WACC Demonstration Contest Grand Prize Winner

Mr. Don Alexander, WA8VNP, of Columbus, Ohio, was named Grand Prize Winner in the MITS World Altair™ Computer Convention Demonstration Contest with his computer-controlled amateur Radio Teletype station. The home-built system consisted of an Altair 8800 computer with 8K of memory, an ASCII keyboard, a video display, Baudot Teletype and Teletype converter, and standard transmitter and receiver.

In addition to building the hardware, Don developed his own software, including the assembler and editor on which he writes his programs. To demonstrate the system's capabilities, he entered a Radio Teletype contest that was running during Convention Weekend. Since the Altair 8800 kept track of most of the busy work, Don was free to explain his system to other interested WACC attendees.

Briefly, the object of the R/T contest is to make as many contacts as possible; and in order for a contact to be valid, the time, a message number and signal report must be exchanged. (Duplicate contacts are invalid.) Don's Altair computer was programmed to control every aspect of contest operation: it did ASCII/Baudot translation; received calls, edited them and put them on the video display; checked its memory for duplications; transmitted the time and message numbers automatically, along with lines of text that were generated on command from the keyboard; and finally, printed a log entry on the Teletype after every exchange. A complete Altair Floppy Disk System

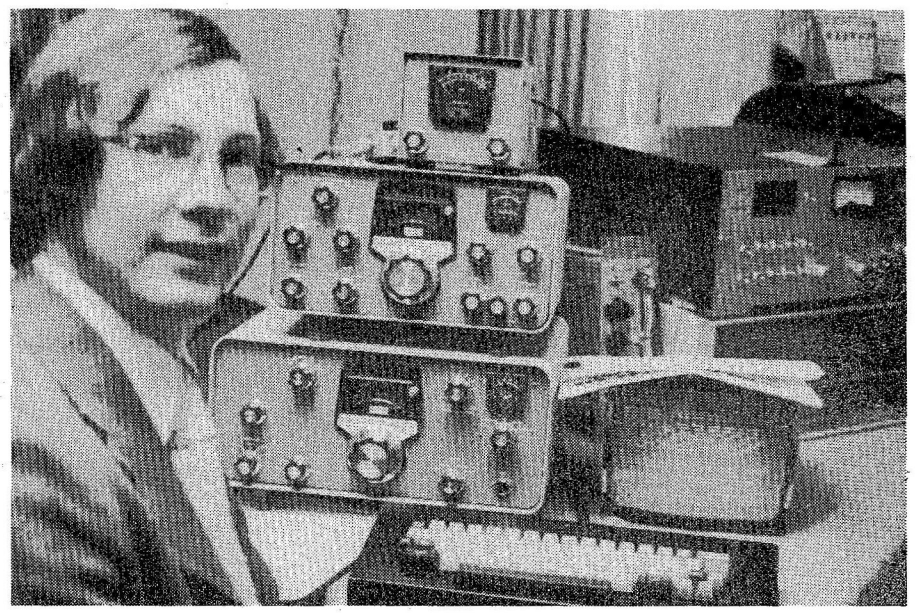


PHOTO BY ANDREA LEWIS

The two most important subroutines, as Randy explained, are called "list" and "legal". "List" compiles a list of all possible moves (these are called the "raw" moves) for any chess piece, and "legal" determines which moves are legal (these are called the "restricted" moves). In order to make a move, the program goes through the following four major steps: 1) Asks the human for his move, and checks the move's legality before making the move; 2) Lists all the possible moves the computer has; 3) Evaluates each possible move with a number; 4) Finds the move with the highest evaluation number and outputs that move.

DON ALEXANDER

was awarded to Mr. Alexander for his first-place entry.

The choice for a second place winner was so close that it was the decision of the judges to declare a tie. Both the second place winners were awarded Altair 8800B computers with 4K of static memory. One of the second place winners was Randy Miller of Tempe, Arizona. Mr. Miller, using an Altair computer, 20K of memory, and a standard Teletype, demonstrated a remarkable chess program that he had written in Altair BASIC.

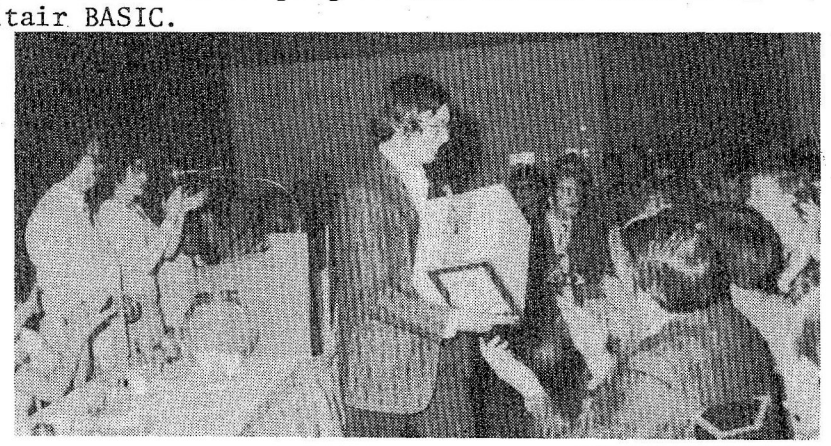


PHOTO BY R. PRATI

The ease and familiarity with which Randy presented his demonstration gave even beginners or "hardware only people" an opportunity to see how the right software can turn a minimum amount of equipment into a powerful system. Randy said he's been working on various chess programs and the algorithms involved for 3 1/2 years, and the demonstration program itself was just written last January. The program was structured so that one main program controlled a number of subroutines.

Wirt and Valerie Atmar of Las Cruces, New Mexico, presented the other second prize winning demonstration, a speech synthesizer. This popular exhibit drew a lot of attention at the WACC, and the "voice" it produced soon became a familiar background sound around the demo rooms.

The speech synthesizer generates speech by concatenation of phonemes. This is accomplished through a physiological analog of the human vocal track, which includes a larynx and filters that simulate mouth positions. A typewriter is converted so that each key has a phonetic sound associated with it. The phonemic information is programmed in the Altair computer in a ROM-like matrix. Thus, each key that is struck calls up a string of characters in the computer which are output through a parallel I/O port to the voice analog and a phonemic sound is generated. When these sounds are strung together, words and sentences can be constructed. A video display simultaneously prints out what is being "said".

-continued on page 14-

COMPUTER NOTES
©mits
APRIL 1976
Vol. 1 Issue 11

"... are you ready for the electronic newspaper?"

By David Bunnell

It is fun to speculate where the computer-future lies. The March-April issue of Creative Computing is full of interesting articles on artificial intelligence and robot house servants. Computer hobbyists are coming up with esoteric interfaces and novel peripheral devices. People are saying that microcomputers such as the Altair will have a profound impact on society. That this impact will probably be as great as that of the printing press.

Well, here I am in the middle of this movement and, frankly, I'm not so sure. Maybe it's just my nature to hedge my bet or maybe I've been so wrapped up in the mechanics of marketing computers that I've lost my perspective. Or maybe I'm right.

One thing that I am certain about is that the computer-future doesn't lie with computer sex machines. You can talk all you want about the "Total Technology Sonic Stimulator" with its various cup-shaped and tubular outputs, and this will get a lot of chuckles, but who in his right mind can seriously look forward to the Age of the Digital Masturbator?

And we can speculate about sophisticated voice input/output, music synthesizers, and biofeedback devices. One of my favorite ideas is an Altair computer with a biofeedback input and a TV dazzler output that would allow one to create electronic paintings by controlling his alpha waves. This would not only be fun, but could conceivably be used as an analytical tool by psychiatrists. But are these ideas really meaningful, or are they just idle speculation?

Not that I have anything against using computers for fun, because, by golly, they are fun. It's just that it seems to me there's too much work to be done in the area where the computer-future truly lies; that is the area of practical applications.

For example, have you been to a large public or university library lately? Did you spend hours looking through the stacks for a list of books on a particular subject only to find half of them already checked out? Did you stand in line to check out the other half, and as I did at the University of New Mexico Library, did you have to fill out the same information card for each of the books including your I.D. number, your name, address, zip code, phone number, the title of the book, author, publisher, and catalog number? And then did you find out that you didn't fill out the cards correctly, that two of the books were in such demand you could only check them out for 24 hours with a dollar-an-hour past due fine for each? Well, go ahead and tell me how computers are revolutionizing society. I think they've been around long enough to have corrected the above situation.

What I'm getting at is this: the inexpensive computer hardware is here and it is backed up by extensive software, but, timewise, it is applications that prove to be the real kludge. Just how long will it be before I can tap into the Library of Congress with my video display terminal?

And then, here's another problem. Before we go out and revolutionize society, hadn't we better find out in what areas society needs and will accept computers?

An example of what I mean is the Universal Product Code--those ugly little strips that are showing up on price tags and on food containers. In the grocery store business, this was supposed to have eliminated the necessity of putting prices on each individual item. But, as it turned out, a can of beans without a price tag is not a can of beans. Consumers were in an uproar and while grocery stores will still reap many of the advantages of the UPC, food containers will most likely carry two demarcations: the UPC and a price mark.

Another example is a recent article in Minicomputer News that refers to a speech by Joel Moses, an associate professor of electronics at MIT. It is Moses' contention that by the mid-to-late 1980's computerized bill payment may replace a large chunk of first class mail. The average citizen will come home, and ignoring his mail box, he'll turn on his CRT only to learn that the phone and utility bills have arrived. Entering his identification code onto the screen, Average Joe can then pay these bills by entering the billing data which is communicated to the local bank over ordinary phone lines.

This "home information system" could easily be expanded to include junk mail and electronic newspapers. Electronic newspapers, according to Moses, could provide more in-depth coverage and carry a wider assortment of articles.

Well, somebody's got to draw the line. And I'm one consumer who gets a kick out of picking up the newspaper from the lawn each morning and while it's annoying to read a front page article when it's continued on page 32, I want to touch my newspaper, drape it over the breakfast table, and when I'm through with it, I want to wad it up and burn it in my fireplace.

Now, I'm not going to be very persuadable on this subject; in fact, I'm going to be downright irrational. I want my newspaper. I want it the way it is, grimy ink on flimsy newsprint, not 5x7 dot matrices on a cathode ray tube.

See how complicated the computer-future can get?

Letters to the Editor

Dear Andrea:

I found an error in the Altair 8800 Operator's Manual that has perhaps gone unnoticed. For the three instructions on page 52 (DAD, INX, DCX), when (rp) is 11 the stack pointer is specified, not the flags and accumulator as is indicated on page 50. The other instructions on pages 50 and 51 are correct. Even if this has been published in CN before, it might be a good idea to do it again.

I ran into this problem while trying to save BASIC's stack pointer as is discussed on page 66 of the BASIC manual. There is no instruction that allows the stack pointer to be stored in memory or exchanged with another register pair; note that XTHL exchanges what is pointed to by the stack pointer and not the stack pointer itself. The only way I've found to save BASIC's stack pointer is the following:

```
LXI H   041
 B2     000
 B3     000
DAD SP  071
```

This has the effect of leaving the stack pointer unchanged, but copying it into the H and L registers. It is equivalent to a MOV H&L, SP, if such an instruction existed. Now that the pointer is in H and L, it can be saved and the user's stack initialized. Note that this would be impossible if DAD operated with the flags and accumulator rather than the stack pointer.

