

SOLUS NEWS

Vol. 1, No. 1

SOL Users' Society

Jan, Feb. 1978

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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 Fire 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 CUTER (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 0000H 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.

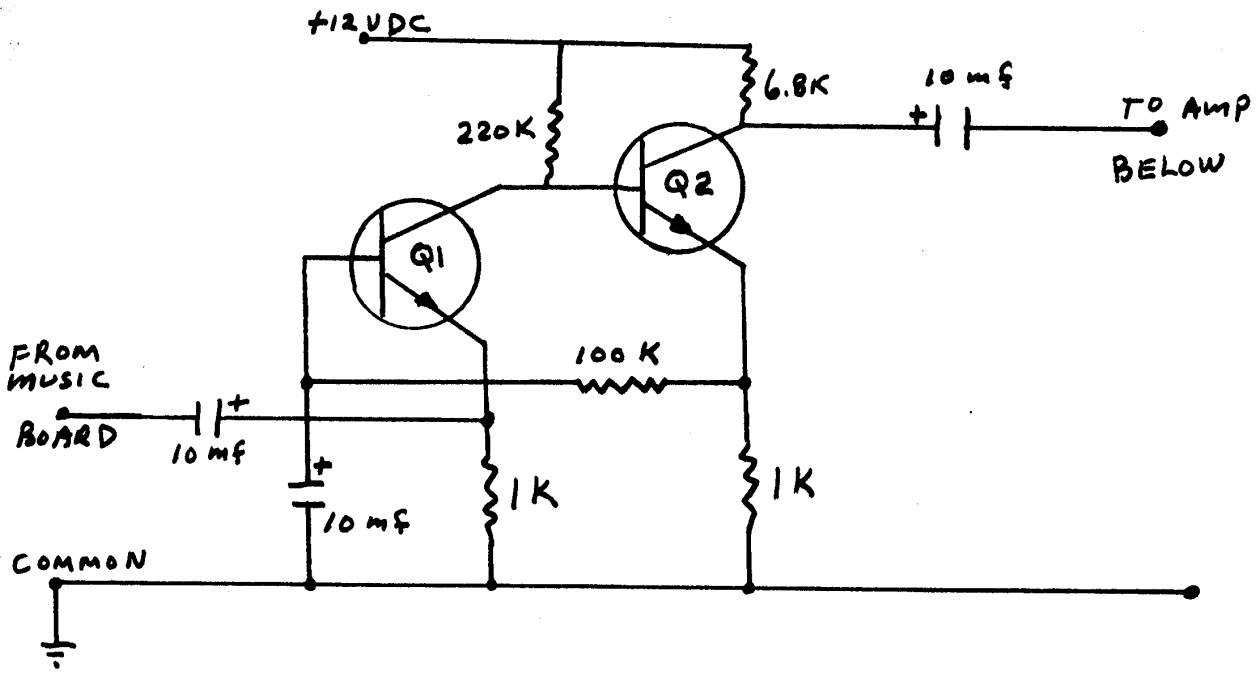
A better choice is shown in Figure 1. This is a very cheap amplifier that runs about two watts and sounds pretty good. I built it on a two inch square piece of perfboard. The components are all available from James Electronics - Total cost is \$2.65 not counting the resistors which can be obtained locally.


