
3. Make the following entries: (computer prompts shown)

   >EN 2DF<
   >B 9E917B 2BE87B 1C6B14C 29 128E53 29<
   >128C013 14 76 21 00 11 37 48 29<
   >32E2100 00 00 00 00 00 00 00 00 00<
   >BA BASIC 0 3F87<

I also included the source code for a driver to support the ALSO "ASSI" command. I hope someone out there can use it.

Guess that is about it for now.

Yours truly,

---

Jeff Tom

U.S. Navy Code 53

Marco Island, CA 34522
3C20
0001  ***********************************************************************
3C20
0002  # REVISED INITIALIZATION ROUTINE FOR EXTENDED  
3C20
0003  # CASSETTE BASIC -- MODIFICATIONS BY JEFF TONT 
3C20
0004  # CSTSC/CODE 53, MARE ISLAND,CA. 94592  
3C20
0005  #**********************************************************************
3C20
0006  #
3C20
0007  ORG 3C20H
3C20
0008  #
3C20
0009  PUSH H
3C21  21 03 3F
3C21  0010  LXI H,$3F83H  <==NEW END OF PROGRAM AREA
3C24  11 00 00
3C24  0011  LXI B,$0000H
3C27  AF
3C27  0012  XRA A
3C29  F5
3C29  0013  PUSH PSW
3C29  F1
3C29  0014  LDX #3CHH POP PSW
3C2A  7E
3C2A  0015  MOV A,H
3C2B  0016  ADD E
3C2C  0F
3C2C  0017  MOV A,$1F
3C2D  7A
3C2D  0018  MOV A,$5B
3C2E  CE 60
3C2E  0019  ACI 00
3C30  S7
3C30  0020  MOV B,A
3C31  F5
3C31  0021  PUSH PSW
3C32  7C
3C32  0022  MOV A,H
3C33  B5
3C33  0023  ORA L
3C34  2B
3C34  0024  DCX H
3C35  2C 29 3C
3C35  0025  JNZ $3C29H
3C38  F1
3C38  0026  POP PSW
3C38  EB
3C38  0027  XCHG
3C3A  22 66 3F
3C3A  0028  SHLD $3F86H
3C3D  0029  POP H
3C3E  0030  MOV A,$5B
3C3F  32 E1 04
3C3F  0031  STA $0410H
3C42  32 58 26
3C42  0032  STA $2658H
3C45  32 7C 26
3C45  0033  STA $267CH
3C48  32 85 26
3C48  0034  STA $2685H
3C4A  32 F4 26
3C4A  0035  STA $26F4H
3C4C  32 07 05
3C4C  0036  STA $0726H
3C50  32 9A 26
3C50  0037  STA $269AH
3C53  32 38 15
3C53  0038  STA $1538H
3C57  32 F9 14
3C57  0039  STA $14F9H
3C5A  32 0E 15
3C5A  0040  STA $150EH
3C5C  32 08 14
3C5C  0041  STA $1408H
3C60  32 66 15
3C60  0042  STA $1566H
3C63  32 38 00
3C63  0043  STA $0038H
3C64  32 BE 14
3C64  0044  STA $14BEH
3C69  32 2F 10
3C69  0045  STA $102FH
3C6C  32 0D 09
3C6C  0046  STA $090DH
3C6F  32 05 09
3C6F  0047  STA $050AH
3C72  32 11 3F
3C72  0048  STA $3F11H
3C75  32 1E 3F
3C75  0049  STA $3F1EH
3CFB 0D 70 26 0104 CALL 2670H
3CFE 21 F0 3E 0105 LIX H+3F0H
3D00 0D 0B 2E 0106 CALL 269BH
3D04 CD 70 26 0107 CALL 2670H
3D07 21 00 00 0108 LXI H+0000H
3D0A 22 00 00 0109 SLD 0000H
3D0D 22 01 00 0110 SLD 0019H
3D10 21 34 3F 0111 LXI H+3F34H
3D13 46 0112 L3D13H MOV B,M
3D14 3E AA 0113 MWI A+AAH
3D16 77 0114 MOV M,A
3D17 B0 0115 CMP M
3D18 70 0116 MOV M,B
3D19 C2 22 3D 0117 JNZ L3D22H
3D1C 23 0118 INX H
3D1D 7C 0119 MOV A,H
3D1F 85 0120 ORA L
3D1F C2 13 3D 0121 JNZ L3D13H
3D22 28 0122 L3D22H DCX H
3D23 22 00 09 0123 SLD L+09AH
3D26 21 00 3D 0124 LIX H+3000H
3D29 CD 0B 2E 0125 CALL 26BH
3D2C CD 0A 09 0126 SLD L+09AH
3D2F CD 21 3F 0127 CALL L3F21H
3D32 2D 70 26 0128 L3D22H CALL 2670H
3D35 23 3A 3E 0129 LXI H+3E3AH
3D38 CD 0B 2E 0130 CALL 26BH
3D3B 24 0A 09 0131 SLD L+0AH
3D3E 33 0132 INX H
3D3F CB 49 3F 0133 CALL L3F49H
3D42 28 0134 DCX H
3D43 EB 0135 XCHG 
3D44 22 0A 09 0136 SLD L+0AH
3D47 CD 24 28 0137 CALL 2624H
3D4A D2 3E 3D 0138 JC L3D3EH
3D4B EB 0139 XCHG
3D4E 11 FF 3F 0140 L3D4EH LXI D+3F3F
3D51 CD 24 28 0141 CALL 2624H
3D54 D0 32 3D 0142 JC L3D32H
3D57 22 0A 09 0143 SLD L+0AH
3D5A 22 69 2E 0144 SLD L+09AH
3D5D CD 70 26 0145 CALL 2674H
3D60 21 01 3E 0146 L3D60H LXI H+3E01H
3D63 CB 08 2E 0147 CALL 2608H
3D66 CB 0F 3F 0148 CALL L3F08H
3D69 F5 0149 PUSH PSW
3D6A CD 70 26 0150 CALL 2670H
3D6F E1 0151 PDP PSW
3D76 FE 59 0152 CPI 59H
3D79 CA 79 3D 0153 JNZ L3D79H
3D7D FE 4E 0154 CPI 4EH
3D7F CA 02 3D 0155 JNZ L3D79H
3D82 C6 69 3D 0156 JMP L3D69H
3D87 21 9A 34 0157 L3D87H LXI H+39AH
3D7E 34 0D 0158 MWI H+00H
3D80 23 0159 INX H
3D81 22 65 2E 0160 SLDL 2652H
3D84 22 67 2E 0161 SLDL 2672H
3D87 21 F0 29 0162 LXI H+29FH
3D8A 22 FE 04 0163 SLDL 04FH
3D8B 21 1D 3F 0164 L3D8BH LXI H+3E1DH
3D9C CD 00 2E 0165 CALL 2608H
3D93 CB 0F 3F 0166 CALL L3F08H
3D96 F5 0167 PUSH PSW
3D97 CD 70 26 0168 CALL 2670H
3D9A F1 0169 POP PSW
3D9B FE 59 0170 CPI 59H
3D9C CA 0D 3D 0171 JZ L3D90AH
3D9E FE 4E 0172 CPI 4EH
3D9F CA D2 3D 0173 JZ L3D20AH
3DA4 C3 8D 3D 0174 JMP L3D80H
3DAB 21 68 2E 0175 L3DABH LXI H+268H
3DAD 36 0D 0176 MWI H+00H
3DAD 23 0177 INX H
3DAE 22 67 2E 0178 SLDL 2672H
3DB1 22 65 2E 0179 SLDL 2652H
3DB4 21 F0 29 0180 LXI H+29FH
3DB7 22 65 05 0181 SLDL 0565H
3DBA 22 74 05 0182 SLDL 0574H
3DBD 22 76 05 0183 SLDL 0576H
3DBE 22 80 05 0184 SLDL 0580H
3DC2 22 77 05 0185 SLDL 0577H
3DCC 22 44 05 0186 SLDL 0554H
3DCF 22 60 05 0187 SLDL 0560H
3DD2 CD A1 06 0188 JLDK 0106H
3DD5 CD 03 00 0189 JMP 000H
3DD8 4C 43 54 0190 L3D80H ASC LAST AVAILABLE MEMORY LOCATION (HEX) IS ＊
3DDA 41 41 41 26 41 56 41 49 41 41 41
3DDB 4B 20 40 45 45 45 45 45 45 45 45
3DDE 45 45 45 45 45 45 45 45 45 45 45
3DDF 44 45 45 45 44 44 44 44 44 44 44
3E01 4A 45 45 45 45 45 45 45 45 45 45
3E0C 4A 45 45 45 45 45 45 45 45 45 45
3E11 4A 45 45 45 45 45 45 45 45 45 45
3E16 4A 45 45 45 45 45 45 45 45 45 45
3F4C DA 36 0258 SUI 30H
3F4E DA 79 3F 0259 JC L3F7YH
3F51 FE 0A 0260 CPI 0AH
3F53 DA 58 3F 0261 JC L3F58H
3F56 DA 07 0262 SUI 07H
3F58 FE 10 0263 L3F58H CPI 10H
3F5A DC 79 3F 0264 JNC L3F79H
3F5D 29 0265 BAD H
3F5E DA 79 3F 0266 JC L3F79H
3F61 29 0267 BAD H
3F62 DA 79 3F 0268 JC L3F79H
3F65 29 0269 BAD H
3F66 DA 79 3F 0270 JC L3F79H
3F69 29 0271 BAD H
3F6A DA 79 3F 0272 JC L3F79H
3F6D CB 68 46 0273 CALL 068H
3F70 C3 44 3F 0274 JMP L3F44H
3F73 7C 0275 L3F37H MOV A,H
3F74 B5 0276 DRA L
3F75 D1 0277 POP D
3F76 CA 0278 BNZ
3F77 EB 0279 XCHG
3F78 CY 0280 RET
3F79 04 3F 0281 L3F79H MVI B,3FH
3F7B CB 19 3F 0282 CALL L3F19H
3F7D CB 79 26 0283 CALL 267H
3F81 C3 41 3F 0284 JMP L3F41H
3F84 71 9A 0285 L3F84H IN 9A71H <<<NEW EXPECTED CHECKSUM
3F86 00 00 0286 L3F86H IW 0000H ACTUAL CHECKSUM STORED HERE

READY

0001 # THESE ROUTINES ARE DESIGNED TO BE USED WITH THE SOLOS
0002 # MONITOR, AND ALSO ASSEMBLER. ALL REFERENCES TO EITHER
0003 # OF THESE PROGRAMS ARE LISTED IN THE EQUATE TABLE BELOW.
0004 # THE CARRY FLAG IS USED AS A FLAG TO INDICATE AN ERROR.
0005 # AND CAUSES THE "WHAT?" MESSAGE TO BE OUTPUT, A SOURCE
0006 # FILE MUST END WITH THE "END" PSEUDO OP. AN OPEN FILE
0007 # MUST BE CLOSED BY SEPARATE COMMAND AFTER AN ASSEMBLY.
0008 #
0009 # JEFF TOM, CSTSC/CODE 53, MARE ISLAND CA, 94592
0010 #
0011 00F6 EQU 0C007H
0012 FCLOP EQU 0C009H
0013 RSBYT EQU 0C00BH
0014 WRBYT EQU 0C010H
0015 SINP EQU 0C019H
0016 NOPF EQU 0D002H
0017 SWCH1 EQU 0D006H
0018 IRRF EQU 0D154H
0019 SCRN EQU 0E308H
0020 WHAT EQU 0E700H
0021 UNIT EQU 1 (MAY BE 1 OR 2 DEPENDING ON YOUR SYSTEM SETUP)
0022 #*****************************************************************************
0023 # THIS ROUTINE IS WILL READ A BYTE FORMAT CASSSETTE AND
0024 # PASS A FILE ONE LINE AT A TIME FOR USE WITH THE "ASSI"
0025 # ASSEMBLER COMMAND. MAKE IT AN INPUT DRIVER
0026 CREAD LDA SWCH1
0027 ORA A
0028 JNZ TLOOP
0029 INR A
0030 STA SWCH1
0031 LXI H+HEADR
0032 CALL OPNOP
0033 JC WHAT
0034 #
0035 # PROGRAM JUMPS HERE TO READ THE FIRST BYTE IN A LINE
0036 # IF THE BYTE IS A ONE WE GO TO REWIND IF NOT WE
0037 # FALL THROUGH TO READ THE REST OF THE LINE
0038 TLOOP CALL RDBYT
0039 JC WHAT
0040 CPI 1 ECF
0041 JZ REWIND YES, THEN REWIND TAPE FOR NEXT PASS
0042 LXI H+IBUF-5 INPUT BUFFER LOCATION FOR NUMBERED LINES
0043 #
0044 # THIS ROUTINE GETS DATA ONE BYTE AT A TIME FROM THE SOLOS
0045 # BUFFER AREA UNTIL IT FINDS A <CR>
0046 RLOOP MVI A,UNIT
0047 PUSH H
0048 CALL RDBYT
0049 JC WHAT
0050 POP H
0051 MOV M,A
0052 CPI 0DH A<CR>
0053 RZ YES, PASS LINE TO ALSB

21
0054 INX H ELSE...
0055 JMP RLOOP GET NEXT BYTE
0056 *
0057 * THIS ROUTINE CLOSES A FILE, PRINTS A MESSAGE, THEN WAITS
0058 * FOR YOU TO TYPE IN ANY KEY TO INDICATE THAT YOU'RE SET
0059 * UP TO REWIND, THIS ROUTINE IS ENTERED BETWEEN PASS 1
0060 * AND PASS 2 OF THE ASSEMBLER, OR FOR EACH SYMBOL IF YOU
0061 * ARE DOING AN ASSIX.
0062 REWIN CALL TOFF
0063 XRA A
0064 STA SWCH1
0065 LXI H+RMESS
0066 CALL SCRN
0067 WAIT CALL SINF
0068 JZ WAIT
0069 JMP CREAD
0070 *
0071 * THIS SHOULD BE MADE A CUSTOM COMMAND TO CLOSE FILE AFTER
0072 * ASSEMBLY. ALSO STOPS ASSEMBLY WHEN IT SEES THE "END".
0073 * PSEUDO OP, AND NEVER CLOSES THE FILE.
0074 TOFF MVI A,UNIT
0075 JMP FCLOS
0076 *-------------------------------------------------------------------------
0077 * THIS ROUTINE WRITES THE CURRENT FILE ON TAPE IN THE
0078 * BYTE FORMAT FOR USE WITH CREAD. MAKE THIS ROUTINE
0079 * AN OUTPUT DRIVER
0080 CLIST MVI A,UNIT
0081 LXI H+HEADR
0082 CALL OPNOP OPEN CASSETTE FILE
0083 JC WHAT
0084 LLDH BOFF BEGINNING OF SOURCE FILE POINTER
0085 WHOP MVI A,UNIT
0086 MOV B,R
0087 INX H
0088 PUSH H
0089 PUSH B
0090 CALL WRBYTE
0091 JC WHAT
0092 POP H
0093 POP H
0094 MOV A,R
0095 CPI 1
0096 JNZ WLOOP
0097 MVI A,UNIT
0098 JMP FCLOS
0099 OPNOP CALL FOFEH
0100 RET
0101 RMESS ASC 'REWIND TAPE'
0102 DB 13
0103 HEADR ASC 'CLIST'
0104 DB 0
0105 DB 'S'
0106 DW 256
0107 DW 0
August 20, 1978

Dear Stan,

Please, please do whatever is necessary to keep SOLUS NEWS up to it's excellent standards. I know it's tough publishing a newsletter but if paid help is required to get it done, in my opinion, it's worth it. I would gladly pay an increased amount in dues for that purpose. One issue of SOLUS News contains as much information as a dozen phone calls or letters to FFC and, at the long distance rates I have to pay, it's a bargain.

Suggestion: I keep my copies of SOLUS News in a three ring binder. The last issue is driving me nuts because I must continuously rotate the binder as I read from page to page. Please go back to the format you used in the April issue. Thanks.

Thanks for the clarification about HELIUM. I will continue to pass all my HELIOS tidbits along to SOLUS News.

HELIOS NOTES:

Stuck Disk Presetting the eject button failed to eject the disk from the Persol drive. The disk was firmly stuck in there even though I could hear whirring noises when I pressed the button. Removing the cover disclosed that the plastic hub was not retracting from the spindle collar where it holds the disk. The hub is a very precise fit and the least misalignment will cause it to jam. The problem was the three-toothed retaining washer which holds the hub to the retractor plate. Certain positions of the washer will shift the alignment of the hub enough to cause it to jam. Rotating the washer to a new position fixed the problem — for awhile.

Garbled Directory As has probably been discovered by many by now, the 16KRA and HELIOS are not exactly compatible. The DMA action of HELIOS sometimes interferes with the refresh of the 16KRA and intermittent memory failures can result. Sure enough, when I was saving a new file and PTDBS was updating the directory — crash! This is the worst possible place for a failure to occur (Murphy's law!) since now none of the files on the disk are accessible. Every attempt to read the disk results in a DISK STRUCTURE BAD error when PTDBS tries to read the directory. And, of course, the directory track in REMOVES protects (Murphy's corollary) so it can't be salvaged. My real gripe is that PTC, in trying to protect us from ourselves, purposely did not include disk primitive commands in PTDBS. I know where the files are on the disk (I have a printout of the FILES before the crash) and if I could read a particular track and sector into memory I could save the file again on another disk. But, alas, PTDBS does not allow this. If some HELIOS member has written a routine to do this I would dearly like to see it.

Note: PTC has announced update 731071 (change J) for HELIOS to correct the 16KRA incompatibility problem. I highly recommend it.

SOL NOTES:

ALSO I tried relocating AL55 with the information given by John Ondar in Vol. 1, #3 SOLUS News but it didn't work. The problem was the stack. After relocation to lower memory I removed the memory in the DOOQ to FFPP area and the problem with AL55 kept coming. Seems the AL55 uses the stack in the FFPP area even in the relocated version. Taking out the memory in that area of course, caused it to blow up. Cure: use a LVI.SF near the initial entry point to set the stack pointer to a usable memory area. Note to John: Your article saved me many hours of searching through the AL55 code to find the data areas. Thanks very much.

North Star JP I found the reason why much of my PTC software blows up when trying to access it from the North Star DOS with the JP command. It seems that PTC software likes to save the contents of the HL register on entry in order to properly set the I/O drivers to be compatible with SOLUS or CUTER. When entering from SOLUS, HL contains C000 but from the NS DOS it is something else. This something else messes up the I/O routine and it doesn't work. Fix: Enter a few bytes before the normal entry point and set HL to C000. Make this the new start address in your NS disk file.

Heat Problem For those suffering from heat problems who don't want to out holes in their pretty blue covers for an extra fan, here is another approach. Heat is a byproduct of power consumption. The Sol is essentially a big resistor. It takes in power from the AC line and converts it to heat. A typical Sol uses about 120 watts. (120V x 1 Amp) All of this heat is gotten rid of by either radiation (the cabinet feels warm) or convection (air cooling). The cabinet is of finite size and the fan is only large enough for a limited amount of heat dissipation. If neither is to be changed then the only alternative is to reduce the input power. This can be done by using low power memory boards (dynamically memory is most noted for low power) or reducing the input voltage. A microcomputer is a DC machine. As long as the required DC operating voltages are present it could care less what AC voltage is available at the wall socket. But a reduction of AC input voltage to the point where the minimum DC is available to the regulators will have a dramatic effect on the amount of heat produced. Experience here in Japan, where the standard AC power is 100 volts and 50 Hertz, has shown that the Sol is fully capable of normal operation at this level. The 48VDC line from the power supply is the one which gets the heaviest demand. Measurements on a Sol with 120 VAC input show this line to average around 10 VDC, a full 2.5 Volts above the minima required. Some early Sols developed as much as 14 Volts on this line but hopefully all of these have been corrected. In some areas of the United States, particularly those with a high air conditioning load, the AC voltage may measure as high as 130 Volts at times. This can really play havoc with the Sol heat problem. If you want to try lowering the AC input voltage, here's how:

1. Measure the unregulated DC voltages at the backplane connector. The minimum for the 167 lines is 15 Volts and for the 97 line is 7.5 Volts.
2. Measure the AC voltage available at the wall socket.
If the unregulated DC voltages measure more than 10% above the minimum values and the AC measures more than 110 Volts, proceed to step 3.

3. Wire up the circuit shown in figure 1. This device is called a bucking transformer. The voltage at the output socket is lowered from that of the input by the rating of the transformer secondary. In other words, if the input is 120VAC and the secondary is 12.6VAC, then the output will be 120-12.6 or 107.4 Volts. Before connecting the Sol to the output check the voltage. If it measures instead, 132.6 Volts, reverse the connections to the secondary at points A and B. The transformer specified will carry the full load of the Sol up to the point the 3A fuse of the Sol itself blows. Note that a bucking transformer need carry only a portion of the load. A stepdown transformer must be rated for the full load. If you build this circuit into a handy box, you may want to include an interference filter at the same time. If you want to lower the voltage even more, select the appropriate transformer with the desired secondary rating. The current rating of the secondary should be at least 3 Amps. A reduction of 10% input voltage should result in a 20% power reduction and a much cooler Sol.