The error is only in the Operator's Manual; the quick-reference sheets appear to be OK.

Yours truly,
James Lindelien

-continued on page 4-

COMPUTER NOTES

Publisher	David Bunnell
Editor	Andrea Lewis
Production	Tom Antreasian Al McCahon Grace Brown
Contributors	Ed Roberts Gale Schonfeld Paul Allen Tom Durston Annette Milford Steve Pollini Mark Chamberlin

Ramblings from Ed Roberts

by Ed Roberts,
President of MITS, Inc.

WACC

We are all gratified and honored at the overwhelming response to the first World Altair Computer Convention. Let me take this opportunity to thank all of you who attended and helped make it such a success. Special thanks to the clubs and in particular to the SCCS which was well represented. Next year we anticipate an even bigger and better convention with additional emphasis on technical and applications sessions and more exhibits.

USER GROUP

As a result of meetings at the WACC, we have launched a campaign to greatly strengthen the User Group in terms of what it supplies and what it does for the Altair user. This effort is to be made in conjunction with the dealers. We will make all library software available free through the dealers for User Group members.

DEALERSHIPS

We are seeing more and more aggressive support of the Altair by all Altair dealers than ever before. As a matter of fact, I have been authorized by the dealers to pass along their offer to render support. If you have a problem with an Altair, even if you did not buy it from the dealer originally, feel free to go to them for assistance for either software or hardware problems. This service is free. All of our dealers have expressed an interest in getting systems up and running and solving existing problems.

SCCS

As I mentioned above, the participation of the SCCS was certainly one of the major factors contributing to the success of the WACC. SCCS stands for Southern California Computer Society, implying an organization restricted to Southern California, but this is certainly not the case. SCCS has become not only a national, but international organization. As a matter of fact one of the prizes awarded during the convention was supplied by the SCCS chapter in Mexico City.

IMSAI

As a matter of policy I have deliberately avoided discussing competitor's products, but in view of recent developments I felt compelled to respond. The following is my "objective" evaluation of the IMSAI. This evaluation is based upon a comparison between the currently advertised IMSAI and the early Altair.

We received our IMSAI machine approximately 30 days after the order was placed (January). My initial reaction was positive from two standpoints. The first being that it obviously wasn't a piece of junk and indeed appeared to consist of good quality materials. I had been concerned that IMSAI might be another junk house like so many of the companies that have come and gone during the last year. The second pleasant surprise was that essentially it is only a slightly modified version of the Altair design I did over two years ago.

Based on their advertisements we expected a machine with a 22 slot mother board, a 24 amp power supply and memory. What we received was a transformer that we would rate at approximately 12 - 13 amps, a 4 slot (1/16" thick) mother board, and no memory. The price we paid was $439.00 + a 5% handling charge, or approximately $460.00. I understand the price for the same unit has been raised almost $200.00 since that time.

Improvements Over Original Altair

a) Front Panel Wiring: The front panel plugs into the system bus, a nice touch which eliminates the bulk of the front panel wiring harness.

b) Improved Power Supply: The system power supply has approximately 20 to 30% greater capacity than the early Altair (not 300% as claimed).

Flaws

a) Cabinet: The IMSAI advertisements imply that the Altair is in a "hobby" case, while their machine is a commercial quality case. The fact is all Altairs have OPTIMA enclosures which are the highest quality cabinets available anywhere. The IMSAI cabinet is similar to a glorified mini box folded by some local sheet metal shop, it does not have any of the standard features included in an Altair, such as the sub-chassis, dress panel, etc.

b) Cabinet Rigidity: Related to the above comment, great care must be used when moving the IMSAI machine as the cabinet will flex enough to pop cards out of their edge connectors. This is especially a problem if the top (as in the case of a mini box) is removed.

c) Assembly Manual: We have received some justified negative comments concerning the Altair manual, but if you think that the Altair Assembly Manual is less than fantastic, wait till you see the IMSAI manual. It is primitive by our standards. The same is true of the schematics, from a drafting standpoint they are excellent, but from a useability standpoint they are almost worthless.

d) Front Panel: The front panel is a real do-it-yourself kit, lots-of-luck. All that work you saved on the front panel harness is made up for here. Its final appearance is totally subjective so you be your own judge.

e) Front Panel Switches: Construction of the front panel switches results in a sloppy appearance, and contrary to what you may have read, they are standard toggle switches with inexpensive plastic handles. Manual loading of a program is significantly slower as a result of the close spacing of these switches.

f) AC Power Location: The AC power is on the top of display and control so watch your fingers (the original Altair design is not ideal in this regard either).

g) Ventilation: Like the very early Altair there is a large opening in the back panel for a fan (watch your fingers).

h) PC Boards: The PC boards are <u>not</u> silk screened. This coupled with assembly manual can make for tough assembly and maintenance.

i) Bus Driver: The CPU bus driver is an 8212 instead of 8T97 or 74367.

j) Memory Protect: It doesn't have a front panel protect capability.

k) Intangible Factors: Lack of mature software, minimal peripheral hardware and many other inadequacies that can only be solved with time.

There are a number of other minor problems with IMSAI, but I assume that IMSAI could solve them. In summary the IMSAI does not represent any advancement in the state-of-the-art and indeed is at best a slightly modified imitation of the original Altair. If you ignore the software, peripherals, etc., that go along with the original Altair and if you further assume the IMSAI sells for less than the original Altair, then the IMSAI is competitive with the early Altairs.

One final point, I have been asked about the Hypercube, i.e., asked if I had anything to do with its design, the answer is no. Where this rumor apparently started was the IMS advertisement which states in effect that IMSAI 8080 technology and the hypercube technology are common. Since the IMSAI 8080 is an imitation of the Altair, I guess its easy to extrapolate that the Altair is responsible for the hypercube, but it just isn't true. Some of the readers of this column are probably aware of a system design that I worked on in parallel with the early Altair to allow for a multiprocessor system (256 CPU's). The Altair bus structure was configured in part to facilitate its implementation in a multiprocessor environment. This turned out not to be a practical way to achieve increased computing power, therefore, I abandoned the technique. Maybe someone reading this column will prove me wrong.

This evaluation was based entirely upon the original Altair and not on the second and third generation machines (8800A and 8800B). We feel these later machines are in an entirely different league than the IMSAI or original Altair.

customer service news

by Gale Schonfeld

Beginning this month, Users Group News (formerly authored by Barbara Sims) and Customer Service News will be combined in this column. Barbara Sims was married last month and terminated her employment with MITS at that time. Many of you probably know me, Gale Schonfeld, from phone conversations or correspondence with MITS.

Each month I will be passing on information to you from our various departments. We are hoping this will help to clear up problems with orders, deliveries, repairs, etc. Of course, any feedback from our customers is welcome.

We have expanded Marketing to include a Customer Service Department. We will eventually add more people, but for now our Customer Service people are Kris Ray, Mollee Smith, and myself. Please let one of us know if we can help with your orders, problems, or technical information.

Message From Our Shipping Dept.

Customers' special shipping requests have created some problems for the MITS shipping department. So this month I will relay to you some of the things that must be considered when equipment is shipped to or from the MITS factory.

UPS

If at all possible, please use your street or business address rather than a Post Office box. We prefer to ship via UPS (United Parcel Service) because it is faster and more flexible. However, a UPS shipment that is sent to a PO Box will be delayed at the Post Office until the addressee is contacted. UPS covers 49 states including Hawaii. Alaska orders normally go Parcel Post.

COD

We cannot ship COD to foreign countries (including Canada) via the Post Office. Foreign COD's are shipped Air Freight. COD shipments via the Post Office can only be insured for the COD amount, such as repairs or partial payment orders. UPS will insure for the total value, so please use a street address when requesting COD.

APO and FPO

All orders to APO and FPO addresses are shipped Parcel Post. (We do not ship via PAL to APO and FPO addresses.) We cannot ship a Teletype or a line printer to an APO or FPO address, because weight and size limitations do not permit shipment of these two items by parcel post. Teletypes and line printers must be shipped by truck or by Emery Air Freight, and neither of these methods allows shipment to an APO or FPO Post Office Box.

TTY Call Control Kits

Please remember, per March 1976 issue of "Computer Notes", we can only accept orders for the 88-TYA, 88-TYR, and 88-TYK that are within the Continental United States. THE TELETYPE PORTION OF THESE ORDERS WILL BE SHIPPED VIA FREIGHT COLLECT DIRECTLY FROM TELETYPE CORPORATION.

Prepayment

Shipping charges should be prepaid on items being returned for credit, repair or replacement, unless prior arrangements have been made with the factory.

Air Parcel Post

If you are requesting air shipment via the post office, please be advised that maximum weight for Air Mail is 9 ounces. Since most of our products weigh more than 9 ounces, we have to ship Air Parcel Post, which is much more expensive than Air Mail. If you do request Air Parcel Post, please use your Master Charge or BankAmericard, so we can charge the correct postage.

Canada

To our Canadian friends who are on our Time Payment Plan, please be advised that Time Payment #4 (the Altair case) must be shipped Emery Air Freight collect. The size of our carton is 74 inches, and Canadian post office regulations allow for a maximum of 72 inches.

Next month I'll discuss some of the common problems that come through our Repair Department. Until then-Happy Computing!

Gale

Letters to the Editor

-continued from page 2-

Dear Sirs:

This is to reiterate how much I enjoyed, and benefitted from "WACC '76". I was particularly impressed by the knowledge, motivation, and capability of some of the younger members of your staff - something that I rarely experience these days.

Over the weekend there were a number of "Cheap Shots" flying around the Marina both on and off mike. It would seem that the only one attending who had benefitted from production delays was me - this I find hard to believe. During the eighteen months between the time that I ordered a 744Ø and the day that my 744Ø (S/N D1Ø212) Kit arrived (with production line assembled boards requiring only interfacing and the mounting of one chip) I benefitted from improved design, ease of assembly, and a significant price reduction. A few months prior to receipt of my 744Ø, while on a Thanksgiving "Enchilada-Therapy-Trip" to Santa Fe, I stopped at the then new and larger Linn St. facility to order a P744Ø Kit. Six-plus months later when my Programmer Kit (S/N D11372) arrived, it was fully assembled and operational, requiring only interfacing to the mainframe. I again enjoyed a sizeable price reduction and rapid interfacing. I could have indulged myself during those months, and the years to follow with "Cheap Shots" but then that would indicate that I had not benefitted from our dealings. Did I benefit??? You be the judge - I can only see one verdict. I am sure that when I finally decide on my initial MITS 8800 system configuration, those benefits will continue to accrue.

Again, the festivities at the Marina, the exchange of ideas/information with both your staff and other attendees, along with multiple trips to "La Placita" (the "Green" was outstanding), were all most rewarding. I look forward to more and better (smaller?) things from MITS, and even bigger things at "WACC '77".

