Well, here we go again. Hal and I continue to groan and moan about the time and effort this thing requires but without a doubt it is a labor of love (and brings us both a lot of satisfaction). As we mentioned in NL #12 the minimum number of renewals before going ahead with Volume 2 was to be 350. So far we've received only about 250. If you haven't sent in your renewal, and would like to support this effort, we would sure like to hear from you.

I'm no longer with Varian Data Machines as an instructor. I'm now working out of my home as a Customer Engineer for Datachecker Systems (with a lot of free time to work on my computer). Before I left Varian I acquired enough scrapped and rejected boards to build a V-73 (the computer I taught there). It's now up and running, and my first project will be to develope an 8080 emulation package thru microprogramming (so I can run some of that software that's going to be developed in the future....and write some). By the way, if you need to get word to Hal or me during the day call me at home: (805) 736-7337.

One of our functions in the future will be the printing of summaries of various newsletters from around the country. We already have an exchange agreement with most of the local club newsletters and would like to work out a similar arrangement with those we haven't. The 'summary' will probably involve a one or two sentence description of the really good info contained in a particular newsletter. For example; "A color TV graphics system has been developed by Joe Smith and construction plans and software were published in the February issue of the Miami club newsletter." (Followed by information on how to obtain a copy.)

Wow! Have you seen "INTERFACE"? The Southern California Computer Society (formerly the Los Angeles club) has gone all out with it's "newsletter". There can be little doubt that it is a magazine (32 slick pages filled with lotsa good stuff). The magazine and membership in the SCCS is $10.00 annually (Southern California Computer Society, P.O. Box 987, South Pasadena, Calif. 91030, or call -213-682-3108). Some of you local clubs ought to investigate the possibility of becoming chapters of the SCCS so that you can benefit from being part of a large formal organization (get in on the group pruchases, etc.). And, speaking of magazines.... Wayne Green has left "BYTE". He is still very much interested in the computer hobbyist area and plans to publish about 40 pages of microcomputer info in upcoming issues of "73" magazine.

You'll notice in this issue an advertisement for a new microcomputer system offered by P C M . It's built around an Intersil 6100 microprocessor which is software compatible with a DEC PDP/8e. (And, if you're not aware of it, the PDP/8 is the most popular minicomputer ever sold. Probably 20 to 30 thousand of them out there!) It kind of boggles the mind when you consider all of the software which is available to be run on a machine such as this. This, is of course, an important consideration when purchasing any computer. Too many guys have rushed out to buy hardware only to find they have a nice 'lite blinker' when they were all thru. And, speaking of new kits..... we've noticed advertisements recently from a company called Systems Research, Inc. (see p. 67, January issue of BYTE). They're offering a system based on the Mostek F-8 microprocessor. Several months ago the same ad said the system was based on the PACE chip. Has anyone had any dealings with this company?? We'd like to hear from you.

After reading all of the responses which have come in we now feel the newsletter will be primarily aimed in two directions; 1) Printing of participants letters (which might contain schematics, programs, comments on suppliers, equipment evaluations, and participant's present and future applications. 2) Summarization of local club newsletters and reprinting the best articles.(after obtaining permission, of course). We feel the 'heavy' stuff should be left to INTERFACE & BYTE (i.e., lengthy technical articles). You'll notice that this particular issue of the NL is only 12 pages, and printed half size. This was done so we could mail out (with a 13¢ stamp) copies to all of the volume 1 subscribers...regardless of whether a renewal has been received or not. Next issue will be back to the regular size.

Thanks for giving me a chance to have so much 'fun'.

JOHN T. CRAIG

#*

SUBSCRIPTION FORM
(Copy if you don't want to mess up NL)

☐ ....Volume 1 back issues 1 thru 4 $3.50
☐ ....Volume 1 back issues 5 thru 12 $6.00
☐ ....Volume 2   1 thru 6 $6.00

NAME _____

ADDRESS _____

_____

ZIP _____

TELEPHONE # _____
          (May be published -- leave blank if you prefer)

Also include (if you desire) a little note or letter describing your equipment, plans for the future, experience, etc.   Thank you.
#*

Several of the NL readers seem interested in the Martin Research MIKE203. I've had my system running for several months (with considerable help initially) and can testify to the general performance. It seems to be well made and the monitor enables the user to begin programming immediately. It may well be that the simple instruction set of the 8008 and the simplicity of adding perpheral equipment to the system offsets the apparent advantages of the faster and more "glamorous" 8080 and 6800 CPU systems.