2. ELECTRONIC MAINTENANCE ENGINEER - Maintain computer test equipment for PDP II, HP 9500 and Dit-MCD. Design and build electro-mechanical test fixture and supervise maintenance team. S. F. Bay Area location. Salary negotiable.

Contact M. Graebner
Educational Management, Inc.
2831 Seventh Street
Berkeley, CA 94710
(415) 848-5527

T1 - Radio Shack 273-1511
Z1 - Optional Interference filter "Brute-Force" type see any edition of Radio Amateur's Handbook

Fig. 1

Joe Klagrin
SEPTEMBER MEETING TO FEATURE PTC SOL SOFTWARE

OOPS! LAST ISSUE HAD PRINTER'S ERROR.

SOLUS SOFTWARE DIRECTORY: CALL FOR LISTINGS.

NOMINATIONS ARE OPEN.

EDITORIAL: THE FUTURE OF SOLUS NEWS.

LETTER REGARDING SOLUS SOFTWARE DIRECTORY.

INSTRUCTIONS FOR SOLUS DIRECTORY LISTING.

A SOFT-SECTOR DISK CONTROLLER FOR THE HELIOS.

EXCERPTS FROM PTC'S COMPUTER RETAILER NEWSLETTER.

CP/M USERS GROUP DISCUSSION DIGEST.

TWO NEW PRINTER INTERFACES ANNOUNCED.

A QUERY ON CP/M AND UCSD PASCAL.

BSTAT: DESCRIPTIVE STATISTICS PROGRAM.

LETTERS

on PTC Cassette PILOT, programming ROMs, etc.

more on PILOT.

to Micropola Corporation.

answer from Micropola to Moseley.

reply from Moseley to Micropola.

an open letter to SOLUS members.

a question on Bytesaver and ALS-8.

on PTC L.C. BASIC for Northstar, S.D. Sales Expandoram bugs.

the Northstar disk, Denver SOLUS chapter.

question on Dynabyte 32K static in the SOL.

a little cheap text editor, ALS-6, Seattle Computer Prod.

memory, extra fan for hot SOL.

HANGPRESS: a game for 2 players, in BASIC.

on Spacebyte memory, DESCRIBER for SOL, Python assembler.

MSA sASIC interface to SOL.

3 bugs in PTC Extended Cassette BASIC, a fix, and an

ALS-8 driver for ASSI command.

on HELIOS, ALS-8, loading PTC software from Northstar DDS.

another solution to the hot SOL problem.

JOB OPPORTUNITIES.

MAP OF STANFORD UNIVERSITY CAMPUS (to find SOLUS meeting).
HELIOS LIBRARY READY TO SHIP FIRST DISKETTE
PASCAL AVAILABLE

Our first volume (diskette) of the Helios library is ready for distribution by mail. We have collected a number of utility programs and one major system (PASCAL) which are to serve as the seeds to grow a large library of PTDOS-compatible software. A listing of the table of contents of this diskette is printed in this issue. You'll find that the PASCAL is a preliminary version, but nevertheless powerful enough to compile the PASCAL compiler itself. It is an excellent system for learning the language and has nearly all of the standard PASCAL language. It is integrated into PTDOS so it uses the same text file structure as other PTDOS languages. (This is in contrast with the U.C.S.D. PASCAL system which has its own unique text file structure.) It runs about 20 times faster than a fast integer BASIC (Palo Alto TINY BASIC) which itself is faster than full feature BASICs. The diskette also contains improved versions of the original PTDOS 1.4.0 commands "GET" and "FILES", a statistical program, some new commands, a video football game, etc.

To encourage the growth of the library, we have two ways to get the diskette. First, the preferred way is by sending $10 (US dollars) and an acceptable file for donation to the library, on your helios diskette. An acceptable program will be defined below. Second, not to exclude those who don't have a program to contribute, the diskette can be purchased for $25 without a donated program. (If you donate a program, your diskette will be returned as well as a new diskette with the library volume on it.)

An acceptable program is basically any non-copyrighted work of your own creation. Since the entire contents of magazines are copyrighted, programs copied from magazines are not acceptable, even if extensively modified. (The modifications are your own creation so they are acceptable, but not the copied work.) Ideas aren't copyrightable, so you can write your own program that is functionally equivalent to a copyrighted work without violating the copyright. Copyrighted work can be donated only if the written consent of the author and copyright owner are obtained. If you are donating a program, we ask that you read and complete the copyright statement on the order form at the end of this issue.

We are in the process of converting the CP/M users library to run under PTDOS, and as these programs become available they will be added to the library in future volumes. Donated work is not limited to computer programs. If you have a useful data file (such as a dictionary, stock market data, a tutorial text, etc.) you can submit it provided it is otherwise acceptable (non-copyrighted)

Since programs and data require documentation, we also require a file of documentation to accompany each submission. Guidelines for the format and names of these files are explained elsewhere in this issue.

GUIDELINES FOR SUBMISSION OF FILES TO HELIOS LIBRARY

1. FILE NAMES: Since the same program can exist in several forms, we have established the following conventions for file names to distinguish between these alternative forms. Users of the library may want to rename the files for their own convenience, but at least the library will be consistent.
   a. Names should not contain curly case letters.
   b. Each name should end with a suffix that indicates the form of the data contained in the file. For example, by convention already established in PTC documents, assembly language source programs have the suffix "S". Select the suffix from the following list. If none are appropriate, create a new suffix and we'll add it to the list.
   1S Source code, regardless of the language. (The PTDOS file type will indicate the language.)
   1O Object code, such as compiled form of BASIC or PASCAL. (The actual object language is indicated by the file type field. See below about image files.)
   1T Text, not in a programming language. Use this type for data files that are in ASCII, such as a dictionary, a table, a document, etc...

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GUIDELINES FOR SUBMISSION OF FILES TO HELIOS LIBRARY

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D: Documentation text file which explains how to use the other files having the same prefix name.

C: Contents abstract for addition to the Table of contents file on the diskette. This is a text file similar to the "D" type, but being a very brief description of the main program or file so that a user will know if he wants to look into the "D" file. This file will be published in the catalog of library programs.

none: No suffix is necessary if file is an image file, such as a command name, or if it is a device file. You can use the "O" suffix if you desire.

c: For example, a BASIC program ("PROG") in text form will need the following files: PROGd, PROGc, PROGd.

A device driver ("DEVICE") submitted as both source and assembled files of type "O" will need files: DEVICEd, DEVICEc.

d: The colon in the above examples can be replaced by another punctuation character if you prefer.

2. FILE TYPES: The file types will indicate the language of the program. Whenever a PTC file type convention is relevant, it should be used. (See section 3 of the PTDS manual.)

The following types have been established so far. As with file names, if none of these are appropriate, create your own and we'll add it to the list.

<table>
<thead>
<tr>
<th>HEX VALUE</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>00</td>
<td>System files (reserve for PTC)</td>
</tr>
<tr>
<td>81</td>
<td>01</td>
<td>Numeric data in binary form</td>
</tr>
<tr>
<td>82</td>
<td>02</td>
<td>Numeric data in decimal form</td>
</tr>
<tr>
<td>83</td>
<td>03</td>
<td>Stored FOCAL program</td>
</tr>
<tr>
<td>84</td>
<td>04</td>
<td>Semi-compiled BASIC/S program</td>
</tr>
<tr>
<td>85</td>
<td>05</td>
<td>Semi-compiled EDBASIC program</td>
</tr>
<tr>
<td>86</td>
<td>06</td>
<td>Source (text) EDBASIC program</td>
</tr>
<tr>
<td>87</td>
<td>07</td>
<td>Serial access files</td>
</tr>
<tr>
<td>88</td>
<td>08</td>
<td>Random access data file</td>
</tr>
<tr>
<td>C1</td>
<td>A</td>
<td>Archive (SAVE) file</td>
</tr>
<tr>
<td>AE</td>
<td></td>
<td>Default</td>
</tr>
<tr>
<td>A4</td>
<td>S</td>
<td>DO file with command lines</td>
</tr>
<tr>
<td>D4</td>
<td>T</td>
<td>Text file (also BASIC/S text form)</td>
</tr>
<tr>
<td>C0</td>
<td>P</td>
<td>PASCAL source code (text form)</td>
</tr>
<tr>
<td>F0</td>
<td>p</td>
<td>PASCAL p-code form (semi-compiled)</td>
</tr>
<tr>
<td>00</td>
<td>100</td>
<td>Image files associated with system</td>
</tr>
<tr>
<td>43</td>
<td>IC</td>
<td>Command files</td>
</tr>
<tr>
<td>47</td>
<td>IG</td>
<td>Games (image file)</td>
</tr>
<tr>
<td>53</td>
<td>M</td>
<td>Major subsystem (compiler, etc.)</td>
</tr>
<tr>
<td>54</td>
<td>I</td>
<td>Command for use in DO files</td>
</tr>
<tr>
<td>2A</td>
<td>I</td>
<td>Default image file</td>
</tr>
</tbody>
</table>

CONTENTS OF FIRST HELIOS LIBRARY DISKETTE

SOLOS: A copy file for standard and extended version of SOLOS. The original source was obtained from the CP/N users group. Program Tech. may have rights to this program. Your mods are public.

Functions with or without extension PROM board in memory. Can be used for Standard SOLOS by conditional assembly. Uses files named SOLOSdS. (Donated by Ron Parsons.)

SOLOS:d Further documentation of the files SOLOSdS, etc above.

COPY: Copies the files listed after command (separated by commas) from disk 0 to disk 1 preserving attributes. Requests permission to rewrite an existing file. (Donated by Ron Parsons.)

RELOC: Relocation program from July 1977 Byte.

NF01? Prints the number of files on the unit "/u" (Donald by Ron Parsons.)

PSDdS: Displays the free space map on the unit "/u" (Donald by Ron Parsons.)

REDNUM: Removes line numbers (first five col.) from named files. (Ron Parsons)

INTSEL: Interrupt driven background Selector driver. To be (?) described in PTC/ACCESS. (Ron Parsons.)

SF16: Displays a compact list of all files on the unit given as parameter "/u". If no unit given, uses default. Name stands for "Short Files". (Ron Parsons.)

SF16: Command image for the Short Files command above. Recognizes the "/u" parameter.

PRPROM: Standalone Cromemco Bytesaver prom-programmer (SOLOS) (Ron Parsons.)

RED05: A PTDS disk reorganize. Copies all files from unit zero to unit one. Does not rewrite existing files. (Ron Parsons)

COMPAR: Compares the two PTDS files named listing differences Assembly source file. (Ron Parsons)

SOL:S Assembly source code for PTDS command "SOLOS" which turns control over to SOLOS. Assumes SOLOS is at C000 as in the SOL. Once in SOLOS, the command "P5" will get back to PTDS, assuming it is still unaltered in memory. (Stan Sokolow)

DSTAT: EDBASIC program for descriptive statistics (mean, etc) (Stan Sokolow)

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CONTENTS OF FIRST HELIOS LIBRARY DISKETTE

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PRINTER Driver for selectric terminal (IBM 2741 compatible) on SOL's serial port. Uses SOL built-in RAM and PTDOS driver area. BE SURE TO CHANGE TYPE TO "P" BEFORE USING; Output device only. (Input not implemented.) System reset will wipe out initialization part of driver, so be sure to load new image of it. (Donated by Stan Sokolow.)

DMOVE;S Assembly source code for a delimited-move subroutine. It moves bytes from a source address to a destination address until count is reached or a delimiter byte is encountered. Unlike PTDOS's FSCAN routine, DMOVE lets the user define his own set of delimiter bytes. Additional explanation is in the code's remarks. (Donated by Stan Sokolow.)

LD List directory in alphabetical order, file names only. DOESN'T READ PARAMETERS; ALWAYS USES DEFAULT UNIT. (Donated by Chuck Ellis.)

S Jumps to SOLOS but gives description of all SOLOS commands first. Adds custom commands to get back to PTDOS. (Donated by Chuck Ellis.)

NEWGET This is a corrected version of the GET command that was originally released in PTDOS 1.4.0. It automatically will GET device files without RETYPE'ing them by hand. You can copy NEWGET to GET on your working diskettes. (Donated by Processor Technology Corporation.)

NEWFILES A corrected version of the FILES command which recognizes Upper and Lower case letters as equivalent in file names. The FILES released in PTDOS 1.4.0 treated the two cases differently when searching for files that match bracketed substring specifications. Eq., FILES S and FILES s found different files in the original version, but this version is corrected. (Donated by Processor Technology Corp.)

FOUR Generates random "four-letter words". Mode Select terminates and returns to PTDOS. Words are displayed in large block letters on the video screen. Rated PG ---Parental Guidance recommended.

HELP Provides a brief explanation of PTDOS commands. If a command file name is given as the argument after the name HELP, an explanation of the named command will appear. Otherwise, a summary of the HELP command is given. (Donated by Processor Technology Corp.)

HELP;T This is the reference data for the HELP command. HELP expects this file to be on the default unit.

MIND;S Assembly language source for the MIND Robot Control Language by Lichen Wang, see DR. DOBBS JOURNAL, Sept 77, revised by Ken Anderson, DR. DOBBS, May 78. (Donated by Earl Herr.) IN ALS-8 FORMAT A.

PASCAL The Stanford Micro Pascal System, dated 9-13-78, from Stanford Linear Accelerator Center, Stanford University. (Donated by Sassan Hazygi, Computer Group, S.L.A.C.) Essentially the entire P-code implementation of the PASCAL computer language, as implemented for the IDT 360/370 computers. Except for generalized FILE declarations and passing FUNCTIONS/PROCEDURES as parameters, it adheres to the standard PASCAL as defined by Janzen and Wirth in the 1974 PASCAL User Manual and Report. It is NOT the U.C.S.D. system. The Stanford version runs under PTDOS, and thus it can pass data to other programs not written in PASCAL using normal PTDOS file structures. This preliminary release does not have the REAL arithmetic implemented in the interpreter, so only 16-bit integer arithmetic can be used, even though REAL will compile. RAM REQUIRED: 30K TO 36K PLUS PTDOS TO COMPILe PROGRAMS OF MODERATE SIZE. See file PAS.DOC for a more complete description. The source PASCAL for the compiler, post-processor, and the assembly source for the interpreter are NOT on this diskette.

TO RUN THIS SYSTEM YOU SHOULD HAVE 48K CONTIGUOUS RAM FROM THE BOTTOM UP, TO HOLD PTDOS AND THE PASCAL SYSTEM. MORE MEMORY CAN BE UTILIZED, BUT IT TAKES MODIFICATION TO THE INTERPRETER. A VERY LARGE PROGRAM (THE PASCAL COMPILER ITSELF) WAS COMPILED IN THAT WAY ON A SOL.

***SET BU=8000 and execute the INITPAS command before running PASCAL.*****

PAS.DOC Documentation for the Stanford Micro Pascal System.

THE FOLLOWING FILES ARE RELATED TO PASCAL AND ARE DESCRIBED IN "PAS.DOC": PAS.S, PAS.M, PINTRP.S, PASCAL, PASM, PINT, COMPILe, RUN, TEMP.T, TEMP.P, QUEUES.S, SPRINT.S, ARRT.S, SOMA.S, PORG.S, T.S, PAS.CML, PASCOMP, INITPAS.

FOOTBALL An EDASIC program for 2 player video football. Self-documenting. (Donated by Gerry Frickie; adapted to disk BASIC by Stan Sokolow.)

NOTICES Important legal notices regarding this diskette.

WARRANTY The limited warranty on this diskette.

FEEDBACK Explanation of how to report problems you encounter with this diskette's programs.
The EDIT program by Processor Technology is a cassette supporting version of the EDIT program distributed in the Helios software package. The program resides in the lower 65 Kbytes of memory, and this includes 2 Kbytes reserved for the input and output buffers. The program is self-supporting with the exception of calls made to SIMP-SOL-USR13K and WREBLK in the SOLUS/CUTER monitor. EDIT does assume the presence of all input and output buffers distributed in the EDIT program.

The user must specify the pseudo-port that he wishes the hard copy data sent to, by setting "0" for "2" or "3" prior to executing EDIT.

EDIT program sizes memory upon initial execution, and unless the user indicates otherwise, the program will use all the available memory as text buffer.

Since EDIT is character oriented rather than line oriented, the 'RETURN' key cannot be used to terminate a command line. Instead, the 'ESCAPE' key is used, with the key being echoed as "'^'". This takes some getting used to, and I still on occasion, type a 4 instead of 'ESCAPE'.

The user may have an input cassette file, and/or an output cassette file open, these files may have the same or different names (if you wish to join two separate files) and may be as long as 254 (100k) to 1024 (400k) bytes. This is possible because the 'block read/write' routines instead of the 'byte read/write' routines. In addition, defining the name, and block length of a file, a file may be saved in 'raw' form which may correspond to a page worth of material, or a logical break point in subject matter. There are several commands which control the manner in which a file is read, written, or deleted, and commands that will search through a file looking for a specified string, or search for, and replace a string.

EDIT operates using a Character Pointer and it is up to the user to see that the Character Pointer (CP) is properly positioned at all times. Since the results of your commands can only be observed after they have been carried out, it is always a good idea to keep the Character Pointer at the beginning of each line before entering any text. The user of this program is encouraged to retype and reread about the effect that each of the commands has upon the CP.

The string search and substitution capability was a key factor in another editor in purchase this program. As well as a finding a defined string, the program will also find a partially defined string, so that "Hi" will find "Hi" and "hi", but not "hi", if it is "hi", then "hi" becomes "hi". Enough characters must be given to uniquely identify the string that is to be found or changed. Text is inserted at the position of the CP, and the insertion may be of any length. Deletions also occur at the position of the CP. Deletions may be made at the character strings on one line level.

An interesting feature of the program is the ability to generate macro commands. Any of the individual commands may be joined together and defined as a macro command. Whenever the macro is called, it will execute the individual commands will be executed. This saves entering a particular command string over and over, for instance to scroll through a text buffer, or to define the contents of one page when using cut paper in a printer. In addition to the macro commands, any normal command string that was fully carried out (no errors), may be repeated by entering CTRL-R as the next command which in effect gives you a second macro definition.

Included with EDIT are two other programs, PACK and UNPACK. PACK takes a multi-block file, and will generate a single block file either in ASCII format or as a multi-block file with EDIT's or in the case of a BASIC image file compatible with Edit. The Macro Basic editor allows you to edit a BASIC program using either EDIT or Basic.

For editing with a personal use are covered adequately by the EDIT program. It is a barms, I would have liked to have seen a block move routine included, but since the program has the capability of editing data outside of the program, it should be possible to write a routine using Control characters to accept, edit, limiters and pointer to move. It would be nice if the program would automatically print any line that is modified, and if it were possible to declare a new file defining any old text but these minor points can be lived with.

Processor Technology also offers a line oriented, video text editor. Thus, of course, is the TXT-2 extension to ALSB. This program uses the VDU as a window to observe the text buffer 16 lines at a time. With this program, line length is limited to 64 characters, as the cursor moves around on itself. The program allows editing of text outside of the editor, when the editor is called, these lines will set cut to 64 characters.

Editing with this program is quite simple as you can observe the effects of your editing on the screen. The editor uses Control characters as commands to scroll lines by line or page by page, move the cursor left and right, and to insert or delete text. In addition the cursor control keys on the Sol-20 have the same effect as the control character on the VDU.

While TXT-2 has a "FIND" function, it does not have a "REPLACE" function. Once a string is found, the line that the string is found is on becomes the current line for editing.

If you are interested in a relatively primitive editor, an assembly language program for debussing programs, ALSB on cassette at about $45 is not a bad deal. TXT-2 has no processing capabilities to define printing format.

I called TECHNICAL SYSTEMS CONSULTANTS, Inc., who seem to have the other reasonably priced editing system software, and they were kind enough to send me some data on their programs.

The TSC's editor is line oriented, and supports most of the functions of PT's editor, and a few things that PT does not have including block move, and restricted zone strings search. Commands are included to read or save a file on tape. Since the source code for the program is provided, it should be easy to custom this program to SOLUS/CUTER.

Note: The editor program has no printing capabilities, therefore its sole purpose is to generate a text file.

The price is $29.99 for the manual and source code, and $9.00 to set the program on paper tape in INTEL HEX FORMAT.

For printing formatting, TSC offers a TEXT PROCESSING program which was reviewed in CREATIVE COMPUTING, July/August '78 issue. I have had the pleasure of using the Xerox Electronic Typing System, and the TSC appears to support virtually all of the TTS and even has a few tricks of its own. As one might imagine, the Text Processing program requires a line oriented text file input, and it offers no text editing capabilities.
ANNOUNCING PROTEUS: A SUPER-SOLUS

BY STAN SOKOLOW

As I've mentioned before in Solus News, there is a dirth of volunteers to serve on a committee to operate Solus, and the last issue I put out a call for nominations of new officers. The expected response was received: inadequate. One, I can understand everyone's need for the services of Solus and their reluctance to give up valuable time for it. As Processor Technology Corporation makes further sales to the small business marketplace, rather than the hobby market that got it started, the character of Solus owners will change even further in the direction of the pure "end user" and away from the hobbyist.