Keep up the fine work,

Lloyd A. Wolfe
Glencoe, Illinois

— — — — —

Dear Andrea:

Andrea, in celebration of your ascendency to editorship of Computer Notes, I lift my glass of champagne and drink a toast in your honor. Welcome to the boggled, bewildered, and bugridden Society of Friendly Computer Editors.

--taken from a letter from Bob Albrecht of People's Computer Co.

— — — — —

Dear Dave:

Just wanted to drop you a line and let you know what an interesting and fulfilling time I had at the convention. I could hardly get to sleep that Friday and Saturday night . . . I was on such a high! Who would ever want to mess around with dope when there are computers!

--taken from a letter from John Craig of 73 Magazine.

A Second and Final Letter

Since sending out my "OPEN LETTER TO HOBBYISTS" of February 3rd I have had innumerable replies and an opportunity to speak directly with hobbyists, editors and MITS employees at MITS's World Altair Computer Convention, March 26-28. I was surprised at the wide coverage given the letter, and I hope it means that serious consideration is being given to the issue of the future of software development and distribution for the hobbyist. In my remarks at the WACC I spent a great deal of time explaining why I think software makes the difference between a computer being a fascinating educational tool for years and being an exciting enigma for a few months and then gathering dust in a closet.

Unfortunately, some of the controversy raised by my letter focused upon me personally and even more inappropriately upon MITS. I am not a MITS employee and perhaps no one at MITS agrees with me absolutely, but I believe all were glad to see the issues I raised discussed. The three negative letters I received objected to the fact that I stated that a large percentage of computer hobbyists have stolen software in their possession. My intent was to indicate that a signifigant number of the copies of BASIC currently in use were not obtained legitimately and not to issue a blanket indictment of computer hobbyists. On the contrary, I find that the majority are intelligent and honest individuals who share my concern for the future of software development. I also received letters from hobbyists who saw the stealing going on and were unhappy about it, and from small companies that are reluctant to provide software because they don't think enough people will buy the software to justify its development. Perhaps the present dilemma has resulted from a failure by many to realize that neither Micro-Soft nor anyone else can develop extensive software without a reasonable return on the huge investment in time that is necessary.

The reasons for writing my first letter were to open the issue for discussion, let people know that someone was upset about the stealing that was going on, and to express concern about the effect such activities will have on future software development. Some letters suggested that software should be sold for a flat fee to hardware companies who would add the cost of the software to the price of their computer. Whether this is legal or not, the marketability of software to hardware companies is questionable when software is so freely shared among hobbyists. Providing software in ROM may help, but committing a complex software package to ROM before it has been field tested means that users will have to accept the bugs that inevitably turn up. Having a select trustworthy group do field testing for six months would mean that most of the bugs could be eliminated, but delaying the introduction of a product this long isn't feasible or desirable. In any event, software on ROM can be copied.

In discussing software, I don't want to leave out the most important aspect, viz., the exchange of those programs less complex than interpreters or compilers that can be written by hobbyists and shared at little or no cost. I think in the forseeable future, literally thousands of such programs will be available through user libraries. The availability of standardized compilers and interpreters will have a major impact on how quickly these libraries develop and how useful they are.

Two factors that will encourage people to develop software are that the hobbyist market is expanding rapidly and that many commercial applications of microcomputers require the same software that hobbyists need. Unfortunately, some of the companies I have talked to about microcomputer software are reluctant to have it distributed to the hobbyist, some of whom will steal it, when the company is being asked to pay a huge sum to finance the software development.

To avoid an endless dialogue, and to keep the current controversy centered on the primary issue, this is the last open letter I will write on this subject. I thank those who responded in writing to my first letter.

APL is well under way and should be completed by the middle of the summer, when it will be made available to hobbyists. Micro-Soft also has a high-level language compiler in the design stage and is trying to work out a way to publish the source of one of its interpreters in a fairly inexpensive book form along with about one hundred pages of explanatory text.

from Bill Gates

Bill Gates
General Partner,
Micro-Soft

mits mobile caravan seminar

The mobile van that formerly transported the MITS Caravan Seminars to cities across the U. S. has been retired, but the seminars themselves are still going strong. The seminars are being recorded on videotape and will be available for viewing at all MITS local dealer outlets.

The computer stores will be scheduling the videotaped seminars beginning in July, and the qualified personnel who staff each store will be on hand to assist with any questions you may have during the presentations.

The tapes have been prepared at the MITS plant in Albuquerque under the supervision of Pat Ward and Bob Scott. Some of the topics that will be covered include machine language programming, how to use BASIC, interfacing techniques, and logic circuitry.

Our original goal in bringing you the MITS Mobile Computer Caravan was to introduce the idea of low-cost computing to as many people as possible. We feel our videotape presentations will accomplish this same goal much more effectively and efficiently.

mits

Now, you can buy an Altair 8800 or Altair 680 computer kit right off the shelf. Most all Altair options, software and manuals are also available. The MITS Dealer List below is just the beginning:

off the shelf

RETAIL COMPUTER STORE, INC.
410 N. E. 72nd
Seattle, WA 98115
(206) 524-4101

COMPUTER KITS
1044 University Ave.
Berkeley, CA 94710
(415) 845-5300

ARROWHEAD COMPUTER CO.
(THE COMPUTER STORE)
820 Broadway
Santa Monica, CA. 90401

CTI DATA SYSTEMS
3450 East Spring St.
Long Beach, CA 90806
(213) 426-7375

GATEWAY ELECTRONICS
2839 W. 44th Ave.
Denver, CO 80211
(303) 458-5444

GATEWAY ELECTRONICS
8123-25 Page Blvd.
St. Louis, MO 63130
(314) 427-6116

BYTE'TRONICS
5604 Kingston Pike
Knoxville, TN 37919
(615) 588-8971

THE COMPUTER SYSTEMCENTER
3330 Piedmont Road
Atlanta, GA 30305
(404) 231-1691

MARSH DATA SYSTEMS
5405-B Southern Comfort Blvd.
Tampa, FL 33614
(813) 886-9890

the COMPUTER STORE, INC.
120 Cambridge
Burlington, Mass. 01803
(617) 272-8770

MICROSYSTEMS
6605A Backlick Rd.
Springfield, VA 22150
(Washington DC area)
(703) 569-1110

THE COMPUTER ROOM
3938 Beau D'Rue Drive
Eagan, Minn. 55122
(612) 452-2567

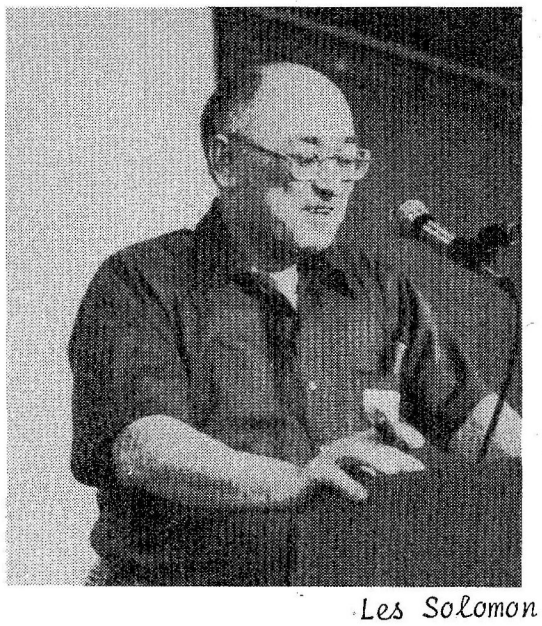
COMPUTER PRODUCTS UNLIMITED
4216 West 12th St.
Little Rock, Arkansas 72204
(501) 666-2839

NOTE: Altair is a trademark of MITS, Inc.

Computer Power of the Future-

by Annette Milford

Ted Nelson, author of Computer Lib, opened Saturday night's seminar at the WACC with this statement, "If the SCCS continues to grow at its present rate, in four years all mankind will be dues-paying members." Lou Fields, the Southern California Computer Society's vice-president, said later that his organization originated in September, 1975, with two people and projected that by September of '76, the SCCS will have 20,000 members. Les Solomon, editor of Popular Electronics, told the Saturday night crowd of 700 that five years ago he and Ed Roberts, MITS' president, were speculating about whether it might be possible to sell 200 Altairs and break even.



Les Solomon

"She said, why don't you call it Altair--that's where the Enterprise is going tonight."

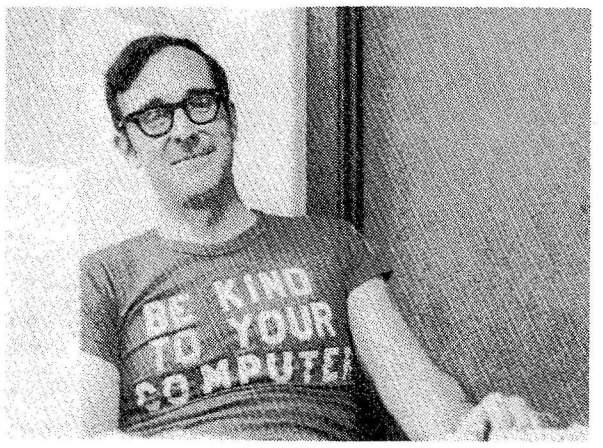
The point of all these comments was not to "ballyhoo" the SCCS and MITS, but to realize the astronomical growth rate of computer hobbyists.

Les Solomon entertained a curious audience with anecdotes about how it all began for MITS. The name for MITS' computer, for example, was inspired by his 12-year-old daughter. "She said why don't you call it Altair--that's where the Enterprise is going tonight." Larry Steckler, technical editor of Radio Electronics, followed Solomon's speech with promises of more extensive coverage for computer hobbyists. According to Steckler, the facts dictate--the snowballing numbers of hobbyists are impossible to ignore.

Ted Nelson defined the growing computer mania more carefully. Nelson began by describing the "Alto", Xerox's wonder computer at the Palo Alto Research Center. The "Alto" has an 8 1/2 x 11" dot screen and its own language, "Small Talk" that lets the user generate different styles of type, interactive graphics, music, you name it. Nelson ended the description of this magnificent machine to an envious audience with this--" . . . and you can't have it." The point is that no one can have it. According to Nelson, the computer industry is being liberated by hobbyists. It's the people playing with switches in their garages who are going to make computers as practical for the household and small businessmen as they are for massive corporations.

Nelson predicts that the phenomenal growth rate of hobbyists will level off. Why? "Because not many people like to program or wield a soldering iron." He says that "Computers are going to recapitulate the history of hi-fidelity." This means, of course, that the household computer will be as common as the Gerrard turntable and that the technical knowledge of the computer will be exclusive among owners as hi-fidelity know-how is today. Nelson told his audience of computer enthusiasts, "There will always be computer insiders-like us, and computer outsiders-like them, but that's all right; it's really all right." He advised the crowd of "insiders" to "cherish and enjoy the fun we're having . . ." but after all he continued, it really isn't necessary "to feel that we have to impose on the world the learning of ASCII code."