My only complaints on the Martin system stem from slow delivery times-- which seem to be common (60 days). My system now consists of 4K RAM, a Suding TV and cassette interface (The latter has been unsatisfactory, and the former , marginal), and a Suding keyboard (Clair-Pendar, and very satisfactory). I've built a crude wood cabinet for everything, which satisfies my current requirements. It would be desireable, however, to eventually house the system in a commercial container of similar dimensions. My reconoitering of the market, however, leads me to believe that a good cabinet may well cost more than the computer. Ted Salume has observed, on several occasions, that the cabinet is an essential part of the system, and should be considered as part of the final cost.
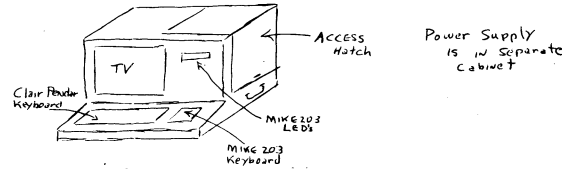
I am currently building the TCH cassette interface and will report on it when finished. I should also mention in closing that I assembled the Suding TV interface and it is possible that it's marginal performance is the result of my lack of skill.

Sincerely,

John Ford
5561 Esplanada Ave
Santa Maria, Calif, 93454
John Ford

October 30, 1975

P.S. In response to Mr. E. Zibulka in NL#11: I made the same mistake on the Suding keyboard--left the conductive packing on. Fortunately, no ill results. It would have been helpful if a few more directions and warnings had been included with the package from Suding.

Access Hatch

Power Supply is in separate cabinet

TV

Clair Pendar Keyboard

MIKE203 LED's

MIKE 203 Keyboard

As you are no doubt aware, I am the President of the Amateur Computer Group of New Jersey(135 members). I am also the editor of our club's monthly newsletter. We are consciously aware of the publications in the field. We consider the Micro-8 NL the father of them all. Further, it serves a very useful function and we would like to see it continued.

Although communications has been established on local levels through clubs and their newsletters there is a need for communications on the national level. This is the strength of your NL.

Byte seems to be catering more to the needs of their advertisers than their readers; their treatment of hardware and software is generally very general and lacking in specifics. TCH is very strong in their treatment of hardware and software but provides very little in the way of exchange of info between computer hobbyists. The Peoples Computer Co is developing well as a general publication providing information exchange(free of advertiser influence) good games software and a little(very little) on hardware. PE, RE and the other mags rate weak in all areas of amateur computing.

Sincerely

Nov 31 1975

Andy Vicg
Media Co-ordinator
AV:dk

Sol Libes
President
Amateur Computer Group of New Jersey
995 Chimney Ridge
Springfield NJ 07081

Attn: R.L. Nelson, Applications Engineer
                                          FOR IMMEDIATE RELEASE

The last year has seen the introduction of several small minicomputers in kit form. Nearly all of these machines employ 8-bit microprocessor devices, and are supported by a minimum amount of software. The PCM-12, pictured here, is an exception. This kit computer is designed around the Intersil IM6100 microprocessor, a 12-bit static CMOS device that is software-compatible with the Digital Equipment Corporation (DEC) PDP-8/E minicomputer. The completed kit can execute most PDP-8 software, including assemblers, editors, debug routines and advanced languages like BASIC and FORTRAN. Much of this software is available from DEC on an unlicensed, over-the-counter basis.

The PCM-12 employs bus-oriented architecture to ensure flexibility and future expandability. The TTL-compatible 80-line bus accommodates up to 15 cards for device interfaces and additional memory. The machine is equipped with 4096 words of 12-bit memory, and is expandable up to 32K words. The completed computer can do a memory-to-accumulator addition in 5.0 microseconds. There is provision for a vectored, priority interrupt system, and direct memory access. The control panel provides essentially all PDP-8/E functions, plus a built-in binary bootstrap loader.

The complete kit contains CPU, control panel, 4K words of static memory, TTY/CRT terminal interface, audio casette recorder interface, cabinet and power supply. Other interfacing modules are available. Assembly requires loading six printed-circuit boards. There is virtually no point-to-point wiring in the machine. All board interconnects are handled by the backplane bus board, and a single ribbon cable. Kit prices range from $400-$600, depending on options. Complete information is available from: PCM, P.O. Box 215, San Ramon, CA 94583; telephone (415) 837-5400.

December 5, 1975

Dear Hal & Group

Please continue my subscription. When I receive the "Hot news flyer" in December I will pay for the next 6 issues by school check. I hope you guys keep going, you're doing a great job.

Our small Morris County group of enthusiasts (we're all members of the Amateur Computer Group of N.J.) now has the following goodies: 2 Altairs, 2 Mark-8's (1 homebrew wire-wrap) 1 MOS Technology 6502 (homebrew), 2 TVT 1's and 3 TVT 2's, the high school has 4 Hewlett Packard 2000E computer & 3 ASR-33, 1 Singer, Decwriter II and 2 TVT 2 terminals. The TVT 2 with RS 232 interface board works great with the HP2000. The serial interface board has to be strapped for "NO parity, NO bit 8", (jumper G to F and jumper I to H).