In response to these perceived trends, I am making a change in the nature of the operation of Solus, as a voluntary association of Solus owners will continue to exist primarily as the conglomeration of local hobbyist groups. A new organization covering the entire Processor Technology Corporation product line will take over the publication of Solus News, and the providing of other needed services to owners of PTC equipment, including Sol, Helios, Subsystem, and new products. The poor performance of HELIOS has prompted me to take on the Helios.

To indicate this new scope, the name of the organization will be PROTEUS, representing a Users Service for owners of Processor Technology equipment. It, as Solus has done, will not have an independent but cooperative posture toward PTC as well as toward other manufacturers of compatible equipment.

Some of the services that are planned for PROTEUS include a library of Helios-compatible software, publication of Solus News (name will change perhaps), a library of cassette software, a media conversion project to get software across media bounds (e.g., software onto Helios), software directory and sale of proprietary programs. The whole operation will be more reliable and business-like. We'll have a paid staff (although a small one) so that everyone working on the projects will have motivation to get it done well and will be rewarded for their effort. If you have suggestions for other services, please let me know.

It is my intention that PROTEUS will fill the gap between what PTC can do and what the users need. The next year will tell whether we can achieve this, but we're sure going to try. As I've announced elsewhere in this issue, we're on the way toward some of these goals already.
BLOCK MOVE FOR PTC CASSETTE "EDIT"

(Continued from page 5)

```assembly
C959 DA 81 C9 0044 JC LEROR
C95C 2B 0045 #NOW FIND LENGTH OF TEXT TO MOVE
C95C EB 0046 DCX H
C95C 25 0047 PUSH H
C95C 2A 00 C9 0048 PUSH H
C95F 2A A0 C9 0049 LHL H A0
C962 0050 #MCP M TO BLK OF 512.
C962 CD 28 00 0052 CALL WDCMP.
C965 E1 0053 PDP H
C965 20 0054 PDP D
C967 22 99 18 0055 SMLD LENGTH
C96A 0056 #NOW TO MAKE SURE THE INSERT ADDR.
C96A 0057 IS NOT BETWEEN THE MOVE ADDRS.
C96A 0058 POP D
C96A 2A 00 C9 0059 LHL INDD
C96A EB 0060 XING
C96B CD 23 09 0061 CALL VALCVR. LNEXTINSERT?
C96C 2A 00 C9 0062 LHL FANDR
C96C 0063 XING
C96D 2A 48 C9 0064 JC OKAY, CARRY=YES
C96D CD 23 09 0065 CALL VALCVR. INSERTFIRST?
C96C 0066 JNC ERROR, CARRY=NO
C96F 0067 #IF INSERT AREA IS AHEAD OF MOVE ADDRS.
C973 0068 #THEN WHEN THE INSERT AREA IS CLEARED.
C973 0069 #THE FIRST MOVE LOCATION WILL BE MOVED
C973 0070 #DOWN BY THE LENGTH OF THE INSERTION.
C973 E5 0071 PUSH H
C974 2A 99 18 0072 LHL LENGTH
C974 20 0073 GAD H
C974 2A 00 C9 0074 SMLD H
C974 EB 0075 POP H
C974 0076 * 0077 XUPH ENTRY. HL PAIR EQUALS INSERT ADDR.
C974 0078 #TEXT BELOW THE INSERT POINT IS MOVED
C974 0079 #KNOWN TO MAKE ROOM FOR THE INSERT
C974 0080 #THEN THE INSERTION IS MADE.
C974 0081 K 0082 UNK M SMLD CLPDC
C974 CD 3C 0A 0083 CALLENDUP.
C974 2A 9E C9 0084 LHL INDD
C975 EB 0085 XING
C975 2A 00 C9 0086 SMLD FANDR
C975 7F 0087 LOOP MOV H P
C976 0088 CPI LAST
C976 0089 JZ ERASE
C978 0090 STAX D
C97C 23 0091 INX H
C97C 13 0092 INX D
C97E C3 55 C9 0093 JMP LOOP
C97F 0094 * 0095 #ONE TIME THE MOVE IS MADE, THE OLD TEXT
C986 0096 #IS WRITTEN OVER BY MOVING THE TEXT
C986 0097 #BELOW THE MOVE AREA INTO THE MOVE
C986 0098 #ARMS. LENGTH IS INCREASED BY 2 GB
C986 0099 #AID "FIRST" AND "LAST" WILL BE
C986 00A0 #ELIMINATED ALL. FABORS TO DECREASE
C986 00A1 #BY ONE TO POINT TO "FIRST", THE CP
C986 00A2 #IS SET TO THE END OF TEXT BEFORE
C986 00A3 #RETURNING TO EDIT. CHANGE COUNTER TO
C986 00A4 #TO SET CP TO TOP OF TEXT.
C986 00A5 * 00A6 ERASE LHL LENGTH
```