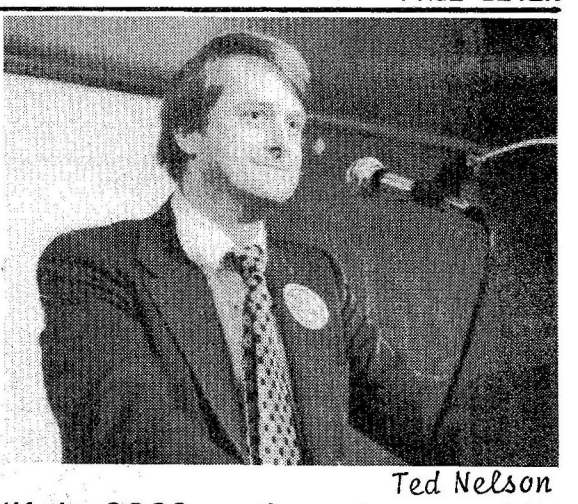
"We should cherish and enjoy the fun we're having, but not feel that we have to impose on the world the learning of ASCII code."



David Ahl

David Ahl, editor and publisher of Creative Computing, came to the WACC's Saturday night seminar to share his excitement about kids and computers. Ahl explained the limitations of computer use in schools. According to Ahl, computers are now being used primarily for record-keeping and occasionally in math class or for science simulations. He predicts that "Computers are going to come into the schools the way pocket calculators did." Kids, he says, are going to be the computer liberators, not teachers.

-The Hobbyists



Ted Nelson

"If the SCCS continues to grow at its present rate, in four years all mankind will be dues-paying members."

"Kids will come to school waving a copy of Creative Computing saying why aren't we learning about this, this is where it's at." The point is again that the hobbyists are going to make computers accessible, practical and exciting for everyone.

Carl Helmers, editor of Byte Magazine, discussed the practicality of computers. He suggested that the values of computers are as "amplifiers for your mental powers". Home computers may be used, for example, to take care of the numerous hassles of daily life, like balancing checkbooks, figuring tax returns or maintaining mailing lists. Helmers' ideas about uses for your computer emphasized another important theme of the seminar--the need to share knowledge.

Lou Fields, vice-president of the Southern California Computer Society, told the audience about his organization, a group of people who through their cooperative efforts are able to instrument ideas, like group purchasing and software libraries. This kind of group, according to Ted Nelson, is where things can happen. Nelson advised that the gap between Xerox's "Alto" and your Altair is marked by the lack of a general purpose common-structure language. He says that BASIC is not enough, that an esperanto beyond BASIC is necessary and that cooperative groups are the instruments that can make the creative powers of computers accessible to everyone.

"Consider how you got here and help somebody else get here."

Ward Spaniol, president of SCCS, concluded the seminar speeches. He announced that the SCCS brought an award to the WACC (otherwise known as "the silver-plated combat helmet and casserole combination") to be given to the editors and publishers of BYTE Magazine in recognition of their contribution to computer users. The success of SCCS, he noted, seemed to be due to the willingness to help others, and he finished the evening with excellent advice for all hobbyists, "Consider how you got here and help somebody else get here."

680-b ready for production

By Steve Pollini

MITS is now ready to begin full production of the Altair 680b. Mark Chamberlin and I have put many hours into testing and retesting the system over the past few weeks and have found it flawless. The PROM Monitor includes many useful features such as the "Load" command which allows the user to directly load a program from paper tape without first keying-in a bootstrap loader through the front panel. This feature alone has made testing and operation of our prototypes fast and easy. (Mark provided a full description of the monitor's features in last month's Computer Notes.)

All of you Baudot buffs out there will be happy to know that we have a Model 15 Baudot machine working with our 680b's. Mark modified the monitor to do all the necessary Baudot/ASCII conversions. The hardware needed to drive a Baudot interface is included with the system. The interface that is needed must isolate the Baudot power supply from the computer. We have done this through the use of opto-isolators; a suggested circuit diagram for accomplishing this will be included in the assembly manual.

MITS is considering marketing this Baudot level conversion and isolation circuit as an optional kit. We did not include this circuit with the basic 680b because to do this would raise the price of the basic unit for everyone, when the addition is really a specialty item useful to a relatively few individuals. Whether or not MITS markets this kit will depend on customer demand. To determine this demand we would appreciate it if you Baudot owners would send us a postcard stating that you would be interested in purchasing this kit if marketed. Please send it to MITS, in care of Gale Schonfeld, Marketing Assistant.

88 ACR USER NOTES

by Tom Durston

Here are more helpful hints for those Altair users having difficulties loading MITS software on cassette tape.

1. Try using lower volume settings on your tape recorder during playback. Sometimes noise generated in recorders playing at maximum volume can cause errors in data. We have found that in most recorders volume settings as low as 1/3 of maximum are satisfactory.

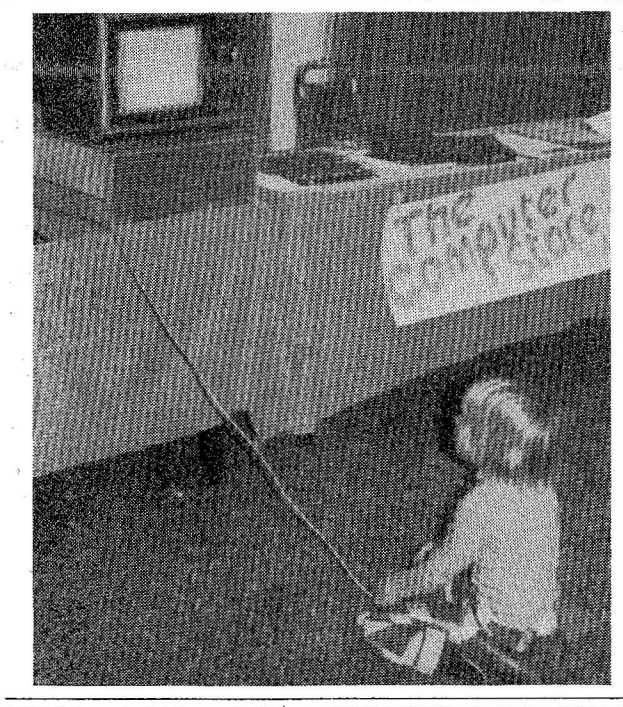
2. If you have trouble obtaining a proper "JUMP" of address lights when beginning a bootstrap load, or you don't want to wait the 15 seconds between starting the tape playing and depressing the run switch, try this 9 step program in addition to the bootstrap loader.

This program tests for the leader bit pattern that is recorded before the checksum loader at the beginning of MITS software. The program will loop at the high addresses until the leader byte is found (10-15 seconds after start of tape) and then jump to the bootstrap loader at ØØØ,ØØØ. Approximately 10 seconds later the address lights change again, indicating proper loading of the software (for version 3.2 A3, A4, & A6 off).

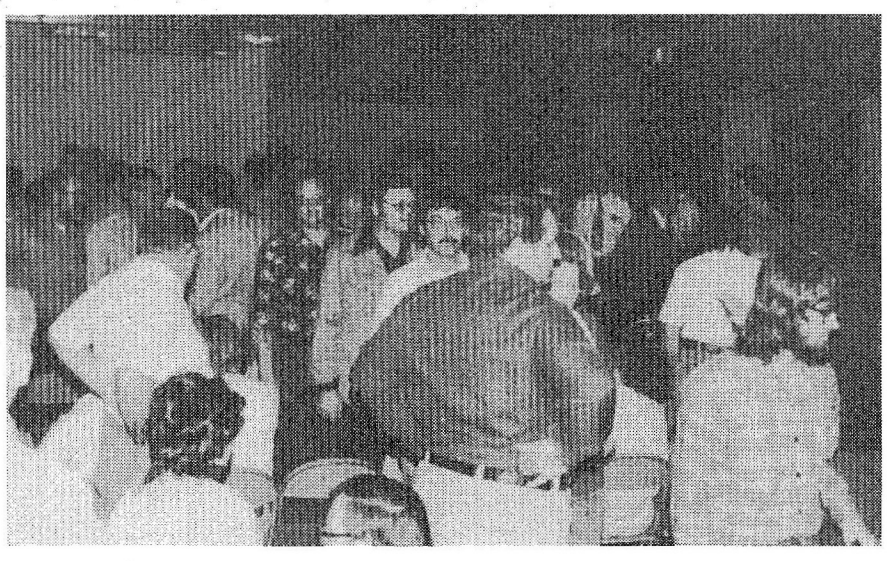
1) Deposit bootstrap loader.
2) Deposit leader detector.
3) Examine 001,000.
4) Start tape and depress "RUN" on Altair.
5) 25 seconds later, Altair should jump, indicating proper loading of data.

Bootstrap Leader Detector

TAG	MNEMONIC	ADDRESS	OCTAL CODE	EXPLANATION
START	IN	001,000	333	input data
		1	007	from ACR
	CPI	2	376	compare data byte to
		3	256	leader byte for version 3.2 (175 for 3.1) (same as bootstrap location 1)
	JNZ	4	302	jump if data ≠ 256 (or 175)
		5	000	to "start"
		6	001	
	JMP	7	303	jump to bootstrap loader
		001,010	000	if data = 256 (or 175)
		11	000	



WACC 76



ALTAIR AWARDS BANQUET

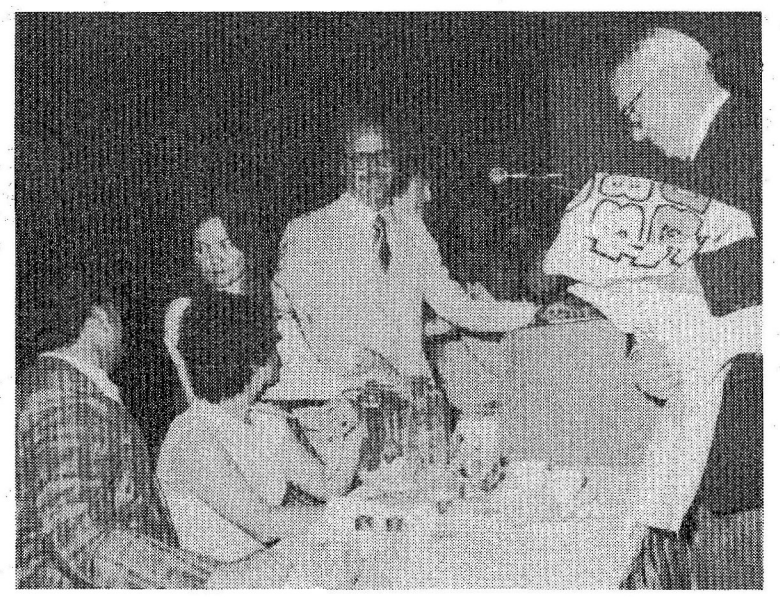
By Andrea Lewis

On Sunday, March 28, 1976, over 700 people attended the Altair Awards Banquet, which was the closing event of the World Altair Computer Convention. The Banquet got off to a rousing start with the presentation of numerous door prizes to lucky ticket holders in the audience. MITS contributed the following door prizes: one assembled Altair 680 computer, three assembled Vector Interrupt and Real Time Clock boards, two $100 gift certificates, one PROM memory card, one serial interface board with two ports and one parallel interface board with four ports.