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, CA94070




 2N3904
 BOTTOM

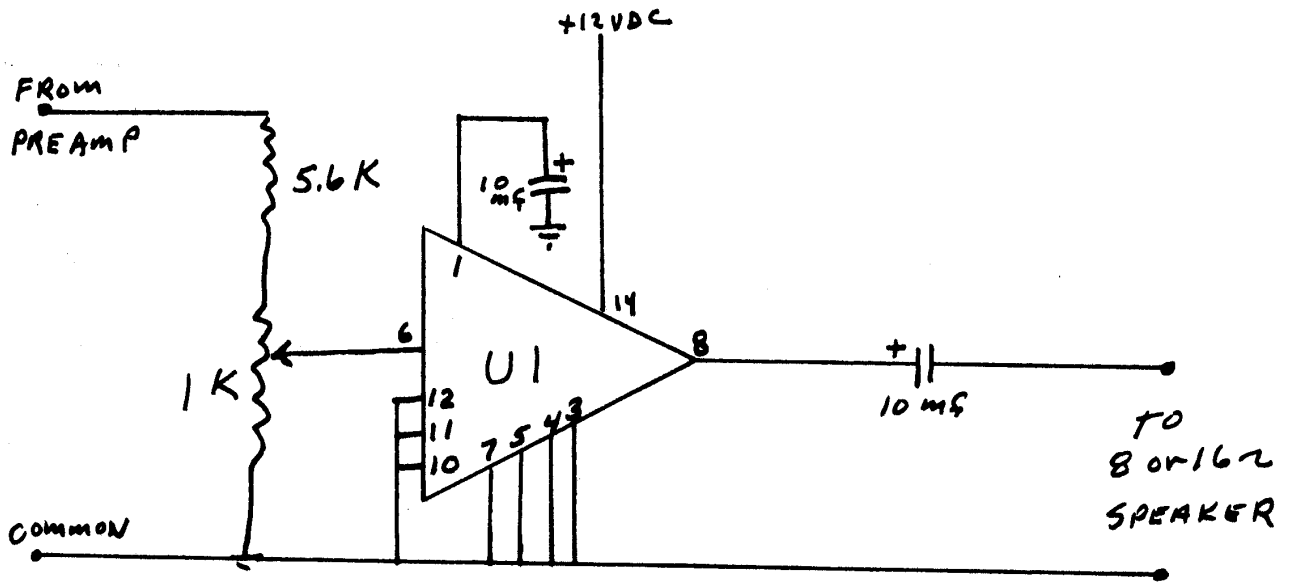


Figure 1

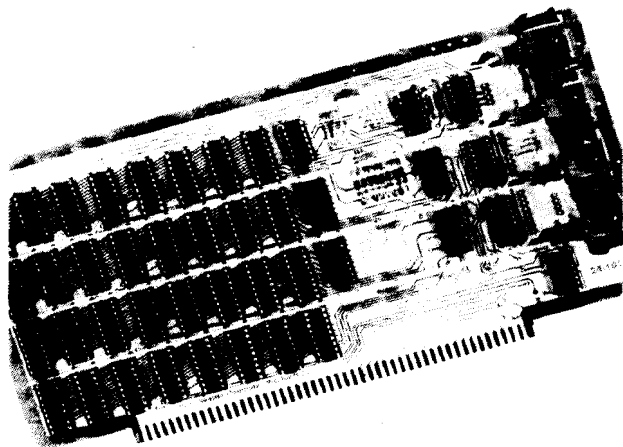
Q-1 and Q-2 are 2N3904 and U-1 is LM380N. Do not use LM380CN which is only .6 watt. All capacitors are 25 volt units and all resistors are 1/4 watt.

*****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 *****

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.

16611 111th S. E., Renton, WA. 98055
(206)255-0750

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:

Quantity	5-9	10-24	25-up
Kits	\$340	\$325	\$310
Assembled	\$360	\$350	\$335

(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 User's Society

Please enter my order for:

Kits at \$340 each.

Assembled, tested units at \$360 each

Check enclosed.

\$100 enclosed, ship COD for balance.

Charge my bank card: VISA

Master Charge

Acct. number _____

Interbank No. _____ Exp. date _____

Signature _____

Order date _____ Phone number _____

Ship to:

Name _____

Address _____

Processor Technology's Helios II
Disk Memory System
By Ron Parsons

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 useable only with other Helii.

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, FOCAL, 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.

HELIOS RISES
by Stan Sokolow

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 PerSci 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 than 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 flags 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 "IOBYTE" 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 accommodated 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 PTDOS 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 BFFFH. 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, PTDOS is a very extensive, well-planned operating system with great potential. Helios with PTDOS 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 ALTAIR'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 CP/M. 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 S-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 high performance disk system.

LETTERS

The Oct./Nov. issue was excellent. I have a SOL-20 with North Star disc. 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

Practical Microcomputer Programming; the Intel 8080, by W. J. Weller, A. V. Shatzel, and H. Y. Nice, Northern Technology Books, 1976, \$23.95.

(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.

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 KIM 1Y1

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Redding, CA: Darrel Rawlings, 3075 Churn Creek Rd., Redding, CA96001

CHAPTER NEWS

Dear Stan,

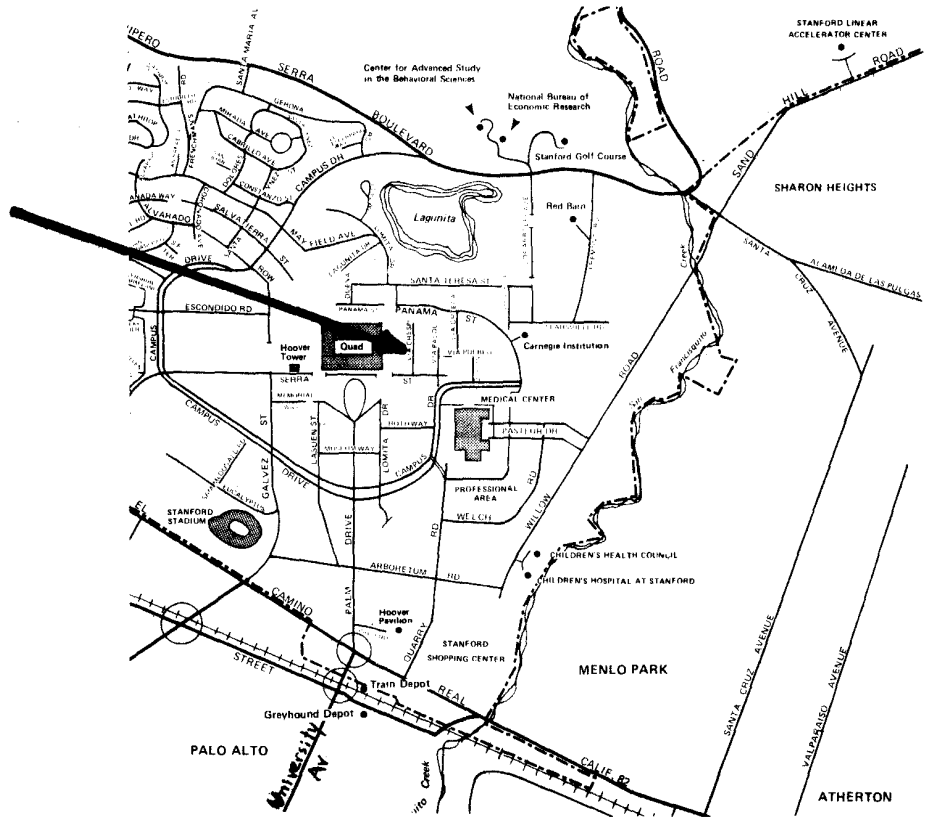
Hello! Merry Xmas, Happy New Year, etc. I am at list writing to you in answer to your inquiry from late Sept. about a possible SOLUS group in Ottawa. If a local chapter has not yet been set up, then I would indeed not mind coordinating some sort of activity among the SOL system operators in Ottawa. Or, should a chapter already be operating in this area, would you forward my 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 retype it if necessary.

San Francisco Peninsula chapter of SOLUS meats at the Stanford Physics building located here.



SOLUS NEWS
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