C96A 23 0107 INX H
C965 23 0108 INX H
C966 22 99 18 0109 SMLD LENGTH
C969 2A A0 C9 0110 LHL FANDR
C96C 2B 0111 DCX H
C96B 22 9F 18 0112 SMLD CLPDC
C970 CD 7E 0A 0113 CALL DELETE
C973 CD 21 0B 0114 CALL CPIND
C976 C9 0115 RET
C977 0116 *
C977 0117 #FAKE COMMAND STRING FOR SEARCH ROUTINE
C977 0118 *
C977 02 0119 CMDSR DB FIRST
C979 1B 0120 DB ESCAPE
C979 03 0121 DB LAST
C979 0B 0122 DB ESCAPE
C979 0D 0123 *
C978 0124 #ERROR HANDLING ROUTINES
C979 0125 *
C97B 21 A2 C9 0126 ERROR LXI H+NOFIRST
C97C 3A C9 0127 JMP ERROR13
C981 21 AR C9 0128 ERROR LXI H+LAST
C984 3A C9 0129 JMP ERROR13
C987 21 B3 C9 0130 ERROR LXI H+INERR
C98A CD 30 00 0131 CALL SCREEN
C98B CD 21 0B 0132 CALL CPIND
C98B 20 0133 #MOVE COMMAND STRING POINTER BACK
C990 0134 #TO PRINT ENTIRE 'CG9004' COMMAND
C992 2A A3 18 0135 LHL SAVSTR
C993 EB 0136 XING
C994 21 FC FF 0137 LXI H=4
C997 19 0138 RAD D
C999 22 A3 18 0139 SMLD SAVSTR
C99C 3B 06 02 0140 JMP ERROR
C99D 0141 *
C99E 0142 #STORAGE AND MESSAGES
C99F 0143 *
C9E0 00 00 0144 INAND DW 0
C9E0 00 00 0145 FADDR DW 0
C9E2 4E 6F 26 46 0146 NOFIRST ASC /No First/
C9E4 69 72 73 74 0147 DB 0DH
C9E6 4E 6F 26 4C 0148 NOLAST ASC /No Last/
C9E7 61 73 74 0149 DB 0DH
C9E9 49 68 73 65 0150 INERR ASC /Insert location error/
C9E9 69 6F 68 20 0151 DB 0DH
C9EB 6F 72 72 0 0152 DB 0DH
C9EC 0D 0151 DB 0DH
```
MEMORY SEARCH UTILITY FOR SOL

BY FR. THOMAS MC GHEE

If you have a Solos Computer by Processor Technology, or a computer that uses the Solos ROM as a monitor, then you should find these memory search utilities useful. By making extensive use of the RAM already contained in Solos, it was possible to squeeze into 273 bytes a program that allows the user to clear memory, search for a given byte, search for two-byte patterns, and display 960 bytes of memory on the VDM display.

The program resides in the Solos on-board RAM area, from C900 to C91F (although it may reside anywhere). The reason for choosing this area of RAM is that every Solos Computer has RAM in this area, and it is often unused. In addition, I have written the memory clear routine to clear memory only up to the Solos ROM which starts at C900...in this way the memory utilities are never cleared.

The Solos Computer has as its main output device a Video Display Monitor (VDM) that is a memory-mapped device. This, coupled with the fact that it will display a unique character for every combination from 00 to FF, makes it possible to obtain a visual copy of sections of memory.

Unlike some memory search programs that only identify where in memory a match has been found, these utilities show you the matched character(s) IN CONTEXT. This allows the user to quickly determine whether or not he has really found what he is looking for, or whether he must continue his search.

Another nice feature about these utilities is that they are accessed by means of Solos CUSTOM COMMANDS. The first part of the program actually loads the custom commands into the custom command table. Should the custom commands be erased (as they are any time the Sol is reset), they may be reloaded simply by typing "EX C900". This assumes of course, that you already have the program in memory.

USING THE UTILITIES

Normally the utilities will be loaded via tape or disk. Once the program is in, type "EX C900". This will load the custom command table, allowing the utilities to be accessed by their custom command names.

CL "CL" is the custom command to clear memory. Memory is cleared from 0000 to C900. "Clearing" consists of filling the memory with the code for a 'space'. The reason for using a space rather than FF is that VISUALLY a space shows up as a blank area. The clear character is located at C906, should you wish to change it. To clear memory type "CL" followed by a carriage return. When the Solos prompt character reappears, memory is cleared.

FN "FN" is the custom command to "Find a Number." This is a search for a single byte. Type "FN XX", followed by a carriage return, where XX is a hexadecimal number in the range 00 to FF. When a match is found the address of the match will appear at the top of the VDM screen. Nine lines of 64 characters will be displayed along the bottom half of the screen. The found character will be the first character on the middle (fifth) line. To aid in quickly spotting the character, it is made to blink under software control. To continue the search, hit the space bar or any key except "Mode Select". The addresses of all matches will be listed one after another along the top of the screen. When room runs out, the addresses will be written down. The addresses listed, always keeping the bottom half of the display free for displaying the matched character in context. The program will terminate automatically after one complete pass through 64K of memory. The user may change the search at any time by hitting the "Mode Select" key. Terminating causes the Solos prompter character to be displayed.

FC "FC" is the custom command to search for two contiguous characters. Type "FC AB" followed by a carriage return, where "AB" is the character combination to be searched for. The format for displaying matches is the same as that described for the "FN" command, and termination occurs in the same way. The search characters may be a combination of letters, numerals, and control characters, although certain control characters are disallowed because they have immediate action. Among these are control A, J, M, S, Q, Z, which perform cursor control or carriage return or line feed operations. In addition, leading spaces cannot be searched for, although trailing spaces are OK. This is due to the way a command line is scanned by Solos. All search characters are entered as regular non-inverted characters, but searches are made with the most-significant-bit stripped, so matches will occur on both inverted and non-inverted video characters. The address given at the top of the screen is the address of the first character in the search pair.

SC "SC" is the custom command to display a block of memory on the screen. Type "SC XXXX" followed by a carriage return, where XXXX is the address of the first byte to be displayed. (The address may be entered in a shorter form if desired. 21 bytes (same as being @000) will display with 64 characters per line. The TOP line is reserved for the command line. To continue the search to some other area of memory, simply type in the new address. The program will display the requested area as soon as a carriage return is received. To terminate the screen search, hit the "Mode Select" key. During a screen search, the current address of the first displayed memory byte is maintained on the top line of the VDM screen.

You can test memory by clearing it and then loading it with a known pattern. Using "SC" it is easy to spot any change in the pattern. More importantly, at a glance you can usually detect if there is any repetitive pattern to the errors. I have found the utilities especially useful for modifying software that includes text. It is an easy matter to find the text storage areas and examine the manner in which it is stored. We have used it to find and alter the reserved areas of routines and Extended BASIC, and we also used it to change the messages contained in TRK60. With the ALS-8 assembler, we have found occasion to use it to recover files that had an error in them, and which could not otherwise be saved.

ABOUT THE AUTHOR

FR. Thomas Mc Ghee is a Catholic priest in the Salesians of St. John Bosco. He teaches electronics and Computer Technology at DON BOSCO TECHNICAL HIGH SCHOOL in Paterson, New Jersey. He has been involved in teaching in the computer field since 1971, and has been active in the field of hobby computers since 1972. He has built several computers including ones based on the 8008, 6800, and 8080, and has been active in the design of various interfaces and peripherals for hobby computers. He has (Continued on page 8)
MEMORY SEARCH UTILITIES FOR SOL

(Continued from page 7)

had articles published in BYTE, ELECTRONICS, POPULAR ELECTRONICS, PCC, and in numerous newsletters put out for the hobby computer market.

Fr. Tom is active both in hardware design and in software programming.

Bro. Al Roman, co-author of the software included in this article, is also a teacher at Don Bosco Tech. He teaches Machine Shop as well as a course in Machine Language and Assembly Language Programming for the 8080 computer. Bro. Al has used computers for Numerical Control applications in the machine shop, and is a dyed-in-the-wool software freak.

| 7000 | 0081 | MEMORY SEARCH UTILITIES |
| 7000 | 0082 | FOR PROCESSOR TECHNOLOGY |
| 7000 | 0083 | SOL COMPUTERS |
| 7000 | 0084 | |
| 7000 | 0085 | WRITTEN BY BRO AL ROMAN |
| 7000 | 0086 | AND FR THOMAS McGHEE |
| 7000 | 0087 | DON BOSCO TECH |
| 7000 | 0088 | PATerson, NEW JERSEY 07582 |
| 7000 | 0089 | |
| 7000 | 0090 | THESE UTILITIES MAKE |
| 7000 | 0091 | EXTENSIVE USE OF ROUTINES |
| 7000 | 0092 | CONTAINED IN SOLOS |
| 7000 | 0093 | |
| 7000 | 0094 | PROVIDES UTILITIES TO |
| 7000 | 0095 | SEARCH MEMORY FOR A BYTE |
| 7000 | 0096 | SEARCH FOR TWO ADJACENT |
| 7000 | 0097 | ASCII CHARACTERS DISPLAY |
| 7000 | 0098 | BLOCKS OF MEMORY END |
| 7000 | 0099 | "CLEAR" MEMORY UP TO SOLOS |
| 7000 | 0100 | ALL OUTPUT IS VIA SOL VDM |
| 7000 | 0101 | |
| 7000 | 0102 | ORG BC0080 |
| 7000 | 0103 | PROGRAM RESIDES IN SOL SYSTEM RAM |
| 7000 | 0104 | |
| 7000 | 0105 | RESEt CUSTOM COMMANDS |
| 7000 | 0106 | |
| 7000 | 0107 | |
| 7000 | 0108 | RESEt LXI |
| 7000 | 0109 | D DATA POINT TO COMMANDS |
| 7000 | 0110 | |
| 7000 | 0111 | DATA ASC 'FC' CUSTOM COMMANDS |
| 7000 | 0112 | |
| 7000 | 0113 | DATA ASC 'SC' CUSTOM COMMANDS |
| 7000 | 0114 | |
| 7000 | 0115 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0116 | |
| 7000 | 0117 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0118 | |
| 7000 | 0119 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0120 | |
| 7000 | 0121 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0122 | |
| 7000 | 0123 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0124 | |
| 7000 | 0125 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0126 | |
| 7000 | 0127 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0128 | |
| 7000 | 0129 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0130 | |
| 7000 | 0131 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0132 | |
| 7000 | 0133 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0134 | |
| 7000 | 0135 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0136 | |
| 7000 | 0137 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0138 | |
| 7000 | 0139 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0140 | |
| 7000 | 0141 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0142 | |
| 7000 | 0143 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0144 | |
| 7000 | 0145 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0146 | |
| 7000 | 0147 | DATA ASC 'CL' CUSTOM COMMANDS |
| 7000 | 0148 | |

(Continued on page 9)
MEMORY SEARCH UTILITIES FOR SOL

(Continued from page 8)

C988 FA 91 C9 0115 JM S+3
C98E 3E 89 C8 0116 STA LINE
C991 E1 0117 POP H
C992 D1 0118 POP D
C993 C9 0119 RET * TO NEXTC OR NEXTN
C994 23 0120 SINX INX H
C995 3E FF 0122 MVI A$FFH LAST ADDRESS IN 'L'
C997 BD 0123 CMP L
C999 C8 0125 INX H LAST ADDRESS IN H (SAME)
C99A BC 0125 CMP H
C99B C3 C9 C1 0126 JMP COMND BACK TO SOLOS
C99E 0127 * JMP
C99F 77 0129 DMP LDAX D FROM TEXT..*
C9A0 13 0130 MOV H A TO SCREEN
C9A1 0131 INX D
C9A2 7C 0132 INX H
C9A3 FE DB 0133 MOVR A,H
C9A5 C2 9E C9 0134 CPI @DDH LAST ADDRESS
C9A6 C9 0135 JMP DMP
C9A9 0136 RET
C9AB 0137 *
C9AC 0138 * LOCATE ONE HEXADECIMAL NUMBER (TWO ASCII)
C9AD 0139 *
C9AE 0140 * ON SCREEN: ADDRESS OF HEX NUMBER
C9AF 0141 * (BLINKING) HEXADECIMAL NUMBER
C9B0 0142 *
C9B9 C3 A3 C3 0143 FNUM CALL SCONV GET NUMBER
C9C4 55 0144 MOV D,L
C9CC D5 C8 0145 CALL PERSE
C9CD 7A 0146 MOV A,D
C9CE ED C3 0147 CALL @3EDH PRINT NUMBER
C9D7 FF FF 0148 LXI H-1 START AT 0
C9D8 0149 *
C9DB E5 0150 LXI H-1 NEXTN
C9D8 0151 XTHL NEXTN
C9DC CD 9A C9 0152 NXTN CALL SINX INCR. HL & CHECK MEMORY
C9DF 7E 0154 MOV A,H
C9E0 BA 0155 CMP H
C9E1 C2 BC C9 0156 JNZ NXTN
C9E4 D5 0157 PUSH D SAVE DATA
C9E5 C3 55 C9 0158 JMP HERE NEXT OCCURRENCE
C9E6 0159 *
C9E8 0160 * DUMPS MEMORY TO SCREEN
C9E9 0161 * ENTER ADDRESS IN HEXADECIMAL
C9EE C8 0162 *
C9EE 21 1C C8 0163 SCRN LXI $8CB1CH BUFFER
C9F0 86 03 0164 MVI B,3
C9F3 CD 6E C4 0165 CALL $C46EH GET NAME
C9F4 CD 3A C3 0166 CALL SCONV GET ADDRESS
C9F5 E5 0167 PUSH H
C9F6 E5 0168 PUSH H
C9F7 D5 C8 0169 CALL PERSE CLEAR SCREEN
C9F8 16 04 0170 MVI D4
C9FA 21 18 C8 0171 LXI $8CB1BH BUFFER-1
C9FD 6A C5 0172 CALL $C56AH PRINT IT
C9FE E1 0173 POP H
C9F1 CD E8 C3 0174 CALL ADDOUT
C9F4 CD 36 C1 0175 CALL @C136H REMOVE CURSOR
C9F7 E1 0176 POP H
C9F8 E8 0177 * XCHG * INTO D=E
C9FA E8 0179 XRA A
C9FE 32 89 C8 0180 STA LINE SET POINTER
C9FD 32 84 0181 MVI A,$4
C9FF 21 48 C8 0182 STA LINE-1
C9F5 CD 9E C9 0183 LXI $8CB40H ACTUAL TRANSFER..
C9F5 FF FF 0184 CALL DMP ON SCREEN
C9FB 3A 07 C8 0185 LXI $8CB8FH
C9FF F5 0186 LDA $CB87H
C9FF F3 0187 PUSH PSW
C9FF C3 DT CI 0188 JMP $C107H EXIT WITH 'MODE-SELECT'
C9F8 E5 0189 *
C9F9 0190 * CLEAR MEMORY
C9F2 0191 *
C9F2 B2 0192 CLEAR LXY H FROM ADDRESS..*
C9F2 36 00 0193 MOV $828H SPACES
C9F2 83 0194 INX H
C9F2 7C 0195 MOV A,H
C9F2 FE C8 0196 CPI @DBH END OF MEMORY: 48K
C9F2 C2 85 C9 0197 INX H MORE
C9F2 C3 C9 C1 0198 JMP COMND DONE..*
The Electric Pencil word processor by Michael Shaver is software that is one of the more popular programs in use but it does present some problems when trying to use it with a Helios disk system.

When the Electric Pencil initializes itself, it zeros all remaining contiguous memory effectively preventing any other program from coexisting in memory at the same time. This leads to the perplexing paradox of attempting to load the Electric Pencil from Helios only to have it wipe out PT005 and then, when trying to reboot, have Helios write over the area occupied by the Electric Pencil. Few rounds of this scenario is enough to make Murphy himself cry. Fortunately, there is a simple solution.

According to one dealer I spoke with, there are some 45 versions of the Electric Pencil in use. They are all basically similar, differing mainly in the I/O routines. The bytes which require changing to make the program compatible with Helios should be somewhere near the same area in all versions. The version I have is designated SUN which means Selectric, UDM, Northstar disk. The following changes limits the RAM zeroed on initialization to 5000 hex. This fits nicely with the area required by PT005 (2000-BFFF) and leaves room for a printer driver besides.

Each time the AL68 is initialized it clears the system global area which includes the cursor command table. If it is desired to leave some custom commands stored permanently on the file copy, then the cursoring routine must be disabled. This can be accomplished by putting a NOP (00H) at location 005.

If the AL68 is loaded from some medium other than cassette tape, a disk system for example, then the HL register must be set the same as it would be if the cassette or the I/O drivers will not initialize properly. A successful format for use with the Northstar minidisk is given below.
USING THE ELECTRIC PENCIL (VERSION SVN) WITH HELIOS

(Continued from page 10)

FT005 WRITE command saving from 2280 to the end of text address.
(Found at location 2283-4 in the SVN version) Loading the text back
into memory is accomplished by REND <file> 2280 with FT005.

The correct saving and loading addresses as well as the
location of the various pointer bytes in other versions can be located
by means of some test programs and examination of memory contents
with the Solos DUMP command.

Happy word processing!
(ED. NOTE: A VERSION TAILED TO HELIOS IS AVAILABLE FROM
MICHAEL SHRAYER SOFTWARE.)

AUTOMATIC RELOCATOR PROGRAM
BY JOE MAGUIRE

Automatic relocator program. Originally printed in Byte Magazine for

(Continued on page 12)
AUTOMATIC RELOCATOR PROGRAM

(Continued from page 11)

C8C0 E1 0530 POP H
C8C1 23 0535 INX H
C8C2 7B 0540 MOV A.E
C8C3 9E 0545 SUB M
C8C4 23 0550 INX H
C8C5 7A 0555 MOV A.D
C8C6 9E 0560 SBB M
C8C7 DA 93 C9 0565 JC L0OP
C8C8 2B 0570 DCH X
C8C9 7E 0575 MOV A.N
C8CA 51 0580 SUB C
C8CB 23 0585 INX H
C8CC 7E 0590 MOV A.M
C8CD 9D 0595 SBB B
C8CE 00 0600 JC L0OP
C8CF 2B 0605 DCH X
C8D0 4B 0610 XCHG
C8D1 6A 0615 LMLD DISP
C8D2 8E 0620 XCHG
C8D3 7E 0625 MOV A.M
C8D4 63 0630 ADD E
C8D5 77 0635 MOV M.A
C8D6 23 0640 INX H
C8D7 0E 0645 MOV A.M
C8D8 5A 0650 ADD D
C8D9 77 0655 MOV M.A
C8DA C3 0660 JMP L0OP
C8DB 7E 0665 COMPH A.H
C8DC 2F 0670 CMA
C8DE 67 0675 MOV H.A
C8DF 7D 0680 MOV A.L
C8E0 2F 0685 CMA
C8E1 6F 0690 MOV L.A
C8E2 23 0695 INX H
C8E3 09 0700 RET
C8E4 B1 0705
C8E5 11 0710 TH58 DNV 1101H
C8E6 21 0715 DNV 2221H
C8E7 31 0720 DNV 3122H
C8E8 32 0725 DNV 3232H
C8E9 C3 0730 DNV 0332H
C8EA C4 0735 DNV 0432H
C8EB CC 0740 DNV 00CDCH
C8EC D4 0745 DNV 0040CH
C8ED GC 0750 DNV 00CDCH
C8EF E2 0755 DNV 00E2E2H
C8F0 EC 0760 DNV 00E2EH
C8F1 F4 0765 DNV 00F4FAH
C8F2 FC 0770 DNV 00FCF5H
C8F3 FA 0775
C8F4 08 0780 TH52 DNV 00F6H
C8F5 1E 0785 DNV 11F6H
C8F6 2E 0790 DNV 22F6H
C8F7 3D 0795 DNV 33F6H
C8F8 4B 0800 DNV 00CECH
C8F9 D3 0805 DNV 00D5CH
C8FA DE 0810 DNV 00DEDEH
C8FB EF 0815 DNV 00EDE6H
C8FC F4 0820 DNV 00F5CH
C8FD 8B 0825
C8FE 48 0830 MVI B.M
C8FF 9C 0835 MVI H
C800 9C 0840 CALL SOUT

CA00 C1 0845 POP H
CA01 2F 0850 INX H
CA02 7E 0855 MOV A.M
CA03 9E 0860 CALL SOUT
CA04 0865 CPI 00H
CA05 C2 17 C1 0870 CALL SOUT
CA06 7E 0875 XCHG
CA07 9E 0880 ADD D
CA08 CD 1F C0 0885 CALL SOUT
CA09 DA 29 C6 0890 JMP P1
CA0A EF 7F 0895 CALL SOUT
CA0B 9E 0900 ANI 7FH
CA0C FE 00 0905 CPI 09H
CA0D AD 30 C6 0910 MOV B.R
CA0E 7C 0915 CALL SOUT
CA0F 8C 0920 JMP P1
CA10 04 20 0925 P2 MVI B.REH
CA11 FD 19 C0 0930 CALL SOUT
CA12 CE 10 C0 0935 CALL SOUT
CA13 BE E5 0940 PUSH H
CA14 4D 4B C6 0945 CALL CRLE
CA15 E1 0950 POP H
CA16 CC 99 0955 RET
CA17 06 0960
CA18 06 0965 CALL SOUT
CA19 00 0967 CALL SOUT
CA1A 06 0970 CALL SOUT
CA1B 00 0975 CALL SOUT
CA1C 06 0980 CALL SOUT
CA1D 00 0986 CALL SOUT
CA1E 00 0992 CALL SOUT
CA1F 00 0998 CALL SOUT

(Continued on page...
A report on the new Double Density Micro Disk System
from North Star Computers

A great number of Sol owners have the North Star Micro
Disk system which, until now, was available only in a single
density version with about 50K byte capacity. An interview with
Peter Midnight of North Star by Solus News answered many
questions about the new double density models soon to be
available.

SN: Can you describe your new system for us?

PM: The double density versions of the HORIZON and MDS systems
each include: a new controller board capable of both double and
single density recording, a new Shugart SA-400D minifloppy drive,
a new DOS and an upgraded Basic.

SN: What about the capacity?

PM: Each double density diskette will have twice the former
capacity: 180K bytes. The controller will handle up to four
drives so that, when double sided drives become available from
Shugart in early 1979, users can expect to access almost one and
one half megabytes of on-line information. This is truly big
system performance at mini disk prices.

SN: What must I do to be able to use double density with my
present system?

PM: You must purchase the new controller board and have your
drive modified for double density. All your single density
diskettes can be read by the new system. Drives may be converted
by taking them to your dealer or sending them to North Star. The
cost for each drive modified will be $145.00. Allow four to six
weeks for modification.

SN: I have a dual drive system. Must I convert both drives?

PM: It's optional. In a multiple drive system, the double
density drive must be selected as unit 1, but, other drives may be
either single or double. Of course, only double density
drives can write in that format but they are able to write in
double density mode if so desired.

SN: Can I use the new DOS or Basic with my old controller?

PM: All of the on-board proms of the new controller have been
changed so the old DOS will not work with the new controller nor
will the new DOS work with the old one. The Basic is being
upgraded to allow reading and writing in double density, if
selected, and these features won't work, of course, if an attempt
is made to use them with a single density controller or DOS.

SN: What about all my programs?

PM: All software written to conform to the standard entry points
as used in the old DOS and all Basic programs without special
calls to machine language subroutines within the DOS or
controller prom area, should work. Vendor software, which
contains its own DOS, will probably not work. North Star has
provided information to Lifeboat Associates, the vendor of North
Star compatible CPM, to enable them to modify the BIOS so that it
will work with double density.

(Continued on page 14)
NORTH STAR GOES DOUBLE DENSITY

(Continued from page 13)

SN: Other than increased capacity on my disks, are there any other benefits of double density?

FM: Yes. The double density format is achieved by packing in more bytes per sector, actually 512 as opposed to 256 before. This means higher read/write speeds and consequently, less time for a given amount of data transfer. You should notice much faster operation.

SN: Are there any changes planned for the bootload address or software location?

FM: The boot start address will continue to be E900 in the standard version and is determined by the programming of the PROMs supplied with the controller board. Unlike the previous single density proms however, the sector load address will be software selectable. This means that, with a suitable software relocator, or custom origin software available from us, you may locate the DOS at any address you choose and not have to buy a special PROM set to go with it. The controller will boot up the DOS to an address determined by a software byte stored on the disk.

SN: What about people who still want your single density controller? Are they going to be left out as far as supplies and support are concerned?

FM: No. North Star will continue to manufacture and support the single density controller. All of our software will continue to be offered in the single density format so as to be compatible with the many users who will continue with that equipment. Note that it is a simple matter, for a user with the new system, to convert a disk from single to double density. For that reason, most software vendors should continue to offer their products in single density format also.

SN: How can I tell if some advertisement is referring to single or double density?

FM: To avoid confusion, the single density disk products are renamed with an S included in the product name. The double density will have a D in the name. There will be no single density additional drives offered; all drives delivered after mid November will be double density even if ordered for use in a single density system.

SN: What about availability and price?

FM: The double density equipment will be available in mid November. The price will be the same as has been for single density. The double sided drives should be available in early 1979. The price of these has not been determined yet.

SN: Are there any plans to offer some sort of conversion kit so that I may use parts from my present single density controller, the IC's for example, to build a double density kit?

FM: No, not at this time.

SN: Well, Peter, thanks and good luck with your new products.

FM: Thank you. We are very proud of these new products, and believe that they will find acceptance which exceeds the outstanding success of our initial single density HORIZON and MDS systems. Good luck to Solus News.
LETTERS

DEAR MR. SOKOLOW AND MEMBERS:

NOTE THAT FRED SALAMA IS HAVING TROUBLE WITH HIS EXPANDER PRINTER. MY EXPERIENCE HAS BEEN THAT I WAITED 14 OR 15 WEEKS TO RECEIVE THE UNIT AND HAVE BEEN USING IT ABOUT A WEEK.

THE INTERFACE INSTRUCTIONS IN THE EXPANDER MANUAL REFERS TO DATA LINE 1 - 7+, WHICH SHOULD BE PAIRED WITH THE PARALLEL OUTPUT DATA LINES. THE POD ON THE J2 CONNECTOR OF SOL. FOR EXAMPLE DATA LINE 1 GOES TO J2 TERMINAL 25 WHICH IS POD 1+, AND DATA LINE 2 TO J2 TERMINAL 26+ WHICH IS POD 1+ AND SO ON. IN ADDITION, IT IS NECESSARY TO RESTRAP THE STORE ON THE EXPANDER BY CUTTING BETWEEN J8 AND J7+ AND ADDING A STRAP FROM J8 TO J6+