Barbara Sims and David Bunnell draw doorprize tickets

At that point, everybody decided to get into the spirit of the thing, and we ended up giving away everything but the hotel silverware. Twenty copies of Charles Sippl's Microcomputer Dictionary were awarded (11 of these were donated by the publisher and 9 were donated by MITS). BYTE Magazine gave away a lifetime subscription, Popular Electronics donated two subscriptions and "73" Magazine gave a three-year subscription.

"Computer Lib" and "Creative Computing" T-shirts were the prizes donated by Ted Nelson and David Ahl, respectively. One of the WACC attendees from Mexico City, Carlos de Leon, donated three Mexican gold coins, which were also given away as door prizes. SCCS awarded free memberships in their society, and the MITS dealers chipped in a 4K static memory card. Someone suggested the 8800B banner that was hanging in the lobby would make a nice door prize . . . and it did!

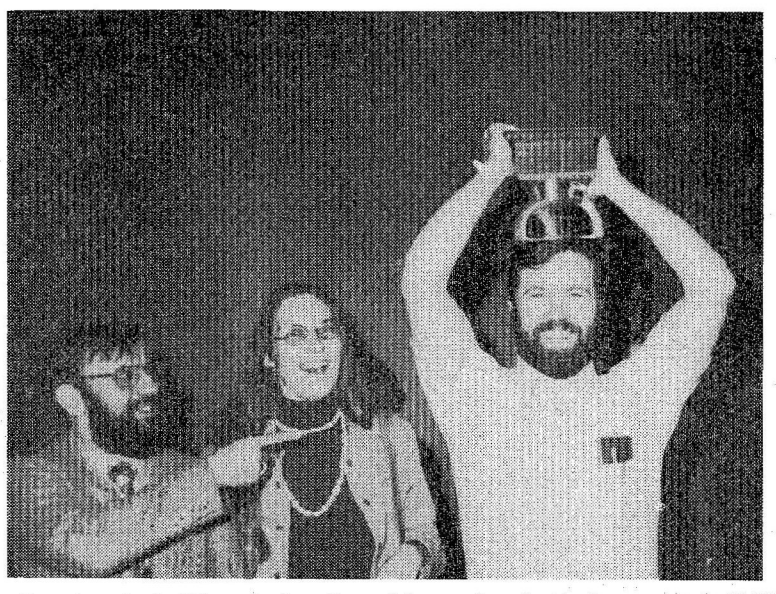


Dale Swenson wins banner

When the door prize melee finally settled down, the crowd awaited with anticipation the announcement of the winners in the demonstration contest. The Third Prize winners, Danny Kleinman, Steve Grumette, and Mike Gilbert, received a 16K Static Memory Card for their backgammon demonstration. A tie for second place resulted in MITS awarding two Altair 8800B's: one to Randy Miller for his computer chess demonstration; and one to Wirt and Valerie Atmar for their speech synthesizer.

The big moment came for the announcement of the Grand Prize and everyone happily congratulated Don Alexander of Columbus, Ohio, as he was awarded a complete Altair Floppy Disk System for his first place demonstration, a computer-controlled amateur radio Teletype station.

Lou Fields, Vice-President of the Southern California Computer Society, presented a Special Award to the publishers and editors of BYTE Magazine for their invaluable assistance to computer hobbyists. Manfred Peschke accepted the award, a beautifully engraved silver bowl, for BYTE Magazine.



Manfred & Virginia Peschke, Carl Helmers of BYTE

The bestowing of honors was not over yet, however, as there were still two important awards left. These were the winners in the annual Software Contest, as selected by MITS software directors from the people who have placed in the monthly Altair Software Library

-continued on page 15-

systemcenter winner

The Computer Systemcenter in Atlanta is proud to announce that Mike Sinclair won the FREE ALTAIR CONTEST at their grand opening on March 26th and 27th. The prize was an Altair 8800 Computer and 1K Static Memory. Mike is an Atlanta resident who is an instructor at Georgia Tech. He is an avid member of the Atlanta Area Microcomputer Hobbyist Club, although he had no computer of his own. The Club set up several demonstrations during the opening, and Mike had a demonstration using a synthesizer.

A computer program to generate random numbers was used to pick the contest winner. Jim Dunion, Rich Stafford, and Steven Mann of the Systemcenter reported a "full house" on both days of the opening.

New PCC Publication

Alphanumeric Music

People's Computer Company has come out with a booklet called Alphanumeric Music with Amplitude Control, by M. T. Wright, that is a complete system of computer music for the Altair 8800.

The music program it uses "... was written for the Altair 8800 computer with an ASCII (upper and lower case) keyboard and one 8-bit output port feeding an amplifier through some resistors." The article includes a description of the output port circuit. A square wave routine called Play Note is incorporated to make frequency range and sound quality determinations more flexible. Play Note uses all of the registers in the 8080 CPU and also the memory stack.

Alphanumeric Music with Amplitude Control is available from PCC/ PO Box 310/Menlo Park, CA, 94025 for $2.00 plus .65¢ postage.

680-b SOFTWARE

By Mark Chamberlin

I have some good news and some not so good news this month, and fortunately the good far outweighs the bad. In the last issue of CN I included a 680b memory test program, primarily for the purpose of illustrating the assembly listing produced by the 680b Resident Assembler. I hadn't tested the program, and I must confess that there are several bugs in it. A corrected version will be included in the 680b documentation.

This leads to the good news. I found the bugs in the memory test program while running it on one of the 680b prototypes. Yes, the 680b is up and running and customers can look forward to shipments beginning in the middle of May.

As promised in the last issue, here is a description of the 680b Resident Editor. The 680b Resident Editor is a character-oriented text editor which facilitates the creation and modification of ASCII files. The Editor has the following commands:

A - Append
The A command loads text from the paper tape reader into the Editor Text Buffer until the buffer is full or the end of the tape is reached.

E - End Edit
The E command causes the contents of the text buffer to be punched and copies the remainder of the input file from the paper tape reader to the paper tape punch.

F - Tape Leader/Trailer
The F command sends fifty nulls to the paper tape punch.

nP - Punch
The P command causes n lines of text in the text buffer to be punched, starting with the line pointed to by the buffer pointer.

nT - Type
The T command causes n lines of text to be listed on the system terminal.

B - Beginning of Buffer
The B command moves the buffer pointer to the beginning of the buffer.

Z - End of Buffer
The Z command moves the buffer pointer to the end of the buffer.

nM - Move Character Pointer
The M command moves the buffer pointer n characters.

nL - Line
The L command moves the buffer pointer n lines.

Sstring
The S command causes a search for the first occurrance of "string" and positions the buffer pointer after the last character in the string if the string is formed.

Itext - Insert Text
The I command inserts text into the text buffer at the position pointed to by the buffer pointer.

nD - Delete Characters
The D command deletes n characters from the text buffer.

nK - Kill lines
The K command deletes n lines from the text buffer. (A line is a string of characters delimited by Carriage Returns).

Cstring1$string2
The C Command causes the first occurrence of "string1" to be replaced by "string2".

-continued on page 11-

"RESEQUENCER" wins contest

This month only fifteen programs were accepted into the library, down from thirty-some last month. Keep sending those programs in!

This month's major program winner is Richard Schaal's BASIC program resequencer (#4-14-761). It allows you to read a BASIC program into memory from cassette and then "spread" the line numbers apart so you can re-insert new lines between old ones.

Second place program goes to yet another monitor, Alan R. Miller's PROMON (#3-22-761) which can reside in 512 bytes of a PROM memory card (PMC).

Third place program goes to Lynn Cochran for an ALTAIR BASIC version of STARTREK (#4-19-761). The program is extremely well coded and seems to pack the most features in the least amount of memory.

First place subroutine goes to Joe McCarty for his stack routines (#4-1-762). These can be very useful if you are passing parameters back and forth to subroutines on the stack.

Second place goes to Jim Gerow for his matrix inversion subroutine (#4-1-761), which can be used to solve simultaneous linear equations.

FIRST PLACE MAJOR PROGRAM

#4-14-761
Author: Rich Schaal
Length: 92 lines (Altair BASIC)
Title: BASIC Program Resequencer
This program reads a program CSAVEd on cassette into memory and then resequences it. (Changes the line numbers and line references.)

SECOND PLACE MAJOR PROGRAM

#3-22-761
Author: Alan R. Miller
Length: 512 bytes
Title: PROMON
PROM version of JAMON which assumes a 2SIO interface board and an ACR board as I/O devices. 12K, 8K, and 4K cassette boot loaders are also available on the PROM.

THIRD PLACE MAJOR PROGRAM

#4-19-761
Author: Lynn Cochran
Length: 143 lines (Altair BASIC)
Title: STARTREK
Well-written BASIC program for game based on popular TV show. Needs 12K total of memory with 8K BASIC.

-continued on page 11-

SOFTWARE

680b Software -continued from page 10-

X - Exit Editor
The X command returns control to the 680b PROM Monitor.

Commands to the Editor are terminated by two escape characters, which are echoed as dollar signs ("$"). For example:

@B$$ moves the buffer pointer to the beginning of the buffer, and

@3T$$ prints the first three lines of text in the buffer.

(The "@" is the Editor's prompt character.)

Commands can be chained together by typing a single escape between the chained commands. For example:

@B$3T$$ has the same effect as the two separate commands above.

Examples of Editor's Use.

First, enter some text:

```
@B$I1Ø NAM EXAM <CR>
2Ø  OPT 5 PRINT SMBOL TABLE <CR>
3Ø OPT NOPAGE NON-PAGINATED LISTING <CR>
4Ø GO NOP THIS PROGRAM DOES NOTHING <CR>
5Ø  JMP GO AND NEVER STOPS <CR>
6Ø  END <CR>
$$
```

Now correct SMBOL in line 2Ø;

```
@B$CSMBOL$SYMBOL$$
```

Get rid of line 30;

```
@B$S2Ø$ØL$K$$
```

(Note that ØL moves buffer pointer to beginning of current line.)

Print out contents of buffer, end the edit, and return to PROM Monitor:

```
@B$5T$E$X$$

1Ø  NAM EXAM
2Ø  OPT 5 PRINT SYMBOL TABLE
4Ø GO NOP THIS PROGRAM DOES NOTHING
5Ø  JMP GO AND NEVER STOPS
6Ø  END
```

PACKAGE II BUGS

by Paul Wasmund

Now that Package II has been in use for a few weeks, a few problems have been discovered. The debugger has 2 small bugs: you can't set a breakpoint on an IN instruction and a CPI instruction cannot be entered in symbolic type-in mode.