I enjoyed Jim Brick's letter in N.L. #12. I think his analogy to canning jar lids was great. I'd like to add to the points he made by relating my experiences with 2 Southwest Technical Keyboards, KBD-1 & KBD-2 that I constructed. They were panned by many people in past newsletters. "Cheap switches", "switches don't fit", "jumper bars not trimmed right" etc. and I cannot argue but I can state from experience that the switches do fit with patience & a gentle touch. They are inexpensive but they do work well, as long as you remember that you are not using an IBM Selectric. The bus bars do not need major trimming if you use good soldering technique. Enough.

The TVT 2's are fast enough at 110 baud, but I'd like to crank one up higher if I could find a source for 1 each 7497 I.C.

If for some reason you decide to call it quits we would like to thank you for one of the nicest hobbyist publications we've seen. It has been an invaluable tool in our attempt at understanding & building TVT's and Micro's.

Thank you again. You can be sure your efforts did n t go to ...cts.

Very truly yours,

Ken McGinnis, Box 2078, San Mateo, California 94401, requests that those of you who are interested in his group-discount purchase of new Phi-Decks should just send a SASE. He's sending back the checks he's received. He recommended contacting Processor Technology or the Digital Group for good cassette controllers and software.

Edward M. Evans, 46 Knoll Crest Ct., West LaFayette, Indiana 47906, (312) 743-4241, reports that he ordered $80.00 (Bankamericard) worth of P.C. boards from Digital Group on 11-15-75 and still hasn't received the boards. He wrote twice but didn't indicate whether or not he got a reply. Says he has had good luck with James and Godbout.

Andy Vics, Pequannock TWP H.S., Pompton Plains, New Jersey 07444, has some comments regarding two Southwest Technical Product keyboards he constructed. "....they were panned by many people in past newsletters as having 'cheap switches', 'switches don't fit', 'jumper bus bars not trimmed right', etc. I cannot argue, but I can state from experience that the switches do fit with patience & a gentle touch. They are inexpensive but they do work well, as long as you remember that you are not using an IBM selectric. The bus bars do not need major trimming if you use good soldering technique."

Jim E. Connaway, 639 Frederick St., S.W., Vienna, Virginia 22180, has his Mark-8 with 1K RAM, ¼K EROM, TVT-I, & Suding Cassette interface up and running with CHOMP, Weber's keyboard loader, and Morse Code program operating. He has Solid State Music's 4K board waiting to be incorporated as well as a paper tape reader, acoustic coupler, and a MNH Modem.

James A. Eby, RR#1, Box 337A2, Pennington, New Jersey 08534, has a Sphere II kit on order and is interested in systems & programs using the 6800. With regard to the Iasis self-teaching course on microcomputers he said that his company ordered it and they found many mistakes in the first few volumns and the self-instruction is effective but very slow and repetitious.

** Here's a hot one.....Tom Campbell, 1183 Sandia, Sunnyvale, California 94087, is currently building a system using the IMP-16 board. He has some goodies he would like to trade: a PACE chip, sixty 5280 4K RAM chips, and sixty 2102's.

John D. Rabenaldt, Data Processing, Ector County Schools, Odessa, Texas 79760, (915) 332-9151 ext. 43, was having thermal and memory problems with his Altair so he returned it to them on Oct. 8th. His letter (dated 4 December) indicated that he didn't expect it back until mid or end of January. Mits explained that they had a backlog of units and a shortage of personnel to work on them.

Steve Wash, 7277 Bluff Acres Dr., Greenwood, Indiana 46142, (317) 881-8548, has renamed his Mark-8 the "Kluge-Comp .5" because it runs very nicely when it only has to read the 'M' register, but hangs up when trying to write into 'M'. (He says, "Close...so close!") He has purchased the MOS Technology 6502 MPU, and their hardware and software manuals. He says it is quite a buy for $35 and had high praise for the hardware manual which, although deals primarily with the 6502, describes in a general sense what to consider when designing a system around a microprocessor.

George Buttles, P.O. Box 201, Paradise, California 95969, says the NL is really needed for people living in isolated areas (Paradise must be something like Lompoc!) He has an 8800 with 4K. He ordered an I/O module (by phone) from Processor Technology in Berkeley, Calif. using his Master Charge and was amazed and tickled with their super service which got it to him in three days. He has also ordered their Video Display Interface, and says that it looks like their cassette system has some nice features (computer control of tape motion,etc.).

A.J. Robertson, Jack's TV Supply Inc., P.O. Box 10482, Birmingham, Alabama 35202, (205) 328-9890, would like to acquire an 8 or 16 bit CPU with line printer, TVT, w/floppy or hard disc for accounting and inventory control.