FURTHER COMMENTING ON THE EXPANDER: THERE IS A LINE SWITCH THAT SUPPOSEDLY WILL INSTIGATE CARRIAGE RETURN AT THE END OF THE LINE. UNFORTUNATELY, THE BOARD HAS NO WIRES WHERE THE SWITCH TIES IN. SO ONE MUST BE CAREFUL THAT A CARRIAGE RETURN IS INSTUITED AT LEAST EVERY 80 SPACES BY SOFTWARE AND FINALLY, IN MY EXPANDER, THE RIBBON REVERSE IS NOT WORKING UNLESS I HELP MANUALLY.

THIS LETTER IS BEING TYPED ON MY EXPANDER USING MY NORTHSTAR BASIC.

YOURS VERY TRULY,

BERNARD PLOTKIN
3128 COLLINS AVENUE
MIAMI BEACH, FLORIDA 33139

P.S. I WOULD BE GLAD TO HELP IN ANY WAY I CAN BOTH THE CLUB AND ANY MEMBERS.

READY

ON MICROPOLIS INTERCHANGE

Micropolis Users:

I am interested in setting up a Micropolis/Sol users group for exchanging information, software, and application ideas. Although the Dual density and Quad density Micropolis don't match or mix (believe me we have tried, but Micropolis finally admitted that the two are and will remain incompatible), software can be transferred via Cut tapes.

Robert van Spyk
Geography Department
University of Hawaii at Hilo,
Hilo, Hawai‘i 96720

Dear Mr. Stan Sokolow,

Some time back you sent me a complimentary copy of SOLUS NEWS after receiving a letter from Maury Goldberg of Mini Micro Mart in Syracuse, N.Y. I found the newsletter most interesting and informative, and am eager to continue receiving it (and obtaining all back issues if at all possible). Our computer club here at Don Bosco Tech has over 100 members, and we are quite active both in Assembly Language and BASIC programming. Unfortunately we operate on a shoe-string budget and cannot subscribe to all the publications we would like to. Since I cannot pay for a subscription, I thought I would do the next best thing and write something you could use in your newsletter. I think you and other SOL users will find the memory search routines quite handy to have around! We developed these a few months back to aid us in modifying and debugging software... they make extensive use of the routines found in the SOLUS module.

To aid you in evaluating this program, I am including a cassette tape (for you to keep) with the program (SRCH) on it. There is also ASSM, the AIS-6 assembler file on the tape, and a program called LIST. LIST can be used to get a printed, assembled listing. Once LIST is loaded just type EX 2H , and the listing will commence on device #1. (To change the listing device, change the data at 2MB to the appropriate device number). This material is offered to you on a non-exclusive basis...copies have also been sent to ACCESS and PEOPLE'S COMPUTERS, since I would like to make the program available to as many SOL users as possible.

Sincerely yours,

Mr. Thomas McGhee
ON N* USERS GROUP

Dear Stan,

The newsletter is great! Keep it up. The reduction is okay but since I keep mine in a ring binder I prefer the layout of Vol. 1, No. 3. It makes it much easier to refer to later on. I joined NSUGS a while back but have not heard a peep out of them since receiving Vol. 1, #1 back in April. I sent in a program to their library and have not heard a word or gotten my disk back despite two letters to Dick Milewski whom I sent the disk to. I guess it's gone for good. Plus, now they are selling programs from the library but I don't know of anyone who has ever gotten one in exchange for sending in a program. Do you? If this sounds like sour grapes it is because disks and postage don't come cheap.

I would be interested in hearing from anyone who knows about the following:

1/0 patches for BBS 8080 Simulator by Lee Stock in the Sept, 1977 Kilobaud;

Pilot from Dr. Dobbs patched to run on Sol/North Star disk;

MIA Basic patched to the N* so you can load and save programs on disk.

My notion standing as an assembly language programmer is becoming a handicap in acquiring and operating some very interesting software. I've seen the FT Pilot on cassette but refuse to get involved with it unless and until someone patches it to Northstar. Most of the people I've met in Lubbock are hardware types and the software pros are too busy to get involved in such mundane projects.

As a satisfied user I would like to recommend the software distributed by:

Microcomputer Resources, Inc.
3000 Medical Park Drive
Suite 107
Tampa, FL 33612
Tel 813-977-5940

They offer several different special purpose I/O drivers tying the SOLIS operating system to the North Star DOS. Their package #6 for $40.00 is an I/O driver to allow transfer of data from North Star to Helios. Their package #1 for $10.00 ties the SOLS cursor control keys to the N* Basic text editor. The handiest feature of this package I've found is that you can stop the screen display with the space bar. Pressing the space bar ends one line and touching any other key restarts the display. The service on my order was fast and the price is reasonable. The supporting documentation was excellent.

Along those same lines the DOS and Basic movers being distributed by the Digital Dell, 65 West El Camino Real, Mountain View, CA 94043 are excellent pieces of software. Any serious N* user should have this package.

Will the SOLIS library distribute programs on diskette? When? Is the catalog available yet? I would be interested in hearing from anyone out there in SOLIS land who has N* software to sell/swapp or whatever.

Sincerely,

Johnny L. Zep

(ED NOTE: I THINK THE COMPANY YOU MENTION HAS A PACKAGE WHICH LETS PTC CASSETTE SOFTWARE SUCH AS PILOT RUN UNDER NORTH STAR DOS. IT'S GENERAL PURPOSE SO IT WORKS WITH ALL SOLOS/CUTER PROGRAMS. ABOUT SOFTWARE ON DISKETTES—YES, BUT I STILL AN WORKING ON ARRANGING FOR N* DISKETTES. INITIALLY ONLY HELIOS.)

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ON PTC MEMORY, SQUARE ROOT, AND NEW PRODUCTS

Joseph A. Iaquira
1-72 Heroinoue
Yokohama, Japan 233

Sept. 5, 1978

Dear Stan,

Please delete the item about the ALSE in my previous letter. It turns out that the problem was not in the relocator but in my memory. During the relocation process a few memory bytes got messed up and caused strange things to happen to the new ALSE.

PTC MEMORY BOARDS A recent conversation with PTC over some memory (16KRA) problems elicited the following caution: Do not substitute parts in an attempt to find the trouble in a malfunctioning memory board. Every IC is selected according to a rigid checkout procedure. Changing IC's from one board to another or even on the same board can cause more problems than it will correct. Dealers will soon have the alignment procedure so take a malfunctioning board to them for checkout. The 32KRA memory board comes in two versions. The memory chips will either be "high" or "low". The chip, a 2100, is actually a 16K part with a bad bit in either the high or low 8K segment. This is not poor quality but in fact a cost saving method used by many memory board manufacturers. These 16K rejects are capable of normal performance in an 8K environment at a considerable saving. The important thing is that a "high" cannot be substituted for a "low" or vice versa. The chip will be marked with its gender by an AGH or AGL following the type number.

Note: The long memory test in the 16KRA manual may be patched to test a board at any address. Change the byte at 0010 (6910 if you have a version starting at 3000) to agree with the high byte of the first page of memory to be tested. For example, to test a board addressed from 4000 to 7FFF, ENTER 40 at location 0010.

FLAT SQUARE ROOT A bug seems to be present in the SQR function of extended cassette Basic. If the argument of the function happens to consist of eight digits, truncation of the leftmost digits sometimes results and the wrong answer is returned. For example, SQR(99.999999) will return 1 instead of some number close to 10. The error occurs whether the argument is a constant or a variable.

Sincerely,

Joe Iaquira
Dear Stan,

October 12, 1978

I received your notice that my remarks had already been submitted for printing in Solus News. Sorry about the omission in my item on the ALSB but I was eager to get the news out. Next time I'll check more carefully. The correction won't hurt but it was unnecessary. Enclosed is a complete analysis of the problem also enclosed is a note to enable the Electric Pencil word processor to be used with Helios.

After reviewing what I had written about the ALSB, I decided to give you a copy of my modifications to Leor Zelna's automatic code relocator program which appeared in Byte magazine for July. This has proven to be one of the most popular programs in use by the Sol owners here in Japan. I have used it to relocate ALSB, Northstar DOS, Northstar BASIC, XEK, and DISassemble Plus others. Feel free to put it in the Solus library (if it's ok with Byte) or print it in Solus News.

What follows are a few notes of interest.

**No More S-100 Boards** A spokesman at Processor Tech told me that effective immediately PTC will stop manufacturing all S-100 boards except the two popular UD, Cuts, 3FS, GFM, and the 16KRA memory board. The reason was given that PTC wants to concentrate entirely on "application systems." An application system was defined as a Sol computer, Helios disk and Diable printer. Their first such system is centered around a word processing software package and was shown at the Philadelphia computer show. Norths Solcup first got started by building S-100 accessories this appears to be the end of an era.

**16K Memory** Beginning immediately PTC will be offering their new memory board which was described as being completely redesigned. It is a single S-100 board which can be configured in 16K blocks to a total of 64K of dynamic RAM. Recent Solos have been shipped equipped with this board (a comment by a dealer but not confirmed with PTC was that Solos can now be ordered without any memory installed).

**Color Graphics** While nosing around Pleasanton I came across two Color Graphics systems which will be announced on the cover of the November Popular Electronics magazine. Also sniffs but faintly, was a Mind-It disk in the works to be available sometime next year. It will offer a subset of Helios software. Now if only PTC would offer a Sol 40 with a 280CPU... wow!

**64K Static RAM** Continuing my tour through Silicon Gulch, I happened upon one company and a design engineer hard at work on a new one-board, 64K static RAM. To show you how hot this news is, the co-founder from management to start the design had only been given that morning and was quickly hustled out of there and sworn to secrecy but not before I got the promise that the design would be checked for compatibility with the Sol and Helios. The exciting thing about this board, for Sol owners is that the total power requirement for a full 64K of memory installed will be only one watt. It will run in direct competition with the dynamics. The price will be very good too. I was told. I am to get a prototype for testing with my system and I'll give a report on it for Solus News.

???????????? In another corner of the design area at the above company (which is noted for it's S-100 bus products) sits a stripped Radio Shack TRS-80 computer. Now, what do you suppose they were doing with that? I'm sure that they were hard at work on a TRS-80/S-100 bus adapter. If you think you have seen a lot of S-100 bus products, wait until a successful adapter becomes public which will open up the market for a million more prospective customers!

**Sick Sol** After more than a year of faithful service from my trusty Sol, it suddenly started doing strange things. Programs would halt in mid-execution for no apparent reason. RESET would sometimes work - sometimes not. Time to take off the cover. What I found were loose IC's, apparently the many temperature cycles of turning on and off worked those IC's out of their sockets just like rocks coming out of the ground after the spring thaw. Some judicious pressing set things back in working order. I have heard that the boards installed in the backplane can do the same thing.

**Japan Attends Show** Last week saw the conclusion of the five day data processing show here in Japan. Just over 60,000 attended to view the latest products available from countries around the world. The United States was well represented by most of the major companies including IBM, DEC and Control Data to name a few. The micro held a lion's share of the exhibit space with big displays by Commodore (PET) and Tandy (Radio Shack TRS-80). Processor Technology was represented by their dealer in Tokyo, Moonbase Store, Shinjuku. The Japanese are coming along well in their development of micros but have not, as yet, gotten the prices down to a serious threat to US imports. If you wonder why it took so long to get a PET in the USA last summer or are still waiting for level II BASIC for your TRS-80 then the reason is that about 90% of the supply is being exported. Eighty percent of the TRS-80s sold in Japan are equipped with level II basic. One dealer in Yokohama has sold a goven of 110 units for almost the last three months. Returning to the data show, the one impression that I came away with is that the 8000 processor is losing ground in favor of the 8086. The 6502 seems to be the other favorite due in part to its low price in the PET and more so in Japan where it is also a big seller in Japan. When the Japanese make their big move in the personal computer market, my bet is that it will be either with the 6502 or something redesigned but with it. The new bit chips coming out will probably be too expensive and too powerful for a home appliance type product.

**Special Item** A word to any dealers or manufacturers reading this: If you have not considered exporting your products you are missing a tremendous market. The dollar was never in a better position to make US products competitive overseas. If you don't do it now, contact the US Dept. of Commerce. They will send you pounds of free literature on how to get started. A special note to software vendors. Many Japanese have asked me for software. Software. Software. It makes no difference that it is written in English but it must work. Especially wanted are business application programs - no games please. Some smart US companies are advertising in the Japanese computer magazines and getting good results. Below are listed two magazines which have carried US advertising. They will translate the copy into Japanese for you. The usual requested form of payment in the ads is by US dollar check.

**ASCII Magazine**
- 386 W. TORIKO
- 5-6-4 Minami Housha,
- Minato-ku, Tokyo 107 Japan
- 1/0 magazine
- (somewhat akin to Byte)
- Haneza Building 507
- 2-5-1 Yoyos
- Shibuya-ku, Tokyo 151 Japan

-Joe Maguire
Dear Stan,

Here is the result of my visit to North Star this week. Feel free to put it in Solus News.

Some additional notes about the items I already submitted.

1. PTC's new color graphics system will be named CORONA.
2. PTC's new word processing system will be named WORD WIZARD.
3. PTC will continue to manufacture the GFM Sol S-100 board.

New Info:

A new release of PTOS is in the works. It will be called PTOS 1.5 and will contain several new commands including one called HELP. HELP is essentially the instruction manual written into a file but with much clearer terms and examples. A majority of the remaining files, which were in PTOS 1.4, have been extensively modified to take out the bugs, allow more freedom of operation and to give faster execution. All in all, PTOS 1.5 is practically a brand new DOS.

Software updates have been completed on the following programs which will be released to dealers shortly. All will have new manuals available.

Extended Cassette Basic
Disk Basic
Fortran
PTOS 1.5 (new)

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Joe Maguire

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Dear Stan,

As long as you and SOLUS members retain control, the "future of SOLUS News" should be excellent. Let IT produce it; they certainly aren't busy turning out copies of Access!

Note to Joseph A. Maguire: I haven't looked at the SP problem with ALS8, because mine worked fine after relocation; maybe ALS8 uses whatever stack you give it (in which case mine uses the SOLOS stack.)

Thanks for your kind words and for making me aware of the problem. I have managed to answer my question from last time (about Dynabyte 32K static memory in SOL5) by purchasing the board and trying it. I got the 450ns version from Mini/MicroComp (Syracuse, NY) for $740. It works like a charm (a slightly warm one) and the increased memory capacity really makes ALS8 and ECABASIC useful.

Some notes on software:

Ben Milander is right. DDS (Dynamic Debugging System) is very good, and the price ($30 from Computer Mart of New Jersey) is right; also, they deliver the goods quickly. The Electric Pencil may be overpriced at $180, but is generally an excellent product. Tiny-C, a language interpreter system from Tiny-C Associates, PO Box 269, Holmdel, NJ 07733, is a good idea. In spite of unjustified criticism from a certain publication (namely Computerworld), it's not the idea that is deficient, but rather the end product. There appear to be minor and/or major bugs in the system version I received for my $30. The manual, sold for $40 and including source listings, is excellent. I hope the Tiny-C people put some more effort into this; it's worth the trouble.

The trouble is, I am typing this letter on a Carterfone S15C data terminal, which is in the process of hooking up to the serial port on my SOL. I had some shipping trouble with this thing (purchased from Del-Desc in Dallas for $495 refurbished), but now it's in top shape. It should go great with that Electric Pencil software from Michael Shayer. How many people have seen the Microcopyt MegaFloppy brochure? This looks like a fantastic mass storage system (24K per 5¼" diskette) except Microcopyt is selling the drives without software ($465 per drive, $410 for the controller, or $2249 for controller + 2 drives). Maybe they (or somebody else? PT, are you listening???) will put a package together that will outperform Helios at a comparable or lower price. Well, maybe next year...

That's all for now, Stan. Good luck, and don't let the work wear you down.

Sincerely,

John Osudar

(ED. NOTE: SEE ARTICLE IN VOLUME ZERO OF SOLUS NEWS ON HOW TO MAKE SOL SERIAL PORT GIVE THE RIGHT BAUD RATE, ETC., TO ANY 2741 TYPE TERMINAL, LIKE THE CARTERFONE.)
COMANDS YOU CAN ADD TO SOLOS/CUTER

Lewis Moseley, Jr.
2514 Glendale Ct., NE
Conyers, GA 30207
October 20, 1978

Dear Stan,

It was really a pleasant surprise to see all of my recent letters in the last issue of SOLUS News. I hope that some of our members benefited from my information. Almost everyone must occasionally wonder how a particular software product works. If it is important enough to you to take the effort to find out, then go one step farther and share your knowledge with others.

Seeing my work in print motivated me to write a few of the short utility routines I asked for in my recent letter. Enclosed are assembler listings for three utility functions: memory test, ASCII memory dump, and block memory fill. All operate as SOLOS/CUTER Custom commands, and all load into the user portion of the 1K RAM area at C880H. I feel that the computer should do its own housekeeping work, so when loaded from tape by the ASC command, the routines automatically set themselves up as Custom commands. After a hardware reset, EX C880 would do this again. I envision a set of short routines such as these which can be quickly loaded from tape as needed and executed at a common entry point such as C880. Each routine would overwrite the existing first entries in the custom command table, on the theory that the new routine itself probably overwrote the old one in memory.

I have two other software items which I didn't send along because they are of only limited application. I have an assembler which is a real bastard case. It is the old IMSAI version of the old PICO software #1, reconverted to work under SOLOS/CUTER. It has been or otherwise acquired a series of patches which allow this old relic to handle the ASCII pseudo-op, print a symbol table, save and load files from tape, pause or terminate output records, set SOLS parameters, record file names, control characters for special functions, etc. I can provide a commented source listing (of the patches only) to anyone who is interested for $3.00 to cover copying and postage. Or, for $3.00 I'll send a cassette tape of the patches. Or, $5.00 for both. The patches form an assembler file which, when assembled, in effect reassembles the assembler itself. (To be sure we are talking about the same program, this is the one which loads at 0, has the actual program start at 50H, and starts with a jump table to various internal routines.) The methods used in the patches could be adapted, probably, to other versions of the program, including PICO's "new" cassette version.

Several months ago, worldwide electronics of Hudson, NH was offering used commercial quality impact printers with documentation for $225 + shipping. I purchased one of these, which turned out to be a Sanders FQ110 unit based on the Singer HSP-30 print machinery. After solving some problems, this turned out to be an excellent printer, which, however, required some custom interface work, both hardware and software. If anyone is interested, I'll supply info on how I did this, including a source listing, for $2.00 copying and postage. (The utility program listings were done on this printer.)

Now, maybe someone can help me. I would like to write my software to work with both SOLOS and CUTER, but the internal routines of SOLOS are at different addresses from the CUTER routines. I have only a source listing for my CUTER,

and PICO didn't even bother to answer my request for a SOLOS listing. Does anyone out there have a spare copy of the SOLOS listing they could send me? I would be glad to pay reasonable copying or postage or trade for other software I have.

Things in the works: improved tape 1/0 for MSA 8K basic, easier to use than Helvin Dalton's recent version. Memory block move utility. Others???

Well, enough for this month.

Best regards,

[Signature]

---

ASSM J

0077 *ALTO ROUTINE TO FILL A RANGE
0100 *OF MEMORY WITH A CHARACTER
0120 *SPECIFIED IN THE COMMAND
0130 *
0100 *ALSO, ROUTINE TO DUMP
0150 *MEMORY IN ASCII
0160 *
0100 *MEMORY AFTER
0170 *50TH Patterned After
0180 *SOLOS/CUTER DUMP ROUTINE
0190 *
0110 *REVISED BY LEWIS MOSELEY, JR.
0120 *2514 GLENDALE CT. NE, CONYERS,
0130 *GA. 30097
0140 *
0140 *ADUMP WAS PUBLISHED IN JAN, 1975
0150 *JOURNAL, POB 1, MENLO PARK, CAL
0160 *
0170 *FILL COMMAND TAKES THIS FORM
0180 *FILL AD01 AD02 (CHAR)
0190 *WHERE 'CHAR' IS A CUSTOM COMMAND
0200 *AD01 IS THE START ADDRESS
0210 *AD02 IS THE END ADDRESS
0220 *
0230 *CHAR IS THE OPTIONAL
0240 *CHARACTER USED TO FILL
0250 *
0260 *IF (CHAR) IS OMITTED: THE
0270 *DEFAULT VALUE IS '0'
0280 *
0290 *ADUMP WORKS JUST LIKE THE
0300 *DUMP COMMAND, EXCEPT THE OUT-
0310 *PUT IS IN ASCII, NOT HEX.
0320 *
0330 *ALL PARAMETERS TO BE IN HEX
0340 *CONVERSION BY SOLOS/CUTER
0350 *INTERNAL ROUTINES
0360 *
0370 *EQUIVALENT TO CUTER-IN
0380 *
0390 *SOLOS USERS CHANGE AS
0400 *NECESSARY
0410 *
0420 *SCMD
0430 *PSCAN EQU 00378H
0440 *RETRN EQU 00054H
0450 *ADU5 EQU 00329H
0460 *RCLF EQU 00342H (Continued on page 20)
(Continued from page 19)

1460  SOUT EQU 023FH
1470  SOUT EQU 0231H
1480  COUTAG EQU 0CB1H
1490  *
1500  *WHEN EXECUTED AT CBO*, THE ROUTINE
1510  *CREATES ENTRIES FOR BOTH OF ITS PARTS
1520  *IN THE SOLGS/CUTER CUSTOM COMAND
1530  *TABLE, OVERRIDE THE FIRST TWO
1540  *EXISTING ENTRIES, IF ANY.
1550  *THE TWO COMMANDS ARE DISPLAYED ON
1560  *THE SCREEN FOR CONFIRMATION.
1570  *
1580  ENTER EQU &
1590  ORG 0230H
1600  LHI $1,F
1610  SLOLS $1,RAK AREA
1620  SHLD CUTA5
1630  EX ADDRESS
1640  SHLD CUTA5
1650  SHLD CUTA5
1660  LHI $1,AD
1670  SHLD CUTA5
1680  CALL SCRN
1690  CALL SCRN
1700  RET
1710  *
1720  FILE EQU $
1730  CALL SCNV
1740  GET START ADVR
1750  POP H
1760  CALL SCNV
1770  GET END ADVR
1780  PUSH H
1790  CALL SCNV
1800  GETMSP
1810  MOV B,4
1820  CALL SCNV
1830  MOV C
1840  CALL SCNV
1850  MOV A
1860  CALL SCNV
1870  CALL SCNV
1880  CALL SCNV
1890  CALL SCNV
1900  CALL SCNV
1910  CALL SCNV
1920  CALL SCNV
1930  CALL SCNV
1940  CALL SCNV
1950  CALL SCNV
1960  CALL SCNV
1970  CALL SCNV
1980  CALL SCNV
1990  CALL SCNV
2000  CALL SCNV
2010  CALL SCNV
2020  CALL SCNV