From the response I've gotten, the major problem seems to be with the monitor. Users tell me they load the monitor, it types a question mark, and then ignores all input. This is simply a documentation deficiency. As the manual points out, the new package is designed to run using input interrupts. If this strap has not been made on your I/O board, terminal input will be ignored. For those of you wanting to run without interrupts, sense switch A9 should be raised during the load procedure, forcing the monitor to use handshake I/O. Running this way disables the control C'ing of a program, but allows use of all other features.

Another documentation error is on page 53 in the load options chart. For a 2SIO board it indicates that all sense switches should be up. All up is the correct sense switch setting for this board.

Software Contest
- continued from page 10-

FIRST PLACE SUBROUTINE

#4-1-762
Author: Joe W. McCarty
Length: About 100 bytes
Title: 1POP, 2POP, 1PUSH, 2PUSH
Routines to POP and PUSH entries deep on the stack passed as parameters to a subroutine.

SECOND PLACE SUBROUTINE

#4-1-761
Author: Jim Gerow
Length: 92 lines (Altair BASIC)
Title: MATINV
Uses Gaussian elimination with pivoting to invert a matrix.

#4-15-761
Author: Gerhald Hansel
Length: 42 lines (IBM BASIC)
Title: LOG 10
Prints a table of Base 10 logarithms.

#4-6-761
Author: Walter S. King
Length: 34 bytes
Title: IPL
Boot loader suited for a diode matrix or PROM.

#4-9-762
Author: Paul Braddock
Length: 200 bytes
Title: MUSIC
Music program. Allows entry of notes of a song through the sense switches, and subsequent playing of the song on the Altair. Modified version of Steve Dompier's program.

#3-31-761
Author: Alan R. Miller
Length: 70 bytes
Title: RELOCATE
Changes address of JMPs and CALLs to relocate an assembly language program in memory.

#4-15-762
Authors: Marc Montemorra & Glenn Sherman
Length: About 230 lines (BASIC)
Title: CATCH
Plays a game where you chase the computer inside a two-dimensional (5x5) matrix.

#4-9-761
Author: Alan R. Miller
Length: 56 bytes
Title: TAPECHK
Compares tape dump of memory against memory that was dumped.

#4-15-763
Authors: Marc Montemorra & Glenn Sherman
Length: 88 lines (BASIC)
Title: DAZE
This program calculates the number of days between two calendar dates.

#3-24-762
Author: William O. Fisher
Length: 120 lines (Altair BASIC)
Title: Gregorian Calendar Program
Allows the user to print out a calendar, find the day of the week of a given date, etc.

#3-24-761
Author: Martin H. Eastburn
Length: 47 bytes
Title: Numerical Order Sorter
Machine Language.

#3-19-761
Author: Don Baechtel
Length: 61 bytes
Title: REG DEC
Decimal print routine, outputs [H,L] registers.

ALTAIR DISK TEST PROGRAMS

by Tom Durston

Listed below are some Altair Disk Test programs that will check out all the normal functions of the Disk Drive. These check-out procedures will also be included in the Altair Disk Theory of Operation manual.

A. Disk Read/Write Test Program

This program writes data on disk on sector Ø of the track it is positioned on, then reads the data back, stores it in memory, then outputs it to an I/O device. It is used for testing all read/write functions.

WRITE: The number of write data bytes is set by the position of the sense switches (maximum of $22Ø_8$). Write data consists of:

1st byte = 377_8 (D7 = 1 - sync bit)
2nd byte = data on sense switch
3rd byte = 2nd - 1
4th byte = 2nd - 2
.
.
.
"n"th byte = 001
last byte = 000

If sense switch is set to ØØØ, program will stop.

READ: The read data is stored in memory, starting at address $001,236_8$ and consists of the data written by the write program

OUTPUT: After the read program, the data is outputted to a terminal (Teletype, CRT, etc.). The output program is set to output on channel 1. To obtain a useful output pattern, change the sense switches until a desirable pattern is printed. The characters printed will consist of all printable ASCII characters in reversed order (as in 987654321 and zyxwvu . . .). This pattern repeats itself and is easily observed for errors.

B. Stepping Program

This program steps the disk head out 77 times to track Ø and then in 77 times to track 76, continuously repeating with the computer in the run mode.

This program is useful for testing the disk enable, MH status, track Ø status, and stepping functions of the disk.

While stepping with this program, the head is unloaded, so it may be run continuously without wear on the read/write head surface. A squeaking sound caused by the head load mechanism is normal in this test.

To loop with the read/write program, see next section.

For stepping program, disk drive address of ØØØ is used. To change disk drive tested, the address is contained in location (001,001).

Looping With Stepping Program

To check the read/write and step functions simultaneously, the two programs may be run together by changing:

1) Data in locations (000,154) and (000,155) to 037, 001 as indicated.

2) Data in location (001,034) to 303 as indicated.

Start the program at (001,000), the start of the stepping program.

The disk head will step out to track Ø.

The head will then load and a write/read will occur. The head will then unload and output will take place. After output, the head will step in once, starting the write/read sequence again. After this repeats 76 times, the head is stepped out to track Ø, and it begins again. **

READ/WRITE PROGRAM

TAG	MNEMONIC	ADDRESS	OCTAL CODE	EXPLANATION
	MVI(A)	000,000	076	
		1	000	Disk drive address
	OUT	2	323	
		3	010	Disk controller enable channel
LDHD	MVI(A)	4	076	
		5	004	Load head bit
	OUT	6	323	
		7	011	Disk function control channel
WRTLP	IN	10	333	Input # of bytes to be written
		11	377	Sense switch
	MOV(C)←(A)	12	117	Store in "C" reg.
	MVI(D)	13	026	Store in "D" reg.
		14	377	First write byte
	MVI(B)	15	006	Store in "B" reg.
		16	001	"ENWD" status mask
WSECT	IN	17	333	Write sector test
		20	011	Sector position channel
	CPI	21	376	
		22	300	Ø sector
	JNZ	23	302	Jump if not start of Ø sect.
		24	017	to "WSECT"
		25	000	
	MVI(A)	26	076	
		27	200	Write enable bit
		30	323	
		31	011	Disk function control channel
FBYT		32	333	First byte test
		33	010	Disk status channel
	ANA(A)/(B)	34	240	Test for "ENWD" status
	JNZ	35	302	Jump if "ENWD" false (=1)
		36	032	to "FBYT"
		37	000	
	MOV(A)(D)	40	172	Move 377 into accum.
	OUT	41	323	Output first byte
		42	012	Disk data channel
INDAT	IN	43	333	Start of write data sequence
		44	010	Disk status channel
	ANA	45	240	Test for "ENWD" status
	JNZ	46	302	Jump if "ENWD" false (=1)
		47	043	to "WDAT"
		50	000	
	MOV(A)←(C)	51	171	Move "DATA" byte to accum.
	OUT	52	323	
		53	012	Disk data channel
	DCR(C)	54	015	Decrement "DATA" byte
	JNZ	55	302	Jump if data byte = Ø.
		56	043	to "WDAT", write another byte
		57	000	
WZT	IN	60	333	Start of zero byte
		61	010	Output sequence
	ANA(A)←(B)	62	240	Test "ENWD" (last byte written)
	JNZ	63	302	Jump if "ENWD" false
		64	060	To WZT
		65	000	
	XRA(A)(A)	66	257	Zeros accumulator
	OUT	67	323	Output zero byte
		70	012	Disk data channel (end of write, start of read)
	LXI	71	041	Load H+L reg. with:
		72	236	Starting addr. to store read data
		73	001	
	MVI(B)	74	006	Store in "B" reg.
		75	200	"NRDA" mask
	NOP	76	000	
	NOP	77	000	
RSECT	IN	100	333	Read sector test
		101	011	Sector position channel
	CPI	102	376	
		103	300	Ø sector
	JNZ	104	302	Jump if not start of Ø sect.
		105	100	to "RSECT"
		106	000	
RDTST	IN	107	333	Start of "NRDA" test
		110	010	Disk status channel
	ANA(A)/(B)	111	240	Test for "NRDA" status
	JNZ	112	302	Jump if "NRDA" false (=1)
		113	107	to "RDTST"
		114	000	
	IN	115	333	Input read data
		116	012	Disk data channel
	MOV(M)←(A)	117	167	Store data in memory (H+L)
	INR(L)	120	054	Increment L reg. (mem addr)
	JNZ	121	302	Jump if L reg. ≠ 0
		122	107	to RDTST
		123	000	
	MOV(A)←(D)	124	172	Move 377 byte to accum.
	OUT	125	323	Disenable disk by output logic 1 on
		126	010	D7 to disk enable chan. (end of read start of output)
	LXI(H+L)	127	041	Load H+L with:
		130	236	Starting addr of data stored by read program
		131	001	
OTST	IN	132	333	Test output device for busy
		133	000	Status chan. of terminal
	RLC	134	007	Test bit Ø, rotate into carry
	JC	135	332	Jump if carry (bit Ø = 1)
		136	132	to "OTST"
		137	000	
	MOV(A)←(M)	140	176	Move data from mem(H+L)
	OUT	141	323	Output data
		142	001	Data channel for term
	INR(L)	143	054	Increment L register
	JNZ	144	302	Jump if L reg ≠ 0, output another byte
		145	132	to "OTST"
		146	000	
	MVI(A)	147	076	
		150	000	Enable disk
	OUT	151	323	
		152	010	
	JMP	153	303	
NOTE		*154	004	To "LDHD"
		*155	000	
		156		
		157		

*--For R/W-step loop change
Data at (000,154) to 037
Data at (000,155) to 001

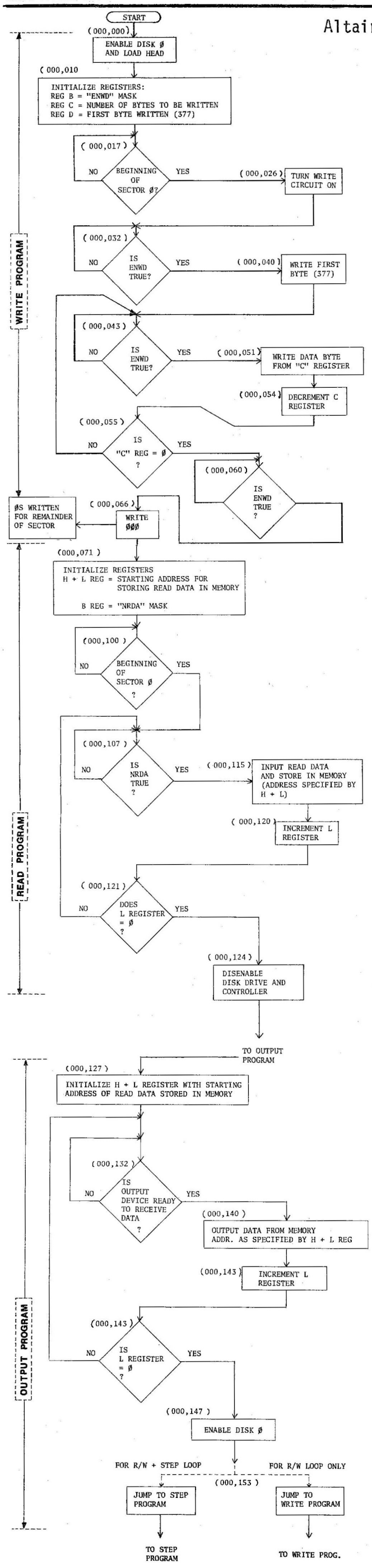
NOTE: ** 1) For read/write program, disk drive address of ØØØ is used. To change disk drive tested, the address is contained in location (000,001) and (000,150).