New Address: William E. Lasko II, 5244 W. Belmont, Chicago, Illinois 60641, (312) 736-2266

Wesley Tanoue, 2147 Kaumana Dr., Hilo, Hawaii 96720, (808) 935-0130, has an Altair w/2K, a not yet interfaced flexowriter. He's expecting delivery of a card reader and will build a TVT II, 8 I/O port interface, TCH graphics terminal, and Suding Cassette interface.

G.L. Thrower Jr., Box 3293, Florence, South Carolina 29501, (803) 669-5270

R.G. Parks, 25211 Stockport #121, Laguna Hills, California 92653

Kenneth Hogg, 417 E. Kiowa St., Colorado Springs, Colorado 80905, (303) 471-7315

John D. Withrow, Jr., 233 W. Mt. St., Kernersville, North Carolina 27284, receives over a dozen publications for the electronics/uP field already, but he's renewing his subscription to the NL, And, he adds, "that should tell you something about the need your publication fills." Also, he is no longer a "comp sci student at U. of N.C." (#12, p. 6)....he is "looking for a job."

John M. (Jack) Cloninger, Jr., 2201 Riviera Pkwy., Pt. Pleasant, New Jersey 08742, is building his peripherals first and hasn't decided on a microprocessor. He's got an SWTP TVT-II assembled and tested...and he speaks very highly of SWTP.

John Lind, 422 Ramsey Avenue So., Litchfield, Minnesota 55355, has sent for an Altair 680 & is already on the prowl for peripherals.

Bob Pearce, 504 McCoys Fork Rd., Walton, KENTUCKY 41094 (606) 485-4951, announces that his "MIKE-2" is up and running great with the Digital Group's keyboard & cassette interface.

Teunis Slagboom, 1694 Donnelly Ave., Victoria, B.C. V8P1X9, has joined the ranks of the Altair 8800 owners.

Dana Scott, 15 Evergreen Ave., Auburndale, Massachusetts 02166, reports that his 4½K Altair worked beautifully the first time power was applied. He's interested in music synthesis control, audio mixing control, and TVT games. He would like to hear from someone who has a Processor Technology Video Display Module. He would also like to know the access time of a 1702A EPROM to aid him in writing his cassette timing loops. (I looked but couldn't find it.)

Thomas Parouette, P.O. Box 92, Clinton, New York 13323, has ordered the hardware and programming manuals for the MOS Technology set. He's thinking about designing a computerized dispatch board for the local fire station.

Christopher Taylor, 108-B Largo Lane, Minot AFB, North Dakota 58704 (701) 727-9204, has an 8008 "home brew" micro and is working on a MC6502 system design. FOR SALE: Chris would like to sell a TVT-1 w/UART, and a Solid State Music 4K Memory board (w/sockets & edge connector).

James A. Stark, M.D., 485-34th st., Oakland, California 94609, is not to happy with the half-size NL and is very interested in a budget oriented floppy disc. Ph: (415) 658-2566

Sy Lieberman, 1489 Durango Ave., Los Angeles, Calif. 90035, would like to see more unbiased user reviews of available kits (i.e., written by those who have built them).

Gary Fishkin, Box 349, Rochester Institute of Technology, 25 Andrews Memorial Drive, Rochester, New York 14623.

....

USER GROUPS

DEC Classics in educational use: If you are using a DEC Classic for educational purposes (or know of someone who is) contact LO*OP CENTER
Ph: (707) 795-0405   8099 La Plaza
Cotati, Calif. 94928

VARIAN Computers owned by private individuals: If you have, or know of someone who has, a Varian 620 or V-70 Series computer contact:
Ph: John T. Craig
(805)   2497 Lompoc-Casmalia Road
736-7337   Lompoc, California 93436

....

Fred Litton Jr., Litton Instruments, 3618-30th St., Lubbock, Texas 79410

Kim De Vaughn, P.O. Box 6706, Reno, Nevada 89503, is wondering what has happened to The Computer Hobbyist. Hasn't got anything from them since Vol. 1 No. 7. (#8 is out, Kim)

Ed C. Epp, Freeman Jr. College, 748 South Main St., Freeman, South Dakota 57029, is seriously considering the Digital Group's 8080 system & would appreciate comments from anyone familiar with it. He's also interested in a Classic for the school. (see above, Ed)

John G. Raiche, 10406 55th Ave. South, Seattle, Washington 98178, Ph: 723-6305, has written his first significant program! It's a tic-tac-toe game and he's understandably proud of it.

Ed Andrews, 51 Glenburn Rd., Arlington, Mass. 02174, has an 8800 and TVT II & an interest in software.