2030  CALL SCNV
2040  CALL SCNV
2050  CALL SCNV
2060  CALL SCNV
2070  CALL SCNV
2080  CALL SCNV
2090  CALL SCNV

(Continued on page 21)
(Continued from page 20)

0170 * ALL PARAMETERS TO BE IN HEX. SOLDS/CUTER
0180 * ROUTINES ARE USED TO CONVERT ADDRESSES.
0190 *
0200 * THE FOLLOWING EQUATES BASED ON CUTER. SOLDS
0210 * USERS SHOULD MAKE APPROPRIATE CHANGES.
0220 *
0230 *
0240 * SCNV EQU 0378H CONV TO HEX, CK FOR ERRORS
0250 * PSCAN EQU 03A9H SAME, BUT OPTIONAL
0260 * RETRAN EQU 0346H RENTRY POINT
0270 * SOUT EQU 0399H STD OUTPUT
0280 * ADDT EQU 03D9H FROM 'DUMP' ROUTINE
0290 * BOUT EQU 037TH ALSO FROM 'DUMP'
0300 * CRFL EQU 03D9H CRFL ROUTINE
0310 * CUTO EQU 03E8H CUSTOM COMMAND TABLE
0320 * PSW EQU 04 D0 E0 ON OLD-STYLE SAPIK
0330 *
0340 *
0350 * WHEN EXECUTED AT C000H, THE ROUTINE
0360 * CREATES AN ENTRY IN THE SOLDS CUSTOM
0370 * COMMAND TABLE FOR ITSELF, OVERWRITING
0380 * THE PREVIOUS FIRST ENTRY, IF ANY.
0390 *
0400 * OGG COGH JH SOLDS/CUTER IX RAM
0410 *
0420 * LX PH 'TH' COMMAND NAME (REVANGED)
0430 * SHTD CUTAB
0440 * LXI H, START EXECUTION ADDRESS.
0450 * SHLD CUTAB+2
0460 * RET THRU WITH SETUP
0470 *
0480 * MEM TEST ROUTINE STARTS HERE.
0490 * START D $1
0500 * CALL SCNV GET START ADDRESS OF TEST
0510 * SHLD BEGIN STORE FOR LATER USE
0520 * CALL SCNV GET # OF BYTES TO TEST (0=DATA
0530 * SHLD LENGTH STORE
0540 * LXI H, GET LO-BIT 0
0550 * SHLD ERR CLEAR ERR CTB
0560 * INX H SET UP FOR PSCAN
0570 * CALL PSCAN GET OPT PARAM. 3A KEEP 1
0580 * MOV A L+$ SET LOW ORDER BYTE
0590 * STA TIMES STORE
0600 * CALL CRFL
0610 *
0620 * THIS IS RENTRY POINT FOR MULTIPLE TESTS
0630 * AGAIN LHLD LENGTH
0640 * XCHG ONE HAS # OF LOCATIONS TO TEST
0650 * LHLD BEGIN H+1 HAS STARTING ADDR
0660 *
0670 * CLEAR XRA A ZEROD ALL MEM LOCS TO BE TESTED
0680 * XCHG M, D
0690 * D, XCHG
0700 * INX H
0710 * CMP D
0720 * JNZ CLEAR
0730 * CMP E
0740 * JNZ CLEAR
0750 * ALL THROUGH WITH CLEAR.
0760 *
0770 * NON DJ TEST A: CHECK IF ALL CLEAR
0780 * TESTA LHLD LENGTH SET LENGTH ADDR AGAIN
0790 * XCHG TO D
0800 * LHLD BEGIN GET START ADDR AGAIN
0810 *
0820 *
0830 *
0840 * MEMORY STILL CLEAR?
0850 *
0860 *
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Dear Sir,

We are a youth center dealing with social disadvantaged children. Our media is teaching through fun and creativity. We have various departments like electronics, physics, music, handcrafts, and English teaching. We started a computing department where children can learn about the computer, how to write basic programs, and for the advanced ones, even in assembly language. The children are 9-13 years old. Our equipment consists of 4 solus-28 and 3 micropolis floppy disks. We have also a speech analyser and synthesizer (计算机) and a music box.

We are running P-T, Basic S, and now 6.5K byte shop. We also using ALS-8 for assembly and text processing. We are having trouble with basic 5 in the escape sequence for display module and in setting breakpoints in ALS simulator getting the impression there is a bug here. Another difficulty is that the diskette driver ROM sits at F400 and the drivers of ALS also. We are not able to save the edited program on the diskette yet. Do you have the listing of ALS or may be some idea how to solve it?

Our subjects of interest are everything that may entertain our students and some applications like a mailing list, letter generator. We have other clubs in different cities in Israel even in Borders Village, and we are interested in a primitive network installation.

We hope that through the Solus Club we could find solution for our problems and also find other clubs with similar interests.

Please find enclosed a one year subscription.

Waiting for a quick response. I remain

Kalman Blonder

Computer Center Coordinator

P.S. This letter was edited and printed with ALS-8. There are some troubles with hyphenation and justification.
The SAM76 language was designed by people for people - not by programmers for programmers. It follows a well defined syntax which is easy to learn and to read. The notation avoids the use of pseudo "English" words which are a frequent source of confusion and ambiguity in many of the other computer languages.

The SAM76 language can be used in a large variety of tasks as one is able to imagine - this or personal computers without requiring computer specialists or programmers to intercede.

There are more than 150 functions - or instructions - available making the SAM76 language the most powerful available today, and it fits in approximately eight thousand bytes of memory; this can be ran or rom as the user desires.

The SAM76 language can be viewed as a real language which follows the user's stream of consciousness in much the same manner as spoken language. This permits the language in its written form as used by the computer and the user to serve as documentation.

The SAM76 language provides the user with the capability of requiring the computer to perform complex operations in many areas; a few of these are: Control, Text manipulation and editing, Simulation, Arithmetic with any desired precision.

The SAM76 language is interactive and reactive. As one task is accomplished the user continues and in effect the SAM76 language processor carries on a conversation, reacting to expressed desires.

The SAM76 language provides a uniquely flexible means to control facilities or to derive data from sources other than the user’s keyboard.

The SAM76 language is a "string processor". This means that the units of information are not confined to any fixed length, but may be made up of any number of characters, or even no characters, as determined by the user. Entire strings may be manipulated by single commands.

The SAM76 language is interpretive. This means that when a string is evaluated and an expression found to contain an instruction or command, then the specified action is immediately performed and the resulting value, if any, replaces that expression in the string.

The SAM76 language facilitates the use of pre-defined procedures. This means that the user's procedures or scripts may be stored for potential use and later called by name and immediately acted upon, with variables supplied to specified arguments as part of the process.

The SAM76 language makes no distinction, except in the user's own use of information, between data and procedures. Procedures tell the processor what to do; data is the information acted upon by the procedures. Procedures may be modified when other procedures treat them as data.

The SAM76 language is most powerful in providing man-machine interaction permitting the user to modify his work and to intervene when desired. The language provides facilities to define and save scripts for subsequent use; this in effect can behave or operate as if they themselves were inherent functions of the language.
ON EXPANDING SOL TO 26 SLOTS

SMITH-KETTLEWELL INSTITUTE OF VISUAL SCIENCES
and
DEPARTMENT OF VISUAL SCIENCES
UNIVERSITY OF THE PACIFIC

2232 Webster Street
San Francisco, California 94115
(415) 567-0967 & 567-3323

25 September 1978

Dear Stan,

SOL has been too long backplane slot-bound. I have succeeded with a simple solution comprising a direct extension of the mother board and a separate power supply. I have used a TEI mainframe for the purpose but most any other box potentially capable of supporting a front panel should work.

First the front S-100 connector (the one a front panel would be plugged into) is removed and resoldered in the same location but on the bottom of the piggyback mother board, facing downward.

Next a half-inch-wide slot is cut in the underside of the add-on cabinet directly beneath the upside-down connector to completely expose it. The mother board is then reinstalled in the cabinet with the new S-100 connector available from the bottom.

Next cut off a piece of extender board about one inch long and trim its width such that it will plug into S-100 connectors on both ends. This short extender plugs directly into the SOL vertical S-100 connector on the bottom and into the resoldered TEI S-100 connector on top, connecting the two mother boards. The length of this short umbilical connector should be trimmed such that the two S-100 connectors make flush with no extra space between them when the TEI chassis is carefully lowered onto SOL, in piggyback fashion. Before applying power, the +8 volt and + and -16 volt traces should be cut or removed from the short umbilical extender board. All other traces remain intact.

The new cabinet and mother board sit on top of SOL with the SOL rear cover removed. The TEI box is neatly centered on the SOL cabinet. The front edge of the TEI cabinet sits about an inch behind SOL's vertical faceplate. The back of the new cabinet overhangs the back of SOL by 2 to 8 inches, depending on the depth of the new cabinet. A 16 slot cabinet would overhang about 2 inches. My 22 slot TEI overhangs about 8 inches, but remains balanced since the PS is forward. A block in the rear holds it secure. (Legs could be fashioned if desired.) I place my CRT monitor on top of the new 7-inch-high cabinet.

No termination is required or desired. All boards tried so far work well without termination. A Godbout active terminator caused troubles.

To date the system has successfully supported the following boards:

- Solid State Music 4 and 8K Memory
- Seals 8K Memory
- Seattle Computer Co. 16K (static) Memory
- Helios controller and formatter
- 3 P + 8
- D + 7A I/O
- Mullen 8-bit parallel I/O
- Computalk

Heuristics Speechlab
PT Music system
Mt. Hardware Controller (and AC Remotes)
Mt. Hardware Clock
Computime Clock and Calculator
Matrox 256 x 256 Graphics

Some snapshots of my system are included to help visualize the setup. It is a straightforward and a comparatively inexpensive method of providing SOL with a total of 26 slots.

Very truly yours,

Carter C. Collins, Ph.D.
PROGRAMMING NOTES

Bob Heerink (Evansville, Ind.) wrote that he has trouble inputting multiple string variables in Extended Cassette BASIC (ECBASIC). For example,

10 INPUT A$, B$, C
20 PRINT A$, B$, C

produces this result:

(computer prompts for input) ?BANK,20,50,090178 (cr)
(computer prompts for more) ??(cr)
(computer prompts for more) ??(cr)
(computer prints result) BANK,20,50,090178 0 0

He observes that it looks like the comma which normally is used to separate data items in a single input, gets put into the string "A$".

The answer to this dilemma is that although the comma is normally the delimiter for data items and the carriage return (cr) ends the input line, in the case of string variable input, only the carriage return marks the end of the string. If you want to let the operator enter the string delimited by commas as shown in the example, you should input the whole line as a single string, search for the commas, break the input into substrings, and convert the numeric parts with the "VAL(s)" function. This is actually a valuable feature of BASIC, so that text data with commas (such as a name written "Doe, John") can be input without regard for the number of commas in it. (Otherwise, a name like "Doe, John J., Jr." would get messed up if you expected one comma in the name.) Unfortunately, it is not explained in the Extended BASIC manuals, neither the cassette nor the disk version, to my knowledge.

Thanks for the question, Bob. If any readers have other problems they can't resolve, please write to us. We'll do our best to figure it out.

Here's another one. I personally discovered that my extended Disk BASIC seemed to give an ID error when executing a valid disk I/O statement. It looked like a programming bug in EDBASIC. When I called PTC about it, the first question I was asked was, "Did you ZIP 0 before initializing BASICS?"

I thought back and remembered, I did zero memory (ZIP 0) all but the time I initialized the "bad" BASIC. I went back and followed directions, and ya' know what? It worked right.

If your disk BASIC does funny things, try re-initializing it with ZIP 0 first. When all else fails, follow directions.

ADVERTISEMENTS

FOR SALE: SOL-20's, assembled, tested, dealer demos, as new condition. We'll warranty same as PTC. We have 4. Prices: No memory $1600; with 16k RAM (OKRA or Seals 6KSC assembled) $1950. Add $7.50 UPS shipping (in 2 boxes). Allow time for non-certified checks to clear. We'll take V.C. or Visa, but add 2 1/2 %. Phone (800) 457-4440 to verify availability.

Indiana residents: add 4% sales tax. Phone (800) 882-4704 inside Indiana. The Data Domain, Inc., 221 W. Dodds St., Bloomington, Indiana 47401.

SOFTWARE WANTED: I am an active radio amateur and I am looking for software for amateur radio use, such as radioteletype. I would appreciate any help in this area. Ronald T. Wenstrom, P.O. Box 94, Cold Bay, AK 99571.


NEW PRODUCT ANNOUNCEMENT

SOL-28 Keyboard Modification Kit

Barry Watzman is pleased to announce the availability of the model CKB-1 keyboard modification kit for the Processor Technology SOL-28 series micro-computer. This kit modifies the 8-bit output from the numeric pad on the SOL-28 to produce an output with the high order bit (8BH) true, allowing keys on the numeric pad to be distinguished from all other keys on the keyboard. Included with the kit is an assortment of over two dozen double shot molded custom keytops with text-editing/word-processing legends which match exactly in color and style the standard keytops supplied with the SOL-28. Thus by installing this kit and making the appropriate software modifications, a user of ALS-8, The Electric Pencil or similar programs may now have explicit, clearly labeled keys for such functions as insert and delete line, insert and delete character, roll up, roll down, etc., rather than having to remember one or two obscure control code sequences.

The model CKB-1 consists of the set of custom keytops, a special custom programmed ROM and instructions, and is installed simply by replacing U18 on the keyboard with the custom ROM supplied, replacing the numeric keytops with the desired function keytops, and making the necessary changes in the user's software to recognize the new control codes (suggested patches for ALS-8 and the CP/M version of The Electric Pencil are included). And, since the only changes are to the 8BH bit, the keyboard may be reverted to it's numeric mode either by re-installing the original IC ROM, or more simply, by doing an ANSI 7FH in software.

The model CKB-1 sells for $24.95 and is available from:

Barry A. Watzman
2330 Millennium Ln.
Reston, Va. 22091

Va. Residents should include 4% sales tax and order from:
The Computer Systems Store
1984 Chain Bridge Rd.
McLean, Va. 22102
DAM SYSTEMS by CMC
A complete system of modules to let your computer listen to the real world.

## DAM SYSTEMS PRICE LIST

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM161</td>
<td>Analog Input Module - 16 8-bit analog inputs - 1000 microsecond conversion time - 3 state output - requires one 8-bit computer output port for control and one 8-bit computer input port for data</td>
<td>$159.00</td>
</tr>
<tr>
<td>AIM162</td>
<td>Analog Input Module - Same as above plus greater accuracy - gold plated contacts - pilot light - switch selectable start, enable and ready polarities.</td>
<td>$229.00</td>
</tr>
<tr>
<td>POW1</td>
<td>Power Module - Supplies power for one AIM16 module.</td>
<td>$14.95</td>
</tr>
<tr>
<td>ICON</td>
<td>Input Connector - 20 pin card edge connector - solder eyelets</td>
<td>$9.95</td>
</tr>
<tr>
<td>OCON</td>
<td>Output Connector - For connecting the AIM16 to a computer - 18 pin card edge connector - solder eyelets</td>
<td>$9.95</td>
</tr>
<tr>
<td>AIM161 Starter Set</td>
<td>Includes one AIM161, one POW1, one ICON and one OCON.</td>
<td>$189.00</td>
</tr>
<tr>
<td>AIM162 Starter Set</td>
<td>Includes one AIM162, one POW1, one ICON and one OCON.</td>
<td>$259.00</td>
</tr>
<tr>
<td>MANNOD1</td>
<td>Manifold Module - Use in place of ICON. 16 3-screw terminal barrier strips for connecting joysticks, potentiometers, voltage sources, etc. Eliminates the need for soldering. Plugs into the AIM16.</td>
<td>TBA</td>
</tr>
<tr>
<td>ANAMAN1</td>
<td>Analog Manifold Module - Use in place of ICON. Connects DAM SYSTEMS SENSORS to the AIM16 without soldering - sensor cables just plug in. Plugs into the AIM16 or the MANNOD1.</td>
<td>TBA</td>
</tr>
<tr>
<td>SENSORS</td>
<td>Sensors for temperature, pressure, flow, humidity, level, pH, motion, etc.</td>
<td>TBA</td>
</tr>
<tr>
<td>COMPUTER INTERFACES</td>
<td>For the PET, KIM, TRS-80, etc. Use in place of OCON. Eliminates the need for soldering or special construction.</td>
<td>TBA</td>
</tr>
<tr>
<td>MANDISI</td>
<td>Manual and Display Module - Connects between the AIM16 and the computer interface. Allows manual or computer control of the AIM16. Displays channel number and data.</td>
<td>TBA</td>
</tr>
<tr>
<td>GPIB MOD</td>
<td>GPIB (IEEE-488) Interface Module - Allows the DAM SYSTEMS MODULES to be used with the GPIB bus instead of a computer's other I/O ports.</td>
<td>TBA</td>
</tr>
<tr>
<td>XPANDR1</td>
<td>Expander Module - Allows up to 128 8-bit analog inputs (8 AIM16 Modules) to be connected to one system.</td>
<td>TBA</td>
</tr>
</tbody>
</table>
Define a Text named A with contents APPLIES,ORANGES and store it in a section of memory named the 'Text Area'.

Fetch from the Text Area 'A' and output its contents. If the name of the text is not the same as that of any of the functions of the language, the fetch may be made as shown on the second line of the example; this is said to be an 'implied fetch'. Should the text contain symbols which should normally have been protected, or if it is desired not to evaluate the text to be fetched, then the format of the third line should be used; this is said to be a 'neutral implicit fetch'. The fourth line shows a "neutral implicit fetch"; this behaves in a manner that is identical to the first two lines of the example, but information is retained in the computer that it was a 'neutral implied fetch'.

A procedure named F then fetches the Texts in the Text Area determined through use of the '1' (List Texts) function. Each text name is PRECEDED by whatever delimiting character pattern the user specifies as the second argument of the expression. One example uses an asterisk, and the other example has a new line code as the second argument of the expression.
Dear Computer Club Officer:

The members of your club have probably invested substantial time and money in their personal computer systems. Now Consultus offers computer hobbyists a way to put that data processing power to work on a practical household application -- obtaining nutritional information about the foods they eat.

NUTRIVALUE™ personal nutritional analysis programs enable users to analyze recipes, meal plans, and daily or weekly menus on their home computers. The enclosed brochure describes both versions of NUTRIVALUE™ and includes sample printouts.

The programs are accompanied by complete documentation. Not only does the user get commented source listings and detailed operating instructions, but flowcharts, program logic descriptions, and installation instructions are also included.

List prices for NUTRIVALUE™ software are included in the brochure. However, if you consolidate your members' orders, you'll have us processing costs, which we can pass on to you as a discount of 15% on orders that total $100, or more and 30% on orders of $200, or more. Place your composite order on the accompanying order form, compute your discount, and enclose payment. Don't worry about shipping costs. We pay the postage. You'll receive your order by return mail.

If you have any questions or want more brochures to distribute to your club members, just let us know.

Sincerely yours,

Louise L. Silver

(ED. NOTE: LOCAL CLUBS MAY WANT TO MAKE GROUP BUY. WRITE TO COMPANY FOR BROCHURE. WE NOTICED THAT THE CASSETTE IS NOT IN PTC FORMAT. IT REQUIRES A 110 BAUD MODEM TO READ CASSETTE.)

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item</th>
<th>List price</th>
<th>Total</th>
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<tr>
<td></td>
<td>Nutrivalue I, listing</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue I, listing + paper tape</td>
<td>13.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue II/100, listing</td>
<td>30.00</td>
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<tr>
<td></td>
<td>Nutrivalue II/100, listing + p.t.</td>
<td>35.00</td>
<td></td>
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<tr>
<td></td>
<td>Nutrivalue II/100, listing + cassette</td>
<td>35.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue II/200, listing</td>
<td>40.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue II/200, listing + p.t.</td>
<td>45.00</td>
<td></td>
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<tr>
<td></td>
<td>Nutrivalue II/200, listing + cassette</td>
<td>45.00</td>
<td></td>
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<tr>
<td></td>
<td>Nutrivalue II extension, listing</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue II extension, listing + p.t.</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrivalue II extension, list. + cass.</td>
<td>20.00</td>
<td></td>
</tr>
</tbody>
</table>

Total quantity

Subtract discount* $ ____________________

PAYMENT ENCLOSED $ ____________________

*Discount schedule

If total price is $100, to 199., deduct 15%.
If total price is $200. or more, deduct 30%.
Gentlemen,

As individuals involved in the fastest growing hobby in America I would like to introduce you to a product which I think will be of interest to you. We at ESCON manufacture an IBM SELECTRIC typewriter to Microcomputer interface system. This unit allows any microcomputer to output to any style SELECTRIC typewriter.

The installation of the system is very easy. Existing screw holes in the typewriter are used, thus there is no tapping or drilling required. Installation does not affect normal functioning of the typewriter nor change its appearance. Extensively detailed installation instructions are provided. Additionally, installation does not affect eligibility for IBM warranty or service.

If you do not want to do your own installation, ESCON provides a factory turn around service which also includes a typewriter "tune-up."

The ESCON conversion system can be interfaced to your computer via an S-100 board which can plug into your computer motherboard or by RS232, IEEE-488 or parallel output ports.

The extremely high print quality that a SELECTRIC gives means that your microcomputer system can now give you business quality output at a price less than $3000.00.

Normal retail price is $496.00 (Assembled and tested; available in kit form for $456.00.) If purchased through your computer club, we will discount 15% for 2 to 9 units ordered and 25% for orders of 10 or more. Orders should include 25% deposit (California residents add 6% sales tax.) We can also charge the purchase to your Master Charge (Orders by Master Charge should include date of expiration and number of your card.)

If you have any questions please give me a call or drop a line.

Sincerely,

Stephen Gould
V.P. Marketing
ADD HIGH QUALITY PRINTING TO YOUR MICROCOMPUTER AT LOW COST . . . USE YOUR IBM SELECTRIC® TYPEWRITER.

If you already own a Selectric® typewriter, you already have a high quality printer for use with your microprocessor. ESCON interface system lets you convert a standard IBM office Selectric® into an output printer for your microprocessor in just a few hours. No holes to drill. Selectric® typewriters onto which ESCON systems are installed in accordance with factory instructions remain eligible for IBM warranty and service. Complete instructions provided. Entire installation takes only a few hours.

SPECIFICATIONS

Compatible with any systems using the S-100 bus—e.g. ALTAIR, IMSAI, SOL, Poly 88, Equinox, etc.

Output: Parallel
Code: ASCII
User Software Controlled: User defines polarity and position of status bit indicating completion of operation.
Input: One LST/TTL
Output Current: 24mA
Bus: S-100
Power Supply: 30VDC @ 2A

DESCRIPTION ASSEMBLED

Mechanical parts, solenoids and instruction manual

Power supply and solenoid drivers

Computer interface card

Complete set

Instruction manual (if purchased separately)

EA-A $250.00
EA-B $140.00*
EA-C $155.00*
EA-T $496.00

*$available in kit form, subtract $20.00.