2) Output device addresses are in locations (000,133) (status) and (000,141) (data).

-continued on page 13-

Altair Disk Test Programs

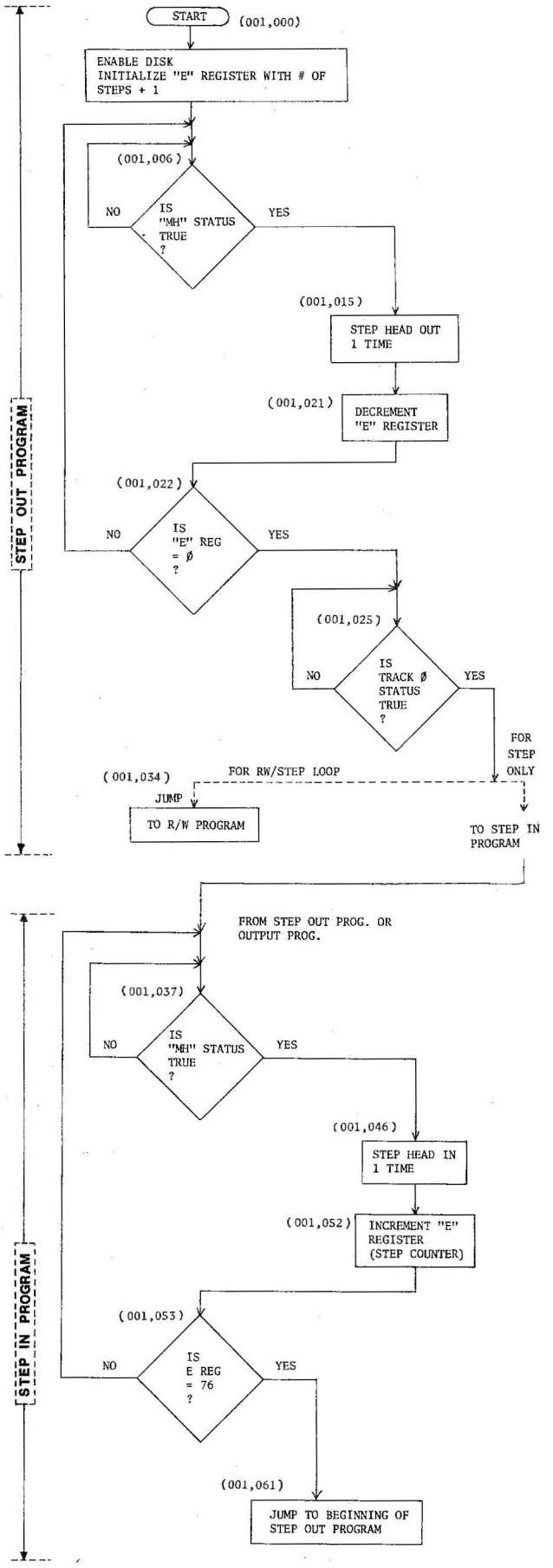
-continued from page 12-



STEPPING PROGRAM

TAG	MNEMONIC	ADDRESS	OCTAL CODE	EXPLANATION
STEP	MVI(A)	001,000	076	
		1	000	Disk drive addr Ø
	OUT	2	323	Output (data-ØØØ) to
		3	010	Disk CTRL enable channel
NOS	MVI(E)	4	036	Initialize E register
		5	115	=77 (number of steps + 1)
SOUT	IN	6	333	Test "MH" status bit (move head)
		7	010	Disk status channel
	ANI	10	346	Test
		11	002	D1 mask
	JNZ	12	302	Jump if "MH" false (D1=1)
		13	006	To "SOUT"
		14	001	
	MVI(A)	15	076	
		16	002	Bit D1=1 (step out)
	OUT	17	323	Output (data 002) to
		20	011	Disk function control channel
	DCR(E)	21	035	Decrement step counter (E reg.)
	JNZ	22	302	Jump if E reg ≠ 0
		23	006	to "SOUT"
		24	001	
TZ	IN	25	333	Test for track Ø status
		26	010	Disk status channel
	ANI	27	346	Test
		30	100	D6 mask
	JNZ	31	302	Jump if track Ø false (D6=1)
		32	025	to "TZ"
		33	001	
LOOP	NOP	*34	000	
	NOP	35	000	
	NOP	36	000	
SIN	IN	37	333	Test "MH" status bit (move head)
		40	010	Disk status channel
	ANI	41	346	Test
		42	002	D1 mask
	JNZ	43	302	Jump if "MH" false (D1=1)
		44	037	to "SIN"
		45	001	
	MVI(A)	46	076	
		47	001	Bit DØ = 1
	OUT	50	323	Output (Data 001) to
		51	011	Disk function control channel
	INR(E)	52	034	Add 1 to "E" register
	MVI(A)	53	076	
		54	114	76 steps
	CMP(A)/(E)	55	273	Compare "E" reg. to 76
	JNZ	56	302	Jump if "E" reg. ≠ 76
		57	034	To "Loop"
		60	001	to "Loop"
	JMP	61	303	Jump if "E" reg. = 76
		62	004	to "NOS"
		63	001	
		64		
		65		
		66		
		67		

*--Change to 303 for Step + R/W loop



WACC D mo Contest - continued from page 1

Steve Grumette, Danny Kleinman, Mike Gilbert

Third Prize in the demonstration contest went to three Californians who really knew how to combine computer know-how with having a good time. Danny Kleinman, master programmer; Steve Grumette, hardware expert; and Mike Gilbert, backgammon pro, merged their talents to produce a computer backgammon game that was difficult to walk past without at least "rolling the dice" a few times.

The program itself is probably one of the longest Altair BASIC programs anywhere--18,000 bytes (and that's not including the interpreter). The program uses many unique Altair BASIC statements such as PEEK, POKE and USR.

Danny's Altair computer ("Jack") is interfaced to a Cromemco TV Dazzler, which displays the game board, dice rolls, and all of the moves. A control board, which is actually an extension of a Comter keyboard, is wired so that the play itself is only a matter of pushing buttons (and trying to outsmart Jack). The program allows every aspect of backgammon to be simulated: it tallies pips, has a doubling cube, changes dice, and even plays on various levels according to the human player's expertise (or lack of it).

Mssrs. Kleinman, Grumette and Gilbert were awarded a 16K Static Memory Card for their prize-winning demonstration.

The remaining entrants in the contest each received $100 gift certificates from MITS. Dan Marcus of Irvine, California demonstrated his 8080 Micro Operating System, designed to be used for development of software. The versatile monitor which he had written contained commands for inspecting memory and registers, searching memory, breakpointing, loading and punching paper tapes. There was also a system call handler, used for performing various types of I/O.

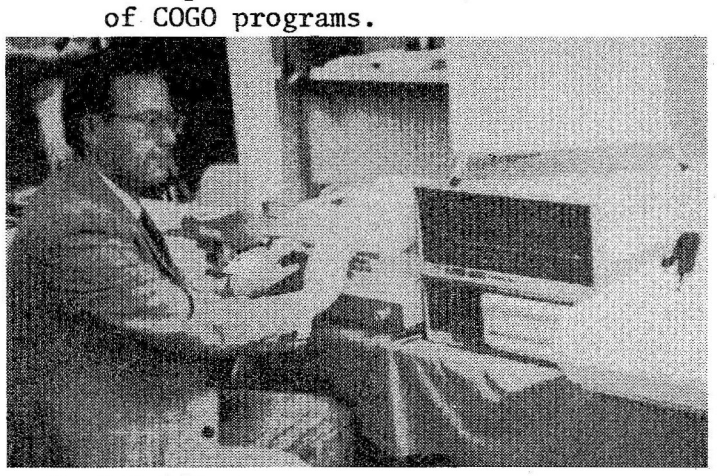
A very complete business system that utilized Altair Extended BASIC programs was exhibited by Carl Swift of Mineral Wells, Texas. Carl's Altair 8800 was interfaced to a line printer, an ASR-33 Teletype, seven 88-4MCDs, an ACR, and a floppy disk. The business applications he has developed include programs that sort and price inventory, process orders, and keep detailed files on customers.

Paul Krystosek, a Chicagoan, entered the contest with a program designed to send and receive Morse code. The program, which is actually two separate programs running on a timeshare basis, takes input from a keyboard and transmits it in Morse code at a selectable speed. The receiver takes the input off one bit on a parallel port, monitors that and interprets it in dots and dashes which are in turn converted into letters.

John Gibson and Don Baechtel from Socorro, New Mexico brought a relocatable assembler which was still not fully debugged at contest time. The assembler, however, runs in 3K, has full text editing capabilities and a core management program similar to JAMON. John and Don had also interfaced their Altair computer with core memory (a task several WACCees were interested in discussing) and were working with shift registers.

Don Baechtel

In order to show that a major engineering systems application can be placed on an Altair computer, H. M. Bradbury of Woodward, Oklahoma was demonstrating the use of COGO. COGO is a popular language amoung engineers and architects or anyone concerned with describing coordinates, measuring distances and angles, etc. Mr. Bradbury brought his own homemade plotter to illustrate the use of COGO programs.



Carl Swift

annual software contest winners

by Paul Allen

The Software Contest winner, announced at the WACC's Sunday afternoon Awards Banquet, was Jim Gerow. The winning programs included Gerow's FORTRAN cross-assembler (#521751), his FORTRAN cross-simulator (#1123751) and a mini-monitor (#1203751). Jim's work has been the basis for simulators and assemblers developed by other Software contestants. He plans to use his $1000 credit to buy a Teletype kit.

The award to the best subroutine writer went to Lee M. Eastburn for his useful bubble sort routine. Eastburn has been the most prolific contributor to the Software Library. His son, Martin Eastburn, has also provided us with numerous programs of late. Lee Eastburn received a $250 credit with MITS for second place in the Software Contest.