William Cattey, 39 Pequot Road, Wallingford, CT 06492 writes (Nov. 30 1975): "I am a personal friend of Howard P. Dodge of Wallingford but would like to hear from others interested in homebrew and other types of computing. I have near infinite access to our PDP-8m which has a single Dectape, 16K of core, 4 going on 5 terminals, and a version of basic that you would not believe. I believe it is the best multi-user BASIC usable on a DEC PDP-8 without going to TSS-8. The computer was purchased last April as a replacement for our old 8i which had 8K, a 32K disk, and a high speed PTR. The business office is receptive to further purchases provided we supply the money. Perhaps a newsletter covering this half of the US is the answer. Not only would it provide a needed service, but if we ever did get into the black, we might be able to further expand our system. What do you think? (I'd recommend cookie sales, H.S.) Soon, I hope to be embarking on an independent study project at my school. After completing our new SWTP TVT, and a refresher course in Digital Logic, I plan, in whatever time remains, to design and build a micro based on MOS Tech's 6502. From what little I have seen so far, it seems like a fine and expanding system in addition to its low price. I may be talking more about this later. Incidentally, the TVT seems OK. SWTP was very good about the two bad switches on the keyboard and replaced them free of charge. At home, I have one of Mini-Micro-Mart's Riker-Maxon terminals without printer. (Anybody go a '32 cheap?) Half of it came within three weeks. The rest came a month later followed by the maintenance manual. I think they are OK if you just have a little patience with their slow delivery."

Dan Wingren, 2714 ½ Greenville Ave., Dallas, TX 75206 (214) 827-3224 is still an information collector. He is still in awe of his HP 55 programmable calculator and is learning from it. He has built seven or eight digital clocks and timing devices, some from scratch, but says that he is so backward that he has to look up Ohm's law whenever he needs it. He'll probably break down and order a microcomputer kit in about 18 months.

December 28,1975

Mssrs. Singer & Craig,

Am enclosing $6 for six more issues. I think the newsletter provides a needed forum for ideas and circuits which the magazines might choose not to use. Even if some designs are "marginal" they could provide springboards.

Lest anyone should think that that Mini Micro Mart has reformed: I placed an order for an RM terminal and Mark-8 kit around August 15. Six weeks later I received a portion of the terminal (bulky, but nice looking), after four months I received four of the Mark-8 boards, probably because of their official obsolescence (as per the enclosed letter from RE). Am still waiting, waiting, waiting for the terminal cover & documentation, have received no response to a request for a refund on the unshipped kit, and now have four Mark-8 boards with nothing to put on them and no book as to where to place the components.

I would be grateful if anyone would loan me a copy of the Mark-8 book or some component layout diagrams.

Also would like to hear from people who ordered from MMM and did not receive a shipment or refund,for my letter of complaint to the Post Office, BBB, N.Y. attorney general, etc., and from from people who found that what they received was not as advertised,in preparation for my letter of complaint to the Federal Trade Commission.

I plan on building the Mark-8 with the keyboard on port O, TVT-cassette on port 1, a push/pop stack on the interrupt input, a la Bowles in issue 7, with a bootstrap prom on the keyboard input or in the keyboard prom, if that's possible. If I can sneak a calculator input in via the front panel I'll have all the inputs I'll need.

I have no expertise in electronics or computers, so can't contribute in that department. I do have one suggestion for layout. It would help in looking up articles in past issues if one or two key*words identifying the topic of each item were placed in the margin. If these key words were standardized in length it would perhaps make preparing an index easier in the future.

Keep up the good work.

Sincerely yours,

John N. Foster
John N. Foster
920 E. 19th St. Apt. 319
Minneapolis, MN 55404

Dear Reader:

Thank you for your order for the mini computer instruction project.

As you must know, this was first publicized in the July 1974 issue of RADIO-ELECTRONICS. From that time up to October 10, 1975, we have been able to fill orders for mini computers. However, our supply is finally depleted.

We therefore, regret that we must return your order unfilled.

Thank you for your interest in RADIO-ELECTRONICS.

Sincerely yours,

Harriet I. Matysko
Harriet I. Matysko
Circulation Director

THE MEDICAL SCHOOL
WARD MEMORIAL BUILDING
303 E. CHICAGO AVE.

NORTHWESTERN UNIVERSITY
CHICAGO, ILLINOIS 60611
4 Dec. 1975.

Dear Hal:

I would very much like to see the μ8 computer user group NL go on. It is better than Byte in being more responsive to subscriber needs. Also, there is a wider range of material per issue due to many contributers inputting ideas vs only a select few. Furthermore, I would like to have NL continue in the same format. As such, it is a very good reference for an ignorant but eager-to-learn beginner to use in getting into μcomputers. I would object to the "computer conference" (#12,p.3 - David Christiansen) on at least 2 grounds:

(a). Many of the really green beginners may not have the special equipment required to handle such a sophisticated form of communication.

(b). This sort of thing would not be useful because of the smallness of the CRT character to page size ratio (one would need many "pages" to cover a relatively small # of characters). Finally, there is the question of how much money a large group of people would be willing to put up for such a system -- especially if hard copies are desired.