ESCON PRODUCTS, INC.
171 Mayhew Way, Suite 204, Pleasant Hill, CA 94523 (415) 935-4590
<table>
<thead>
<tr>
<th>PROGRAM NAME:</th>
<th>HELPI</th>
<th>CATEGORY: Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESCRIPTION:</td>
<td>HELPI is an operating-software package consisting of five standalone assembly-language programs designed to run under HELIOS PTDOS. Included are:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a device-driver file for the Tarbell Cassette Interface for tape/disk operations;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3LDB and 3SAV for tape/memory operations; and ASCII-HEX memory enter and dump commands. All</td>
<td></td>
</tr>
<tr>
<td></td>
<td>programs operate as direct console commands with parameters.</td>
<td></td>
</tr>
<tr>
<td>MINIMUM HARDWARE REQUIRED:</td>
<td>less than 2K system RAM plus the usual 12K for PTDOS.</td>
<td></td>
</tr>
<tr>
<td>SOFTWARE REQUIRED:</td>
<td>HELIOS PTDOS.</td>
<td></td>
</tr>
<tr>
<td>RESTRICTIONS:</td>
<td>none.</td>
<td></td>
</tr>
<tr>
<td>DOCUMENTATION:</td>
<td>30-page user's manual with full description of operation and options.</td>
<td></td>
</tr>
<tr>
<td>MEDIA:</td>
<td>HELIOS data-diskette.</td>
<td></td>
</tr>
<tr>
<td>WARRANTY:</td>
<td>30 days exchange, repair/replace; 1 year notify for changes.</td>
<td></td>
</tr>
<tr>
<td>PRICE:</td>
<td>$22.95 postpaid; add tax to California orders.</td>
<td></td>
</tr>
<tr>
<td>ORDER FROM:</td>
<td>LMC ENGINEERING 185 South Alice Way Anaheim, CA 92806</td>
<td></td>
</tr>
<tr>
<td>REMARKS:</td>
<td>This software is flexible and includes many command parameter options and recorder controls. All programs run unchanged on any HELIOS system but many patch provisions are included for user customization.</td>
<td></td>
</tr>
</tbody>
</table>
PROGRAM NAME: UN-280
CATEGORY: System development

DESCRIPTION: UN-280 disassembles 2-80 object code and produces assembly listing format output or source code for storage, edit & reassembly. Generates TBL mnemonics. Object to be disassembled may be segmented or contiguous anywhere in the available memory space. User input specifies format(byte, word or program) for each segment. Load bias is adjusted, and labels generated for all references. All 1/0 byte oriented.

MINIMUM HARDWARE REQUIRED: For list output - 8K (depend on module to be disassembled. For cassette or disk output, CUTER, NS DIS or CPM required. SOFTWARE REQUIRED: Standalone, if generating list output. Appropriate I/O interfaces provided by user.

RESTRICTIONS: Generates TBL mnemonics. Not necessarily a limitation, if good macro-assembler is available.

DOCUMENTATION: Provided both in paper and machine readable form.

MEDIA: CUTER 1200 baud cassette, North Star, or CPM(W) or mini floppy diskettes.
DATE CURRENT VERSION WAS RELEASED: April 1978
WARRANTY: 30 day media warranty. Agreement enclosed.
PRICE: North Star(2000): $80, CPM versions(1000): $50, CUTER or NS reloc versions-$5 ORDER FROM: alphaBIT Microsystems, Box 1107, 2000 Center St., Berkeley, CA 94704 Check or money order must be accompanied with order. Overseas orders must add $7.00 per order for airmail and registration.(not including Canada). California residents must include sales tax.

REMARKS: UN-280 code itself is only 3K approx; including tables and patch area. Symbol table is generated in a workspace, and requires 7 bytes per symbol. This workspace defaults to the end of the program, but may be moved, and limited in size if the user wishes. Inquire from your local dealer if available from him yet.

PROGRAM NAME: DISAM
CATEGORY: PROGRAMMING AID

DESCRIPTION: 9040 Disassembler and dumper.
The disassembler operates on program in memory to display or append to a file in memory the equivilent source code.
Two passes can be controlled by operator to suppress unneeded labels. Program can be rearranged or selected sections can be combined. The dump command gives combined hex and ASCII dump.

APPEARS AS 5 CUSTOM COMMANDS UNDER SOLOS/CUTER.

MINIMUM HARDWARE REQUIRED: 8K DAAF, DPF7C plus stack and SOLOS,CUTER or my command interpreter. Get source files and reassemble.
SOFTWARE REQUIRED: SOLOS,CUTER or optional command interpreter.
Memory files work with AIL-8 Software 1, Micropolis MDM, assemblers.

RESTRICTIONS: You must guide it around data tables if you want perfect results in disassembly. Doesn't build DB, 8N etc.

DOCUMENTATION: Dr. Bob's Journal, #27 (Aug 78) carried article and assembly listings. Command list available on request.

MEDIA: CUTS cassette (300 or 1200 baud) or MOD II Micropolis (send order).
DATE CURRENT VERSION WAS RELEASED: 2/25/78 assembly date.
WARRANTY: 30 day media warranty. Consultation.
PRICE: $4 assembled as stated, $8 special order, 30 cent source 20K file.
ORDER FROM: Richard Greenlaw
251 Colony St.
Geinawa, Ohio 43720
(not currently available through dealers.)

REMARKS: No credit cards. Checks ok. I provide a cheap cassette and first class US postage. Extensively tested. If you don't have the article ask for brief summary of instructions and commands. This is not a business - sometimes there are delays, but I haven't exceeded 30 days yet.

PROGRAM NAME: THE ELECTRIC PENCIL
CATEGORY: WORD PROCESSING SYSTEM

DESCRIPTION: The Electric Pencil II is a highly sophisticated word processor that adds 20 new features to the original Electric Pencil. This version accesses four disk drives, dynamic print formatting, talking screen, stop at the end of page, nine speeds of bidirectional scrolling, video tape at a time scrolling, total left margin control, print value scorecard, plus centering, underlining and boldface. There are even more great new features to the ELECTRIC PENCIL II that are included in this application!

MINIMUM HARDWARE REQUIRED: Two microprocessors on the 6502 family, monitor, Standard or Diablo Printer, 16k memory, 5K Disk $150.00.

SOFTWARE REQUIRED: CPM Disk Operating System.

RESTRICTIONS: Must use a video interface board and monitor.

DOCUMENTATION: An excellent 38 page user's manual that is simple to read and written with the turnkey user in mind.

MEDIA: 8" softcovered diskette, 5 Star minidiskette, or Micropolis minidiskette
DATE CURRENT VERSION WAS RELEASED: March 1978

WARRANTY: Software support
PRICE: Standard Printer $225.00 Diablo Eyter Printer $275.00
ORDER FROM: MICHAEL WORTHY SOFTWARE, INC.
1253 VISTA SUPREMA DRIVE
LAGUNA BEACH, CA 92651

REMARKS: All orders are shipped from stock. Orders are prepaid or COD. Also available at local computer stores across the country. All Pencils can be upgraded. Here's how send in the original media, +$5 upgrade charge plus the price difference between the old and new versions and include note for shipping and handling. You will receive new media and new documentation.

PROGRAM NAME: THE ELECTRIC PENCIL II
CATEGORY: WORD PROCESSING SYSTEM

DESCRIPTION: This is the MELIOS version of The Electric Pencil II and has all the great features as described above. In addition, this version is completely compatible with FDOS.

MINIMUM HARDWARE REQUIRED: 20L Computer system, video monitor, Standard or Diablo Eyter Printer,Helios Disk System, 2K memory minimum.

SOFTWARE REQUIRED: PC DOS

RESTRICTIONS: Must have video interface and monitor; the program will not run on a serial CRT such as a Sorex or Hazelene.

DOCUMENTATION: A 40 page user's manual that is easy to read and simple to understand.

MEDIA: An 8" diskette for use on MELIOS SYSTEM.
DATE CURRENT VERSION WAS RELEASED: June 1978

SOFTWARE REQUIRED: FDOS

PRICE: Standard Printer $250.00 Diablo Eyter Printer $300.00
ORDER FROM: MICHAEL WORTHY SOFTWARE, INC.
1253 VISTA SUPREMA DRIVE
LAGUNA BEACH, CA 92651

REMARKS: All orders are shipped from stock. Orders are prepaid or COD. This program is also available from computer dealers across the country. Please note the upgrade policy as mentioned above. You may always upgrade to a later version of the Pencil or change versions when your equipment has been upgraded.
**PROGRAM NAME:** SHAL/80  
**CATEGORY:** Programming language

**DESCRIPTION:** SHAL/80 is a compiled, structured microprocessor language for 8080 and 8085 microprocessors. Included is a macro processor that permits conditional expansion of statements and unlimited nesting of macros.

**MINIMUM HARDWARE REQUIRED:** 1K bytes of memory plus disk system plus usual input/output peripherals.

**SOFTWARE REQUIRED:** CP/M or Isis I operating systems.

**RESTRICTIONS:** Current version is non-relocatable.

**DOCUMENTATION:** SHAL/80 User's Guide

**MEDIA:** CP/M or Isis I disks

**DATE CURRENT VERSION WAS RELEASED:** June, 1978

**WARRANTY:** Free exchange for defective disks. Registered owners pay.

**PRICE:** $75.00, Mastercharge/Visa accepted. Updates.

**ORDER FROM:** COMPUTER ASSOCIATES

PC Box 5160

Grand Central Station

New York, NY 10017

**REMARKS:** Relocatable 8080 and 8085 versions in tape cassette format will become available sometime early in 1979. We will undoubtedly have SOLOS/CUTER and PTDOS versions available by the spring of 1979.

---

**PROGRAM NAME:** THE BILLER  
**CATEGORY:** Business

**DESCRIPTION:** The Biller is a complete billing and accounts receivable package. Programs included perform the following:

1. Print invoices, bills of lading and shipping labels.
2. Update accounts receivable files.
3. Print aged trial balance.
4. Convert from manual system to The Biller.
5. Process account inquiries.
6. Create master diskettes.

**MINIMUM HARDWARE REQUIRED:** 32K RAM, including all system RAM; 2 North Star disk drives; SOLOS/Cutter; printer.

**SOFTWARE REQUIRED:** North Star Basic 10 Digit precision, if desired.

**RESTRICTIONS:** None

**DOCUMENTATION:** Complete, easy to follow users manual. Also includes programmers guide.

**MEDIA:** North Star diskette

**DATE CURRENT VERSION WAS RELEASED:** 7/15/78

**WARRANTY:** 90 days repair; one year update

**PRICE:** $525.00 pre-paid

**ORDER FROM:** Fraser Associates, Ltd., P.O. Box 123, Holly, Michigan 48442 (sole distributor)

**REMARKS:** This system has been developed for, and field tested in a commercial user environment.

---

**PROGRAM NAME:** THE BUILDING  
**CATEGORY:** Builders and Contractors

**DESCRIPTION:** The Builder is complete job bid, billing, and job costing system. Programs included perform the following:

1. Print formal bid with all line items for construction job.
2. Update completion status and print periodic invoices.
3. Update account receivable.
4. Update sub-contractors invoices and payments and print job cost report.
5. Print summary job cost reports.

**MINIMUM HARDWARE REQUIRED:** 32 K RAM, including all system RAM; 2 North Star disk drives; SOLOS/Cutter; printer.

**SOFTWARE REQUIRED:** North Star Basic 10 Digit precision, if desired.

**RESTRICTIONS:** None

**DOCUMENTATION:** Complete, easy to follow users manual. Also includes programmers guide.

**MEDIA:** North Star diskette

**DATE CURRENT VERSION WAS RELEASED:** 7/20/78

**WARRANTY:** 90 days repair; one year update

**PRICE:** $475.00

**ORDER FROM:** Fraser Associates, Ltd., P.O. Box 123, Holly, Michigan 48442 (sole distributor)

**REMARKS:** This system has been developed for, and field tested in a commercial user environment.
PROGRAM NAME: SAX76 Graphics CATEGORY: Plotter

DESCRIPTION: Graphics extension to the SAX76 language interpreter with a set of the vector lists for some twenty character fonts developed by A. V. Hershey of the U.S. Navy Weapons Development Lab., Dahlgren, VA.

MINIMUM HARDWARE REQUIRED: Plotting device - can be CALCOMP or equivalent incremental plotter, or display with graphics capability. With a modicum of cleverness any character oriented display device can be used.

SOFTWARE REQUIRED: SAX76 language with CPM disk interface.

RESTRICTION: Authorship credit for the font designs should be given to Dr. A. V. Hershey on any material to be distributed more than casually.

DOCUMENTATION: SAX76 Language manual. Source listing of SAX76 plotter program.

MEDIA: CPM diskettes

DATE CURRENT VERSION WAS RELEASED: March 1978

WARRANTY: Good looking graphics.

PRICE: $15.00 for diskette.

ORDER FROM: SAX76 Inc., P.O. Box 257, RR1, Pennington, NJ, 08534, USA.

REMARKS: None.

---

PROGRAM NAME: SAX76 Adventure CATEGORY: Game

DESCRIPTION: The text data base and the interrelationship tables for the game of Adventure originated by Willi Crouchman. Data base is upper/lower case. Preliminary SAX76 language control script is also provided as a guide and learning tool to implementing the game fully using this language.

MINIMUM HARDWARE REQUIRED: 32K CPM system.

SOFTWARE REQUIRED: SAX76 language interpreter with CPM interface.

RESTRICTION: Credit to original authors.

DOCUMENTATION: SAX76 Language manual.

MEDIA: CPM Diskettes.

DATE CURRENT VERSION RELEASED: October 1978.

WARRANTY: You will probably get lost.

PRICE: $15.00 for diskette.

ORDER FROM: SAX76 Inc., P.O. Box 257, RR1, Pennington, NJ, 08534, USA.

REMARKS: This is NOT a truly functional game - so do not expect to just run it

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PROGRAM NAME: ML01 CATEGORY: General Purpose

DESCRIPTION: Prints mailing labels from a name and address file. The file has 4 lines of 35 characters each. The labels can be sorted by zip code

MINIMUM HARDWARE REQUIRED: Printer with tractor feed, CRT, 32K, 2 disk drives.

SOFTWARE REQUIRED: CP/M, CBASIC, QSORT

RESTRICTIONS:

DOCUMENTATION: Complete, easily understood user's manual.

MEDIA: Single or Double Density Diskette

DATE CURRENT VERSION WAS RELEASED: 6-78

WARRANTY: 6 months

PRICE: Write for price information.

ORDER FROM: H & H Associates, Inc.
   P.O. Box 19004
   Denver, Colorado 80219
   (303) 355-1067

REMARKS:

---

PROGRAM NAME: C101 CATEGORY: General Purpose

DESCRIPTION: Categorizes clients and files, immediate retrieval of any information indexed, cross indexes any information entered, name and address retention, prints reports of clients or clients by 1) reference code, 2) record id, 2) zip code, 4) category and/or code. Prints address labels for mailing lists.

MINIMUM HARDWARE REQUIRED: Printer, 32K, CRT, 2 disk drives

SOFTWARE REQUIRED: CP/M, CBASIC, QSORT

RESTRICTIONS:

DOCUMENTATION: Complete, easily understood user's manual.

MEDIA: Single or Double Density Diskette

DATE CURRENT VERSION WAS RELEASED: 5-78

WARRANTY: 6 months

PRICE: Write for price information.

ORDER FROM: H & H Associates, Inc.
   P.O. Box 19004
   Denver, Colorado 80219
   (303) 355-1067

REMARKS:
PROGRAM NAME: AN01 - Accounts CATEGORY: Business

DESCRIPTION: Handles both Balance Forward and Open End accounts, Automatic and/or manual service changing, Full Audit controls and reporting. Generates Cash Receipts Journal, Trial Balance, Ageing Report, Service Charge Report, and Daily Transaction Journal. Retains High, Low balance, Defer last payment, Defer last activity, Statement cycle, Credit status, Salesman code, 30, 60, 90 day balances and numerous other information.

MINIMUM HARDWARE REQUIRED: Printer, 32K, CRT, 2 disk drives

SOFTWARE REQUIRED: CP/M, QBasic, Qsort

RESTRICTIONS:

DOCUMENTATION: Complete and easily understood user's manual.

MEDIA: Single or Double Density Diskettes
DATE CURRENT VERSION WAS RELEASED: 7-78
WARRANTY: 6 months
PRICE: Write for price information
ORDER FROM: H & H Associates, Inc.
P.O. Box 19504
Denver, Colorado 80219
(303) 355-1067

REMARKS:

PROGRAM NAME: CE01- Order Entry CATEGORY: Business

DESCRIPTION: Customer and Manufacturer history and sales information. Commission figures, Automatically prints inquiry letters, Immediate retrieval of information for customer inquiries, CRT displays of customer orders, Prints order reports showing priority orders

MINIMUM HARDWARE REQUIRED: Printer, 32K, CRT, 2 disk drives

SOFTWARE REQUIRED: CP/M, QBasic, and Qsort

RESTRICTIONS:

DOCUMENTATION: Complete and easily understood user's manual.

MEDIA: Single or Double Density Diskette
DATE CURRENT VERSION WAS RELEASED: 7-30-78
WARRANTY: 6 months
PRICE: Write for price information
ORDER FROM: H & H Associates, Inc.
P.O. Box 19504
Denver, Colo. 80219
(303) 355-1067

REMARKS:

PROGRAM NAME: L801 - Law Billing CATEGORY: Law

DESCRIPTION: Profitability analysis by attorney or case type, Full audit trails, Multiple matters per client, Numerous fields per matter, Historical information retained ( Year to date and case to date), Pre-statement verification, Statements, User defined transaction codes.

MINIMUM HARDWARE REQUIRED: Printer, 32K, CRT, 2 disk drives

SOFTWARE REQUIRED: CP/M, QBasic, Qsort

RESTRICTIONS:

DOCUMENTATION: Complete and easily understood user's manual.

MEDIA: Single or Double Density Diskette
DATE CURRENT VERSION WAS RELEASED: 10-12-78
WARRANTY: 6 months
PRICE: Write for price information
ORDER FROM: H & H Associates, Inc.
P.O. Box 19504
Denver, Colorado 80219
(303) 355-1067

REMARKS:

PROGRAM NAME: IC01 - Inventory Control CATEGORY: Business

DESCRIPTION: Inventory Control offers automatic ordering, full audit trails, optional vendor and/or manufacturer information, number on hand, number on back order, number on order, order point, order quantity, sold MTD, sold YTD, last sale, last order, 5 prices, 3 costs, and unit of measure.

MINIMUM HARDWARE REQUIRED: Printer, 32K, CRT, 2 disk drives

SOFTWARE REQUIRED: CP/M, QBasic, Qsort

RESTRICTIONS:

DOCUMENTATION: Complete, easily understood user's manual.

MEDIA: Single or Double density Diskette
DATE CURRENT VERSION WAS RELEASED: 7-78
WARRANTY: 6 months
PRICE: Write for price information
ORDER FROM: H & H Associates, Inc.
P.O. Box 19504
Denver, Colorado 80219
(303) 355-1067

REMARKS:
PROGRAM NAME: SAM76  CATEGORY: Interpreter

DESCRIPTION: General purpose interpreter particularly effective for character string manipulation. Powerful resident functions for pattern matching and sorting, infinite precision arithmetic and logic functions, recursive and nestable to any depth - limitation being only size of memory. Approximately 100 resident functions.

Disk version interfaces with CPW and contains some thirty additional functions, including means for block checksummed communications between any data source and any data destination.

MINIMUM HARDWARE REQUIRED: RAM or ROM 8K for 200 5K, plus 3K for disk and extra functions; keyboard, output device - upper and lower case full US/ASCII character set desirable.

SOFTWARE REQUIRED: Input and output drivers plus CPW if disk system used.

RESTRICTIONS: None to my knowledge; with a modest amount of ingenuity any task is accomplishable.

DOCUMENTATION: SAM76 Language Manual, Dr. Dobbs, Creative Computing. Source for CPW interface with SAM is available. Main program source available only to individuals who are able to prove extensive knowledge and understanding of the language and its philosophy and who wish to implement on another machine.

MEDIA: CPW standard and North Star, Paper Tape, POLYMorphic Cassette, and TDL/T300 SME.

DATE CURRENT VERSION WAS RELEASED: October 1976

WARRANTY: None except for pleasure and satisfaction unless the user is skilled or likes BASIC and the like.

PRICE: SAM76 manual - $12.00; CPW diskettes - $15.00 Tape or cassettes $10 (with additional info).

ORDER FROM: SAM76 Inc., Box 257 - RR1, Pennington N. J., 08534, USA.

Phone (609)-460-1129/1130 for info. Letters not answered with dispatch.

REMARKS: It is not advisable to get the book unless you have an operational SAM76 system. Users are encouraged to distribute copies of the object code.

PROGRAM NAME: SOLCPM  CATEGORY: OP SYSTEM

DESCRIPTION: CP/M COMPATIBLE INTERFACER SOFTWARE AND FIRMWARE FOR SOL20 / ICOM DISK MODEL FD-3712

MINIMUM HARDWARE REQUIRED: 16K EXCLUSIVE OF OP SYSTEM

SOFTWARE REQUIRED: CP/M, CBASIC

RESTRICTIONS:

DOCUMENTATION: OPERATING INSTRUCTIONS AND SOURCE LISTING ARE INCLUDED WITH 2708 PROM

MEDIA: CP/M PRE-PROGRAMMED PROM

DATE CURRENT VERSION WAS RELEASED: JULY 4, 1978

WARRANTY: 90 Day

PRICE: $150.00 + $ 2.00 Shipping

ORDER FROM: Computer Mart Ltd.,
1543 Bayview Avenue, Toronto, Ontario CANADA M4G 3B5

REMARKS: CP/M, CBASIC MUST BE PURCHASED SEPARATELY FROM DIGITAL RESEARCH CORP., OR COMPUTER MART LTD.
DELIVERY 2 WELS
PROTEUS ORDER FORM

1. Solus News subscription (1979) @ $12 US
   @ $15 Foreign
   (Mid-year subscribers will receive back issues
   for that year.)

2. Back-issues of Solus News (1977) @ $2
   (1978) @ $10

3.* Helios library volume 1 @ $10 with donated
   program or data file (See guidelines.)
   @ $25 without donated file

4. Would you like us to handle books as well?
   (For example, texts on PASCAL.)
   If so, what topics?

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PROTEUS/ SOLUS NEWS
S. M. Sokolow, Editor
1690 Woodside Rd., #219
Redwood City, CA 94061

SEE RENEWAL INFO INSIDE

TIME TO RENEW

EXPIRE WITH THIS ISSUE!

ALL 1978 SUBSCRIPTIONS

James D. McIntyre
2326 Crest Ave. N.
Allentown, PA 18104

[Postmark: REDWOOD CALIF. 11-14-78]
SOLUS NEWS

A newsletter for owners of Processor Technology computers

Vol. 1, No. 7
December 1978

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LOOKING BACK AND AHEAD FOR SOLUS NEWS

This is the end of our first full year of operating Solus News, and a time of transition. We've seen the newsletter grow from a two page flyer into this hefty size, and expect next year to maintain the size and improve the quality and regularity of the issues. Six per year seems to be the optimal number; not too frequent to burn out the staff, but not too seldom for the readership.

In the coming year, I want to introduce more material for the end-user who uses the Sol with pre-programmed packages. To such a person the details of patching so-and-so's BASIC to run on a Sol with whose-it's disk just isn't useful information. As PTC moves from the hobby market to the small business market, more and more Solus News readers will be unfamiliar with programs, and they will need this type of support. This isn't to say that less content will be of interest to the hobbyist. Moreover, it is probably the hobbyist who has the expertise to solve the problems of the end-user, so I hope some of our avid contributors will try to produce more articles of a tutorial nature. By this I mean articles, that help us to read between the lines of users' manuals, explain how to do things that are not obvious, compare competitive application programs (e.g., word processors), etc. We've had a number of these in the past, and look forward to more in the future.

In the next issue, we'll have a review of a book of BASIC programs, a description of the new PTC word processing program called "WordWizard," the first in a series of tutorials for "Understanding PTDos," a review of the new release of PTDos (1.5) and its classy manual, a progress report on the PROTEUS library project for passing software among the various disk users libraries, plus our usual assortment of letters from readers and miscellaneous contributed items (including listings of a 16-bit arithmetic utility and a memory test program as custom commands for SOLOS/CUTER).

Best wishes for the coming year,

Stan Sokolow, your editor.

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SOFTWARE — WHERE IS IT?

In the Oct/Nov issue I published the Software Directory as it now stands, early version. I know there is much more software available on Sol/Cuts cassettes and floppy diskettes than I have listed. As I mentioned elsewhere in this issue, I've tried to contact software vendors directly by mail, but have had little cooperation. Now, I am turning to the users. I want to know what software you have purchased on Sol/Cuts cassette or ANY diskette. Tell me where you got it and what you use it for. Also, let me know about software you got in printed listings from a software book. Many readers want to find programs, but don't know where to look.

If you have written a program which you think is useful to someone else, but you don't want to be bothered with the advertising, distribution, and support of the program, let me know about it. I am toying with the idea of becoming a central mail-order point for all sorts of software for Sol systems, not to make money at it, but as a service to the user. (That's what PROTEUS is all about.) It doesn't have to be an earth-shaking opus, just something that works and is desirable to someone else. I've had inquiries for leads to software for business applications, for doctors, for churches, for retail sales, for research, for education, and other fields.