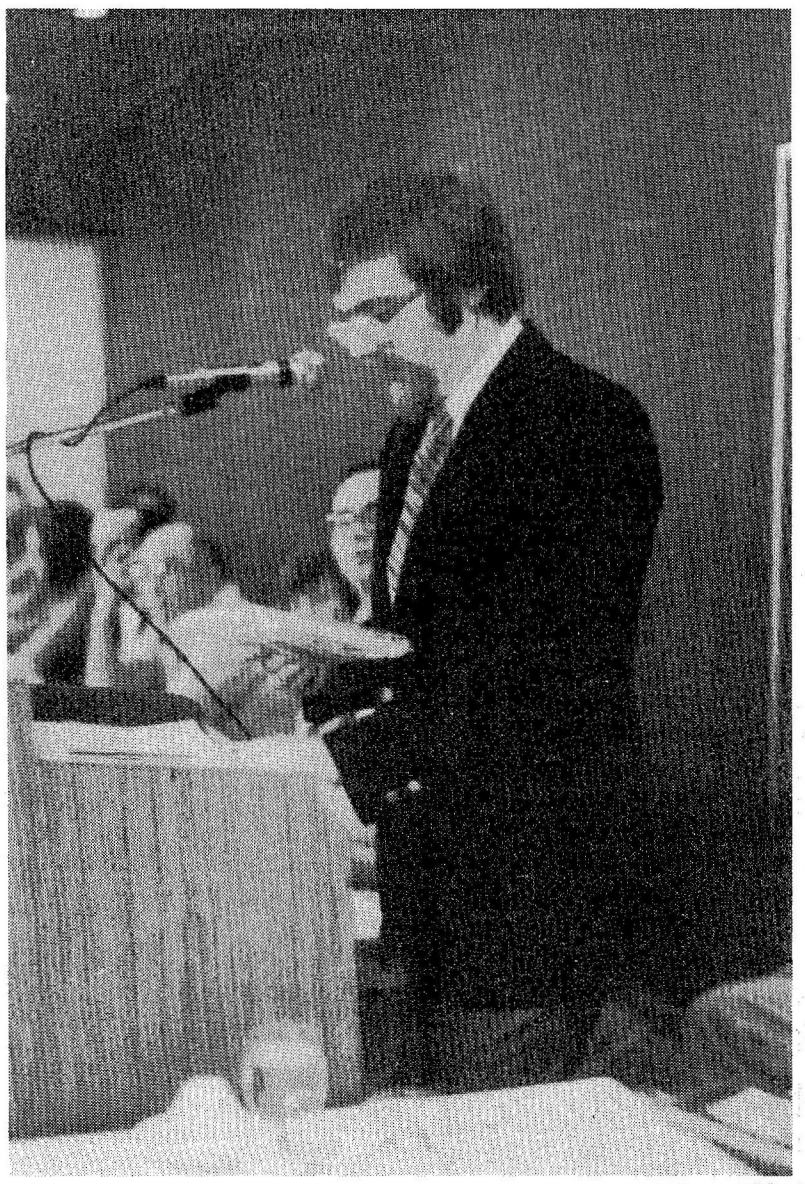
CLASSIFIED ADS

FOR SALE: Four 4K RAM boards (88-4MCDs). $130.00 each. Built with IC sockets. Donald S. Whitehead/South End Ave./Durham CT 06422 203-877-1329

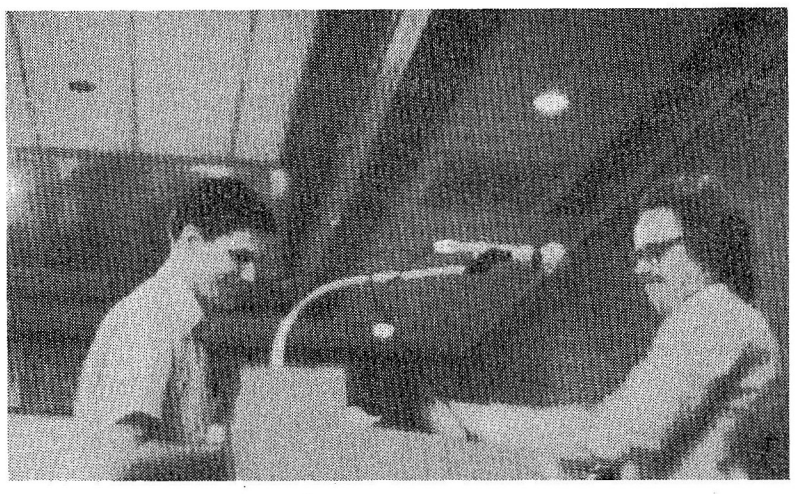
SOFTWARE: Machine readable copies of Micro-Operating System, User Group Program #1217552, available at $5.00 per copy. Specify ACR, 7/8" wide 5 level paper tape, or 11/16" wide chadless 5 level paper tape. A listing of an appropriate bootstrap loader supplied with each copy. Walter King/451-145th Pl. NE/ Bellevue, WA 98007

WANT TO BUY: Used but fully operational Digital Equipment Corp. VT-50 DECScope CRT, or LA36 DECWriter. Prefer DECScope with RS-232C EIA standard interface, but will consider with 20ma current loop interface. Call or write: Steve Fritts/2920 Bellevue St./ Knoxville, TN 37917 616-525-5407

Awards Banquet -continued from page 9-



Paul Allen announces software winners



Wirt Atmar accepts second place award

contests. The Grand Prize Winner for the Best Major Program was Mr. James Gerow of Houston, Texas, and he was awarded a plaque and a $1,000 gift certificate. Mr. Gerow wrote the FORTRAN Cross Assembler that was submitted to the library last May. Mr. Lee M. Eastburn of Langdon, North Dakota, was awarded the top prize in the subroutine category, for which he received a plaque and a $250 gift certificate.

The atmosphere of enthusiastic participation and cordiality that prevailed at the Banquet was indeed gratifying to those of us who work at MITS. We hope to see everyone who attended back again next year, plus many, many more.

l to r: Randy Miller, Danny Kleinman, Steve Grumette, Mike Gilbert

Photographs for this article were taken at the Awards Banquet by Robert Prati, Frank Wancho and myself.

I would like to say "many thanks" to Robert and Frank who, on the spur of the moment, volunteered to give me a hand with the photographs at the WACC. Each of them donated several rolls of their own film to Computer Notes.

Andrea Lewis

altair users

Forrest A. Dustin
885 Aster Ave.
Palatine, IL 60067

William Biter
Westinghouse Research Labs
1301 Deulah
Pittsburg, PA 15235
412-256-3222

Charles D. Braswell
327 W. Squire Dr.
Rochester, NY 14623

Edward T. Johnson
2829 Memorial Dr.
Sioux City, IA 51103

Computer Clubs

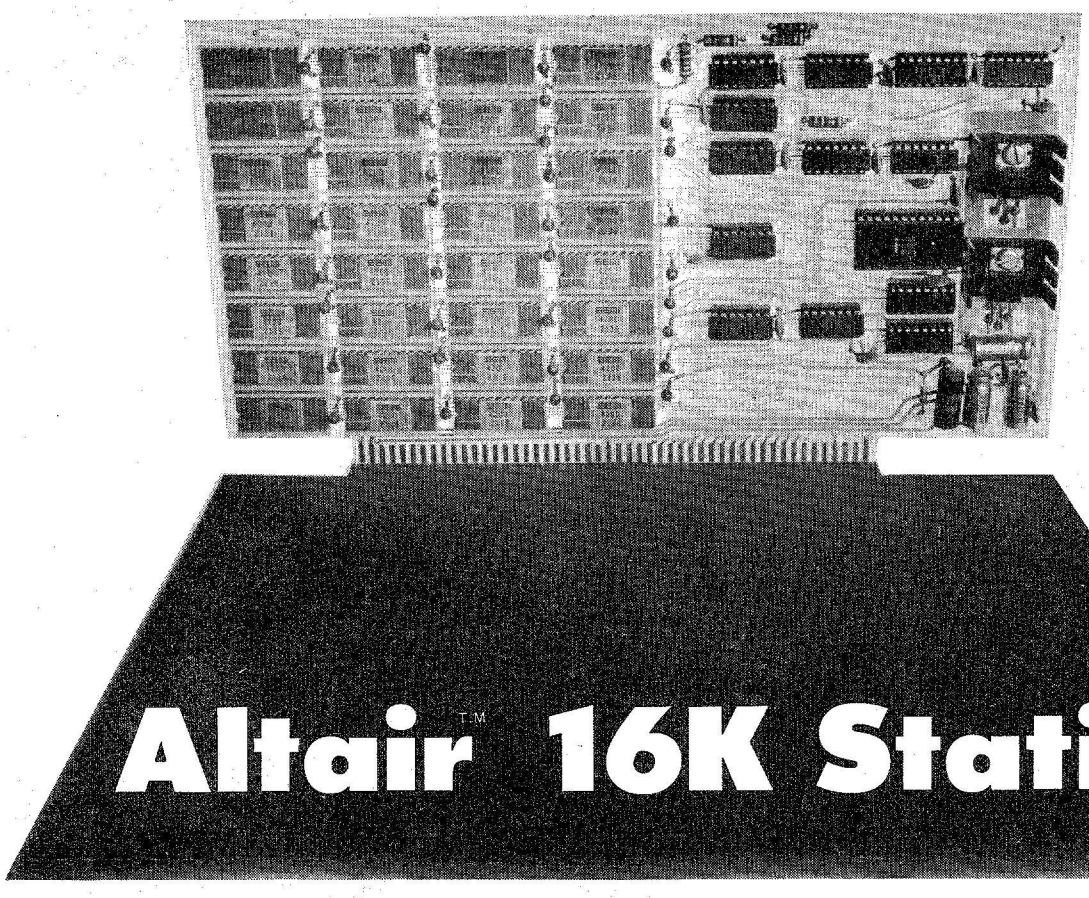
Would like to form computer club:
Roger Garrett
Rhode Island Computer Hobbyist Club
16 Grinnell Street
Jamestown, RI 02835

John Younquist
416-871-0733
899 Niagara Blvd.
Fort Erie, Ontario
Canada

Charles P. Fischer
716-681-1597
355 South Creek Dr.
Depew, NY 14043

Persons in the Huntsville/North Alabama area interested in any aspect of amateur or hobby computing are invited to join the North Alabama Computer Club (NACC). Contact Jack Crenshaw/1409 Blevins Gap Rd. SE/ Huntsville, AL 35802
205-859-7344 or 883-7973

One Slot!



Almost too good to be true, the Altair 16K Static RAM board is easily the most advanced memory module yet developed for the Altair 8800, 8800a and 8800b computers.

Four Altair 16K Static boards add up to the entire 64K of memory directly accessible by the Altair.

The Altair 16K Static board offers two surprise features—minimal power requirements and fast access time. One Altair 16K Static board draws less current than any 8800 compatible 4K boards, thus four Altair 16K Static boards can be plugged into the Altair 8800 without beefing up the power supply.

The maximum access time of the Altair 16K Static board is 215 nanoseconds, which makes this board the **fastest Altair compatible static board in existence.**

The Altair 16K Static is now in full production. Special introductory price is $765 in kit form and $945 assembled.

MAIL THIS COUPON TODAY

Enclosed is check for $_____

BankAmericard #_____

or Master Charge #_____

☐ Altair 16K Static ☐ Kit ☐ Assembled
(include $3 for postage and handling)

☐ Please send free information package and price sheet.

NAME_____

ADDRESS_____

CITY_____ STATE AND ZIP_____

MITS/2450 Alamo SE/Albuquerque, NM 87106/505-243-7821

Prices, delivery and specifications subject to change. Allow up to 60 days for delivery.

2450 Alamo SE/Albuquerque, NM 87106/505-243-7821

mits