It is true that there are many NL's around these days -- Many of them occasionally carry worthwhile articles which might be useful to people who are ignorant of their existence. This leads to the idea of having various NL's sending in camera-ready copies of their contents, along with addresses, costs, and level of expertise required for comprehension of material. What do you say? It would certainly bring interested readers and interesting articles together.

I have sent a SASE to Hal Lashlee for info concerning the LSI-11 system (#12,p.1). It sounds really neat. I would be mostly interested in setting up a color TV graphics system for use in 3D visual display and in language instruction for young people. One of my concerns at present is what the language in such a system might be. It seems to me that most of the μcomputers work is being done with 8008 or 8080. Thus, to really be able to interact meaningfully with other folks' software, would I need a 8080-compatible language? With this in mind, Summer Loomis' Universal Code (#12,p.10) would be a real help. Hope it gets worked out in the near future! OR: If it doesn't get worked out, how about expanding on an existing system such as APL? Hmm?

Since my main interest is in graphics, I will probably be dealing with a great deal of character-space manipulations. And, what better way to handle this than by splitting that space into a matrix of subspaces, each of which can be manipulated separately. APL is the best language I know of for handling matrices. What I would like to see developed is an APL interpreter for a μcomputer system -- say, 8080-compatible. Or -- is there already one out there?! If so, please let me know!!

Finally: Anyone interested in APL, and in knowing others with the same interest? ****MAPLE**** is starting up. Interested? If so, contact: →μcomputer APL enthusiasts!

```
        John Sikorski
        710 N. Lake Shore Dr.
        Chgo, IL.  60611.
```

Sincerely,

Ruth C. Low
Ruth C. Low.

GENTLEMEN:
    ENCLOSED IS A CHEQUE FOR $6.00 FOR YOUR NEXT 6 ISSUES AND A SASE.
    SUPPLIERS: POLY PAKS STRIKES OUT.
    ON JULY 24 I SENT AN ORDER TO POLY PAKS FOR, AMONG OTHER THINGS, 10 50K 15 TURN TRIMPOTS AT 2/$1.00.
    AUGUST: RECEIVED ORDER WITH 10 50 OHM TRIMPOTS (PART NUMBERS FOR ALL VALUES WERE THE SAME). FILLED OUT THEIR 'CUSTOMER SERV-O-GRAM' INDICATING THAT I WAS RETURNING 5 PKG. OF 50 OHM POTS IN EXCHANGE FOR WHAT I ORDERED.
    SEPTEMBER: GOT PACKAGE AT CUSTOMS. 5 50 OHM POTS ENCLOSED. REFUSED PACKAGE, WROTE ON INVOICE THAT I HAD ORDERED 10 50K OHM TRIMPOTS, I.E. 50,000 OHMS.
    OCTOBER: NO RESPONSE.
    NOVEMBER: MAIL STRIKE IN CANADA.
    DEC. 18: RECEIVED PACKAGE - THEY HAD MADE OUT ANOTHER SERV-O-GRAM TO THE EFFECT THAT I WAS RETURNING 5 50K OHM TRIMPOTS AT 2/$1.00 FOR A TOTAL OF $5.00 (???), AND THAT I WANTED 5 50KR AS A REPLACEMENT. IN THE PACKAGE WERE 5 MAN-7 LEDS WITH A COMPLETELY DIFFERENT PART NO. FROM THAT ON THE ORDER. I GAVE IN AND PAID THE 1.60 DUTY.

    MORAL: DON'T WASTE YOUR TIME AND MONEY ON POLY PAKS-
           THE INCREDIBLE HASSLE ISN'T WORTH IT.

    I'M HAVING A MEETING AT MY APT. ON JAN. 23 AT 8:30 PM FOR THE PURPOSE OF EXCHANGING IDEAS, SWAPPING SOFTWARE, EQUIPMENT, AND PARTS, AND POSSIBLY ORGANIZING A TORONTO AREA MICROCOMPUTER CLUB. PLEASE PHONE ME BY ABOUT THE 20TH IF YOU INTEND TO COME SO I'LL KNOW HOW MANY PEOPLE TO EXPECT. WE PLAN TO SERVE COFFEE AND SOME SORT OF SNACK, AND WILL HAVE AN ALTAIR 8800 RUNNING THE PROCESSOR TECHNOLOGY MONITOR/EDITOR/ASSEMBLER IF AT ALL POSSIBLE. A MAP IS ENCLOSED.

I'LL SEND FURTHER NEWS AFTER THE MEETING.

1 RICHVIEW ROAD
APT. 1204A
ISLINGTON,ONT. M9A 4M5
CANADA

(416) 241-3604

SINCERELY YOURS,

Harold

HAROLD MELANSON

This will probably be too late for this meeting but will help you get to the next one.