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WORDWIZARD — PTC'S ELECTRONIC TYPING DEAMON

Processor Technology has released its word processor system menu upon the Sol + Lelios. According to a PTC spokesperson, even users of expensive word processing systems such as the Vytec, Word-Stream, and Lexicon, have been impressed by the capabilities of the WordWizard compared to these other systems, PTC has been participating in exhibitions of the systems to attorneys. In the next issue we will have a detailed article on the features of the system, and hopefully in future issues, a comparison with competitive systems, such as the Electric Pencil.
PASCAL FOR THE SOL

If you have read Byte magazine recently, or have taken computer science courses as an undergraduate, you have likely heard about the programming language PASCAL. It has become the rage among computer science educators because it is a language designed to facilitate (and even coerce) the use of "structured programming". Until recently it was only available on the large computers that universities usually have. However, the University of California at San Diego has produced an implementation of standard PASCAL (extended in certain ways) for microcomputers. It is available from a few microcomputer manufacturers for their machines and from some computer clubs for CP/M disk systems. (It has been rumored that PTO has the UCSD PASCAL on Betas.) In addition, the Stanford Linear Accelerator Center's Computer Group has produced a microcomputer implementation of Standard PASCAL based upon the one done for the IBM 360/370. This system is not tied to its own operating system, so it can be adapted to run on many different operating systems.

The first diskette of the PROTEUS library for Lennon has a preliminary version of S.I.A.C. PASCAL on it. This version is capable of compiling the PASCAL compiler, which itself is a PASCAL program, so it is quite powerful.

PROTEUS is working on adapting the S.I.A.C. PASCAL system to the Sol as a cassette system. It will probably require at least 32K bytes of RAM (not including the RAM used by Solos/Cutie), and would be able to compile a program the size of the compiler in 48K. Two cassette recorders would be needed. Loading the compiler will probably require about 4 minutes. The speed of compilation will be limited by the cassette 1/0 speed. Two phases are required: compilation of the source to intermediate code, and then assembly and compaction of the intermediate code. It certainly won't be as fast as compiling, but it will be as powerful as PASCAL on a full-sized computer. Execution speed of the compiled programs has been estimated at 10 times faster than one of the fastest integers BASIC's around (Palo Alto Tiny basic).

The Sol PASCAL will become available sometime in 1979. We will also be able to add popular texts and reference manuals on PASCAL so you can teach yourself. Later, the system may be adapted to mini-diskette operating systems, such as Northstar and Micropolis.

If you are interested in obtaining Sol PASCAL, let me know at the newsletter office so I can plan how many copies to produce on the first run. The letter of intent will not be a commitment on your part, just an expression of interest.

Dear Stan;

Finally had a chance to sit down and play some Monopoly (no pun intended), and I found a couple of bugs. Please make the following changes to the libraries program, and publish this errata:

1160 IF M(7)K0 THEN GOSUB 5350 ELSE 1170
1165 GOTO 1160

This takes care of making sure you have enough money to get out of jail properly.

4885 LET DM=09

This subtracts your building assessment, instead of adding it.

If I find any more of these quirkies, I'll be sure to pass them on.

As always,

Jeffrey G. Tom

(End Note):

PROTEUS's new service is the LIBROS library. With a Sol IV, you will be able to exchange information via helios diskettes, so you'll fit right in. In fact, you represent the primary target type for the library. Our first diskette has no business application programs yet, but it does have a basic statistics program, a game, a larger software system (a PASCAL compiler), and a few odds and ends. I am working on obtaining and converting programs from other software libraries, such as the Northstar disk library and the CP/M library.

I know there are commercially available business packages for Sol, but I have no utilis. If you have any that you would like to see added to the library, please let me know. You can also submit for your own personal use. Please keep us informed of your activities, especially if you have any ideas for future programs or changes to the library.

Yours sincerely,

C. S. Houseman

SOL Users Society
P.O. Box 21471
San Jose, CA 95153
U. S. A.


Book Membership.

Dear Jim,

We are a small group of people who have decided to form a microcomputer club on this rather remote tropical island. In all probability we will acquire a SOL IV during the next few months. Michael Phillips International Trading Group provided us with your address because we are interested in knowing what sort of software will be available to us (aside from what we can find in Creative Computing and Byte).

Enclosed you will find the $15.00 membership fee for 1 year, plus $5.00 which might be used for sending us a copy of any software catalogue you might have available now. We are interested in small business applications. Is there a 'workfiles' type sort program available? File to file operations, particularly file to print with minimal report generation (inventory, customer billing, general ledger)?

We will have a SOL IV, a Diablo 1354 printer, a Nachos Carlson's Video Monitor II, and some Z80 ROM modules. Audio cassettes will be obtained locally.

Do you have any suggestions as to the type of peripheres we should obtain so as to be sure that the future information exchange between you and us will be as trouble-free as possible (Digital cassettes, paper tape...) Any other comments on the suitability of our configuration?

We hope to be able to contribute small business and technical type programs to your library in the future.

Yours sincerely,

[Signature]

[Editor's Note:]

[New information on new service and library access]
ACCESS RESURRECTED

We've heard from an impeccable source at PTC, that a new editor has been assigned to bring PTC's user-oriented publication, ACCESS, back to life. The new ACCESS will appear in January, 1979, and the first three issues will be sent to all previous subscribers as part of their original subscription. Like SOLUS News, the new ACCESS plans to have a balance of items for the technical and non-technical readers. The new editor is reportedly looking for contributed articles, and especially applications software.

The question has come up in the past, how should SOLUS News and ACCESS co-exist? What is the role of each? To reiterate, ACCESS is published by Processor Technology Corporation; SOLUS News is published by PROTEUS, an independent users service organization for Processor Technology equipment users. Although we have a cooperative relationship, neither exerts any direct control over the other. It is my feeling that both have a role. ACCESS is the voice of PTC to its customers; SOLUS News is the voice of the customers to each other, to PTC, and to other vendors. PTC needs to keep the customer satisfied, and we need to help PTC in our own way to remain a viable company so we can get the customer service we need. PTC has had its growing pains but as far as I can see, it has always tried to provide a high standard of quality and service.

In the coming year, the interaction of the users group and PTC will become clearer. Readers' comments are invited. As for now, let's try to help ACCESS get off to a good start again. I'll be submitting articles for publication there, and hope you will send them a few letters, as well as to SOLUS News. I'm sure they would appreciate material directly related to their products or line, whereas SOLUS News is happy to publish material on other vendors products (accessories, peripherals, etc.) as they relate to PTC products, as well as items on PTC products.

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ISSUES LATE -- BONUS ISSUE

The October/November issue was the first issue to be laid out by the graphics department at PTC. Unfortunately, when the copy was ready for layout, PTC was involved in getting a number of manuals ready for printing, including the new PDP-1.5 manual and the Wordstar electronic typewriter system manual. Then when that was done, a key person in the graphics department became ill. Consequently, the issue was later than usual. This December issue was prepared by PROTEUS as a bonus to compensate for the lateness. If circumstances such as these continue to interfere with getting SOLUS News out to you at reasonable intervals, PROTEUS will make other arrangements as we have said before.

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Sincerely,

Tom Pollesens
4470 Lakeside Dr.
Glen Ellen, CA 95442
(707) 996-5753

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Sept. 26, 1978
Dear Stan,

Please note my change of address for contacting the Regina chapter. You no longer have to be crazy to join, just live in a crazy world. Last month I was a clinical psychologist; this month, manager of manpower and training of a major metropolitan computer utility. I owe it all to my Sol.

Keep up the good work on the newsletter. I know it's probably a full-time job in itself, but it is needed. I don't know what I could do to help, but if there is, let me know.

Best regards,

Rob Stek
Saskatchewan Computer Utility Corporation
2161 Searcy Street,
Regina, Sask. S4P 2H6

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SOLUS USERS' SOCIETY
P.O. Box 23471
San Jose, CA. 95153

RE: SOLUS CHAPTER

Dear Covina Area SOL Users:

We are pleased to inform you that another SOLUS Chapter has been formed for your benefit.

We are an independent research facility and feel it is time to share the wealth.

Meetings are the 1st Monday of every month at 7:30 P.M., in addition there is a 24 hour hot-line open for all SOL Users' who are having problems and need help or other advice.

We hope we can be of service to all SOL Users' and would like to hear from everyone who would like to join.

In view of the area we are located in we feel there are a lot of SOL Users' out there with no where to go; so here's your chance.

We are not limited to SOL computer owners, our lab has tested almost every major brand and can assist almost all small systems owners.

We have a program listing, free to members, tech. manuals for loan to members, and do lend all publications to our members. I.E. books commonly found in computer stores and some uncommonly found.

All services are free of charge except for postage, well can't do everything. There are no hitches and no membership fee just a genuine interest, "it's tax deductible".

Just one personal note: Hate to see SOLUS Turned over to P.T. for publication, "familiarity breeds contempt", so hope you keep the old eyeballs sharpened .

Thanks for a great publication. Please publish address and phone.

Sincerely,

Bruce G. Diller, Ph.D.
Director of Research
Chapter Chairperson

Lexington Labs
SOLUS CHAPTER
18651 E. Galliano Drive
Covina, CA 91722
Hot-Line 213-332-9880/ 24 hours
DEAR SIR:

PLEASE INFORM YOUR READERS THAT THE FIRST 40 TAPES OF THE
SOLAR LIBRARY HAVE FINALLY BEEN COMPLETED.

IN ADDITION TO LISTING THESE TAPES, I HAVE COMPILED A LIST
OF THE OPERATIONS WHICH INTEGRATES THE ENTIRE CONTENTS OF THE
LIBRARY. IF YOU WISH TO PURCHASE THE COMPLETE LIBRARY OR
DETERMINE WHAT

PROGRAMS THE LIBRARY STILL NEEDS, I REGRET THAT I MUST
ALSO REQUEST THAT YOU SEND ME YOUR READERS TO CONFIRM THE
REQUESTED ITEMS. RATHER THAN WRITE YOU, THE RICHES WHICH HAVE FAILED THIS
NECESSARY STAGE, JUST LET ME SAY THAT IF YOU TRUELY COMPLAIN
THE LIBRARY ALMOST FROM SCRATCH.

ADDITIONALLY, WHEN I ASSURED YOU IN MY LAST POST THAT I
WAS GOING TO CONTACT THE VARIOUS PUBLICATIONS TO GET A
STACK COPY PROTECTED RELEASE SO

THAT WE COULD PASS DUPLICATE DISCOPHAGUS LIBRARY AND DISTRIBUTE
THEM TO THE READERS AT COST. UNFORTUNATELY, THE RESULTS WERE
DISAPPOINTING. I FEEL THAT THE READERS WILL FIND THE RESULTS
INTERESTING. DIGITAL INDICATES THAT WE COULD ONLY COPY A SMALL
NUMBER OF THEIR PROGRAMS AND THEN ONLY IF WE GET INDIVIDUAL
RELEASING THE VARIOUS AUTOMATION. CREATIVE COMPUTING WOULD ALLOW
Us TO COPY THEIR PROGRAMS ONLY IF WE PAID THEM A SUBSTANTIAL
ONE TIME CHARGE PLUS A SIMILAR PER COPY CHARGE FOR EACH PROGRAM.

IF YOU HAVE INTERFACE AGE AND PERSONAL COMPUTING WOULD NOT GAIN
BLANKET RELEASES, BUT RATHER REQUIRED SPECIFIC AUTHORIZATION
PER EACH PROGRAM, UPON SUGGESTING A SPECIFIC PROGRAM, WE
GRANTED PERMISSION TO WRITE AND TURNED DOWN AN INTERFACE AGE.

I DID NOT HAVE A SPECIFIC PROGRAM TO SUGGEST TO PERSONAL COMPUTING.
HISTORY. I BELIEVE THAT THE READERS WOULD NOT HAVE SEEN A PROGRAM
ON THE TELEPHONE. PCG SAID THAT WE ARE FREE TO USE THEIR
PROGRAMS. BEING A SKEPTIC, I FOLLOWED UP THE CALL WITH A LETTER.

ALTHOUGH THEY WERE SLOW IN RESPONDING, THEY WERE JUST AS POSITIVE
IN THEIR RESPONSE. I WOULD APPRECIATE IT IF THOSE WHO SUBMIT PROGRAMS
AND ARE PROBABLY IDENTIFIED AS THE SOURCE IN A REMARK
OR SUGGESTED STATEMENT EARLY IN THE PROGRAM.

THE SLOWEST RESPONSE WAS FROM KILMUN. SINCE THEIR PROPOSAL
MIGHT BE OF INTEREST TO THE CLU, I AM FOUNDING THEIR LETTER TO YOU FOR
PUBLICATION. PERSONALLY, I DOUBT THAT ANY DOCKING
A PERSONAL COMPUTER WOULD EVER HAVE A HIGHER WORK OR
THAT ANY CLU DISCOUNTS Would COVER THE USE OF PCG OR IT'S NO POSTAGE
AND HANDLING, BUT THEN AS INDICATED, I AM A SKEPTIC. SHOULD

THERE BE ANY CLU INTEREST, I THINK THAT IT IS IMPORTANT THAT
THE CLU REACH A SATISFACTORY AGREEMENT WITH KILMUN BEFORE
ANY WORK IS UNDERWAY.

FOR THIS AND OTHER REASONS, INCLUDING POSSIBLE PITFALLS IN
MAKING MULTIPLE COPIES, I HAVE SUGGESTED THAT THE LIBRARY BE RUN
AS A LUMP SUM BY THE LIBRARY. BY THE TIME THAT THIS IS PUBLISHED,
THE VARIOUS CHAPTEIS SHOULD HAVE BEEN CONTACTED TO ARRANGE FOR
THE 2 TAPES OF WHICH NO LETTERS SHOULD ENCOURAGE
THE CLU TO MAKE COPIES OF THE VARIOUS CHAPTEIS AND ENCOURAGE MEMBERS TO MEET
TO SWAP THEIR INDIVIDUAL COPIES.

ONE THING WHICH HAS OCCURRED QUITE EVIDENT IS THAT MOST OF
THE TAPES HAVE NOT BEEN SOUGHT AFTER. PEOPLE HAVE NOT)...
October 20, 1978

Solus
P.O. Box 22471
San Jose, CA 95153

Attn: Editor

Dear Sirs:

Enclosed is my check to cover SOLUS membership. I have had some rather serious problems with my system; especially with P.T.C. software. I am seeking answers to a number of questions and you are my last resort. If you are unable to help me, please return my check.

I have an INMOS machine with 32K RAM, CUTS, CURRR, an ADE-3A, and an AC-30. Generally I am very pleased with the system and with the P.T.C. components that are included. The software, when it works, is generally good.

My contacts with P.T.C. when I have received responses has also been good. It is the area of lack of response and the lack of working software that causes the problems. Since P.T.C. is unable, unwilling or just too busy to help, I am turning to you.

I. ACCESS: I picked up a copy of your publication and found that you were planning to have P.T.C. produce your news letter. Based on my experience with ACCESS, I would not recommend it. I subscribed to ACCESS, but have received issues generally only after asking about its status. I believe that the reliability of P.T.C. as a publisher is very questionable.

II. VDM vs CRT: When I started building up my system, I decided to go the CRT route, for several reasons. Some day, I may add a VDM, but not now. P.T.C. supposedly supports the VDM and CRT user, but unfortunately does not do a very good job with the CRT. This has been brought to the attention of P.T.C. on several occasions, but the problems continue. If P.T.C. wishes to support VDM systems only, that is their right and they should so state and get it over with. Most of my difficulties seem to relate to the fact that I have a CRT.

III. SOFTWARE #1: Until I am able to acquire a disk drive, this package appears to answer most of my needs. Unfortunately, it has some problems. It does not respond to CRT. I had one fix that allowed me to work the software, but I could not re-enter if I exited to the monitor. Can you supply me with the necessary patches that will allow the package to become fully operational.

IV. EDIT: Again, a nice piece of software, but again requiring modification to work with a CRT. There is a fix for this also. The real problem here is that the two sub-routines used to pack or un-pack do not work. I am not sure what the Edic fix is anymore and the specific sub-routine that is not working has slipped past me. I have been waiting for a response from P.T.C. for a considerable amount of time, but some of the details have been forgotten!

V. TAPE DRIVES: I am using two Supercopes with CUTS. Generally, I am well pleased with their operation. I do have difficulty transferring data from tape to tape (updating files etc.). I use the full capability of the system and therefore have the input, output, and motor control lines connected at all times. I am beginning to find that possibly this is a mistake. Indications are that only the input or output lines should be connected to a given drive at any one time. Can you confirm or give me some suggestions?

VI. ASSEM: I have seen this package, but have seen no literature. What is it and will it work with a CRT? If the package requires patches to work with a CRT, what are they?

VII. MSA-BASIC patches: In a copy of your news letter, there was an item concerning some patches to MSA Basic to permit better P.T.C. compatibility. The copy I saw was difficult to read and might have had some errors. I believe the author was a Mark Nowley. Can you help?

I realize that I have dropped a bunch of questions, but I have numerous problems. I am looking for some responses that will work. If you desire to pass along to P.T.C., please do so, but a high enough level to get some results. Although Ralph Paleson seems to be a nice guy, his responses and/or follow-up leave something to be desired. I can appreciate that P.T.C. may be a hectic place to be, but customer relations must be maintained at some level, (manufacturer, distributor, etc.) if they are to survive.

I sincerely hope to hear from you in the near future.

Thank You,

[Signature]

John E. Breden
921 Waterview Cir.
Richardson, TX 75080
Home: (214) 234-4384
Office: (214) 692-2255

(Ed. Note: We sent a brief reply to John. Reader's comments may help John and others with similar problems. We'll have more on fixing MSA-BASIC in the next issue.)

CC: SOLUS NEWS
OCA/CA: Stan Sokolow
1650 Woodside Road
#213
Redwood City, CA 94061

Dear Stan:

Attached is a letter which outlines my problem in using this new technology. It is specific and yet typical.

We would appreciate hearing from other businessmen trying to utilize a system such as ours.

We look forward to receiving SOLUS NEWS. Your efforts are appreciated.

Sincerely,

Charles I. Hansing

11-13-78

Charles I. Hansing

AJA Software
P.O. Box 2528
Orange, CA 92669

Gentlemen:

In September 1978, I purchased your GENERAL LEDGER program. As of now it has not been used because of time problems on our part and the following difficulties:

1. I am a one-man sales office and am not a computer specialist. Your instructions seem to be a random list of the product more than a step-by-step direction of what to do with the programs. Try giving the disc and instructions to someone, have them use it and then revise the instructions accordingly.

2. In order to understand what was happening I listed the programs. It would be helpful to have more REM statements in that I don't understand why you print 20 ** (clear screen) in "CREATE" etc.
3. To use the program it is my understanding that a second diskette is to be used with certain files. It escapes me as to where it is in the instructions this is indicated. It would be helpful if you listed the names, length and type in the instructions (since you did list a number of files, one of which was "BUFFA", I created it for insurance purposes). Maybe it is wishful thinking, but perhaps a program can be devised to create those files.

4. My system is a SOL 20 with a single North Star drive and a printer. The printer interfacing information supplied did not help me at all. Your inclusion of additional information such as either a special disc for SOL/US users, a list of program lines to be changed or "PRINT A" and "INPUT A" statements in your software would be helpful.

5. In creating my own list of accounts I found I made errors in entering them but could not correct them without re-entering the data. Except it is obvious I want to make changes in the future. A program or instruction that would let me work on the file would be helpful. A sample list should also be included, especially since '1100 CASH IN BANK' is part of the program.

My point in writing the above is twofold in that I'd like you and other software companies to give further consideration to the product and secondly to the growing number of neophytes such as myself that are trying to utilize this new technology. We need information on what your product is so we can determine if it meets our needs (and isn't too high-powered for us) BEFORE purchasing it, we need directions on how to adapt it to our particular system and we need those step-by-step instructions.

We are using Electric Pencil by Michael Shryer to compose this letter. We were able to use that product the first day we had it. We purchased it because of favorable "word of mouth", somewhat sufficient information on the product before purchase, excellent adaptation to our system and good documentation. Not knowing what the costs are to develop it I can't judge if the price-to-cost ratio is a value or not but it does the job please take heed.

To show you we have some faith in your products we are enclosing a check for your MAILING LABEL SYSTEM. Consider this strictly a "Bingo" purchase as the only information we have on it is the line listing in your flyer and the fact that your similarly priced GENERAL LEDGER program has a lot of program lines.

We are sending a copy of this letter to SOLUS NEWS in the hope that other suppliers may also get some benefit from our tribulations and in an attempt to see if others are experiencing similar problems.

Sincerely,

Charles I. Hansing
4127 Beard Av. S.
Minneapolis, MN 55410

A PTDOS COMMAND TO GO TO SOLOS

COPY NTDEPS
SHEET EQU OBC8BH
ORG C8BH
SOLOS EQU $
LIK H, 'ep' ;COMMAND is 'pe'
SHLD OBC8CH ;STORE IN CUSTOM TABLE, lat POSITION
LIK H, SRESET
SHLDH OCB4EH ;DOES SHORT RESET TO GET BACK TO PTDOS
JMP DCOO4H ;SOLOS RETN ENTRY POINT
XEQ SOLOS
END

PRODUCT ANNOUNCEMENT

ARTEC ELECTRONICS, INC.
605 OLD COUNTY ROAD • SAN CARLOS, CA 94070 PHONE (415) 292-2740

EXPANDABLE: Board and 8K + 8K add on kits will provide 8K, 16K, 24K or 32K of memory in one card. Of highest quality, manufactured on Norplex 1/16" FR4 glass epoxy, with plated thru holes, reflowed solder, solder mask both sides with component legend.

QUALITY: Nickel Gold Plated, 100 pins

MEMORY TYPE: FULLY STATIC: no clocking, no refreshing.

ACCESS & CYCLE TIME: 250 nsec (Compatible with Z-80; board runs at 4MHz)

BUSS PIN OUT: Plug in compatible with Altair (8-100) type bus

POWER REQUIREMENTS: Operating +7.5v to +10v @ 4 amps Standby (82.5v DC)

ADDRESS SELECTION: Addressable in 4K increments within range of 0-65K 1 to 8 banks; jumper selectable. Software controlled via output port 40 hex. Can be addressed up to 8 megabytes.

SOFTWARE: Compatible with DMA

BATTERY BACKUP: All address and data lines buffered with powerful state of the art buffers.


NEW LOWER PRICES

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<td>Board &amp; 8K of Memory</td>
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<td>T.I. TMS4044 250nsch Chips</td>
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*One year warranty on Artec assembled boards.*

MANUFACTURER OF PRINTED CIRCUIT BOARDS AND COMPUTER PRODUCTS

→ Assemble this file into image file "SOLOS." To go from PTDOS to Solos, give the command *SOLOS. To get back give the command *PTDOS. The video screen usually "folds" when switching between the two, but this doesn't bother the programs.