Jackie W. Pierce, 460-84-4884, 178 Signal Co., APO, NY 09120k writes: "I just received by TVT-III from Mini-Micro-Mart. They are slow, but the board sure looks nice. It appears that the only difference in the TVT-II and TVT-II is the expandable memory (the main board looks to be pin for pin and run for run the same). I ordred a MITS 680 (good price I think). I also have on order a Wolensak cassette deck and a printer that prints 5 x 7 matrix on a 2½ inch adding machine paper. I will comment on them when I receive them and get them hooked up. I have ordred from MOS Tech their 6501 and 6502 and manuals. My Mark-8 (modified) has been running since July and is now expanded to 8K memory with a memory save switch for each k. My Mark-8 has a standby switch which turns off power to all boards except the memory board, and it reduces the voltage on the memory board to 3.2 volts (memory is retained at that voltage). Also I have a fail safe back up battery to kick in and supply voltage to the memory board when the AC goes. I have no ROM's in use at this time and I don't think I'll need them with this setup. I have some ideas on a speaking and listening computer using filters (controlled) and white noise generators. Anyone working in this area, please write and we can compare notes."

Irvin F. Havens, 9 Harvey Lane, Westboro, MA 01581 says that NL content has been the start of an education for him. He did not know anything about the possibilities and still doesn't know much but will get started on at least a terminal. At work he uses a Wang 700C with typewriter output and a dual tape cassette and finds it a real help. He also has access to a large IBM system thru a batch terminal and runs some large jobs on it. Several people he knows have their own computers at home but none are doing anything with them. Mostly the people that build them are not the people that use them.

Wallace K. Izuo, 960 Ala Lehua St., Honolulu, Hawaii 96818 (808)839-7542 home and (808) 474-4292 office has an ALTAIR 8800 with 256 words memory and is building the Altair PIO board and the 1 K expansion, a Suding TVT, Proc Tech 3P+s, Datanetics Kbd, Proc Tech mother board and card cage, Proc Tech Extender board and a Godbout 4K Ram (2). He is interested in a cassette interface and building a low cost system.

Fred Brockman, 1608 Wylie Drive, Modesto, CA 95355 would like to jump in soon with some sort of 8080 system along with some version of Lancaster's TVT. He is going to wait to see what the recent price reductions do to system cost. He notices that most programs seem to be done in machine language. As for higher level languages, only BASIC seems to get mentioned. His programming experience is with FORTRAN on a CDC 6400 and he would like a micro that favored FORTRAN.

William T. Precht, 1102 South Edson, Lombard, Illinois 60148, Ph: 620-1671, reports that his Altair "toy" continues to grow, mostly with enhancements from Processor Technology, whose attitude and product quality is unexcelled. (The Chicago group is growing and any-one interested should write: CACHE, P.O. Box 36, Vernon Hills, Illinois 60061. CACHE: Chicago Area Computer Hobbyists' Exchange) He also mentioned that he would like to see a national conference of computer hobbyists someday. Fantastic idea. His comments on Mini-Micro-Mart read like this: "When the new FTC rule goes into effect, Maury Goldberg of MiniMicroMart may as well throw in the towel and keep the loot he has acquired for his junk by misleading advertising and Big Talk on the telephone."

Jim Brick, 820 Sweetbay Dr., Sunnyvale, California 94086, (408) 247-0312, says we didn't get his name and address in the roster printed in NL's 11 & 12. (We certainly do apolo-gise to all the other people who were not included in that roster. We hope there weren't many, and we're trying to get the ones we missed.)

Marshall Hall Edgell, 184 Hwy 86 RR 3, Hillsborough, North Carolina 27278, (919) 732-7179, has a Sphere III and would like to acquire a vector graphic system.

Chase Ambler, The Asheville School, Asheville, North Carolina 28806, would like to see an electronic timer for competitive swimming using a microprocessor (commercial prices start at $4K and go up over $20K).

Joseph P. Chalala, RD 1, Willow Street, Pennsylvania 17584, would like to get a schema-tic or any other info on a computer terminal made by General Computer Systems. They were sold as surplus by ALTAN Electronics and were equipped with a DI/AN strip "S" printer.

Don Morrison, 32200 Arlington, Birmingham, Michigan 48009, (313) 642-0175, has an Altair 8800 with 25K of memory (is that going to be enough, Don?). He has the Mits 8K BASIC & is still waiting for their assembler (since July 1st). With regard to suppliers he says, "God-bout, James, and Digi-key have been consistently excellent; Processor Technology looks good at this time; MITS has been good although slower than we would like; and good old Mini-Micro Mart continues to run hot and cold with some excellent and some miserable service. The Digital Group is running Mini-Micro-Mart a close second in the inconsistant level of ser-vice ranking."

Steve Fischer, PO Box 2412, Rapid City, SD 57701 has built an 8080 masked priority vectored interrupt interface and will send schematics in January. He'd like to run BASIC on his 8080.

WOULD ANYONE WHO IS FAMILIAR WITH THE MODEL M + 311 KLEINSCHMIDT PRINTER PLEASE CONTACT ME? I HAVE AN ALTAIR 8800 W/8K OF MEMORY, THE ACR 88 CASSETTE I/O AND A TVT-1 HOOKED UP TO IT. I ALSO HAVE 8K BASIC FROM MITS UP AND RUNNING. I HAVE THE ALTAIR PIO BOARD FOR THE KLEINSCHMIDT, BUT SINCE THERE ARE SEVERAL VOLTAGE LEVEL CHANGES INVOLVED, I AM LOOKING FOR SOME GUIDANCE ON THIS PROJECT. I AM WILLING TO GIVE SOFTWARE ROUTINES TO ANYONE WHO CAN HELP ME OUT. I DON'T HAVE TOO MANY AS YET, BUT YOU ARE WELCOME TO WHAT I HAVE IN EXCHANGE FOR SOME HELP ON THIS PROJECT. THE M-311 IS A 30CPS PRINTER AND SHOULD BE A VERY NICE ADDITION TO MY COMPUTER ROOM WHEN IT IS UP AND RUNNING. M. DOUGLAS CALLIHAN, BERKLEY ST. RFD # 1, BERKLEY, MASS 02780.

EL PASO COMPUTER GROUP: Contact Alvin Schatte (598-9748) or Thomas Thompson (581-0676) or write: Altair, 213 Argonaut #27, El Paso, Texas 79912. (Address is Jack O. Coats')

Glen Smith, 5822 Daffodil Cir., Dayton, Ohio 45449, would like to see newsletters devoted to particular microcomputers (I think you'll see this already starting, Glen). He has an Altair w/12K, Suding cassette & calculator interfaces, Clare-Pender Keyboard and a rather impressive 128 character + 128 graphic "character" TV display in the works.

Bobby Baum, 6607 Pyle Rd., Bethesda, Maryland 20034, is building the Universal Microcom-puter, which will run any microprocessor up to 16 bits with the same bus structure and front panel. (Sounds interesting.)

Beardsley Ruml, II, 3306 Cathedral Ave., N.W., Washington D.C. 20008, is very interested, and currently involved in the development of a "$2000" dedicated system for law offices. He referred to Dennis Faulk and his aspirations (see NL #12). He is currently building an 8080 based system (as yet unannounced...so we won't do it here) and would like to get in touch with anyone working on a word-processing system.

S.A. Cochran, Jr., P.O. Box 607, Tyler, Texas 75701, (214) 592-3833, is also an attorney interested in an 8080 for law office applications. He cited one of the problems as being the need to come up with a suitable tape drive. (Beardsley Ruml said that he was using a new improved -three of 'em- Phi-deck for his system.)

Gary Coleman, 14058 Superior Rd. Apt 8, Cleveland, Ohio 44118, (216) 371-9304, (Note: address correction) says that an 8080 board is now available from the Moducomp people in Canada and can be plugged directly into the Mod-8 backplane. He says also that the Cleveland Digital Group is really taking off.

Mogens Pelle, Birkhojterrasserne 416C, DK-3520 Farum, Denmark, is glad the NL has pro-vided him a means of contacting other hobbyists (1) in Denmark, and notes that his name & address was not included in the roster. (The length of that street name is probably why, Mogens!)

" INTEL 8080 Microcomputer Systems User's Manual " Page 4
- New, first printing July 1975, 8½x11, about 200 pages
- Good Book -

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SL
R;
C>* I BELIEVE I INCLUDED A LISTING OF MY HEX KEYBOARD LOADER
C>* (ILLUSTRATING PARALLEL I/O BUS SEQUENCE) WITH MY SUBSCRIPTION
C>* ORDER. SINCE THEN I HAVE DISCOVERED A MISSING JUMPER ON MY
C>* SWTP KEYBOARD WHICH MADE MY CANCEL KEY CODE EQUAL TO THE
C>* X KEY CODE INSTEAD OF CONTROL-X. FOLLOWING IS A CORRECTED
C>* PROGRAM LISTING FOR MY CORRECTED KEYBOARD, WHICH SHOULD WORK
C>* ON ANYBODYS SWTP KEYBOARD, PROVIDING ALL OF THE JUMPERS ARE
C>* INSTALLED. REMOVING THE FIRST TWO PROGRAM INSTRUCTIONS AND
C>* CHANGING THE I/O INSTRUCTIONS TO POINT TO A PARTICULAR PORT
C>* SHOULD MAKE THE PROGRAM USABLE ON AN 8080 WITH STANDARD I/O PORTS.
C>*
C>*
C>T HXKEYLDR LISTIN[ACC 191 A
'191' REPLACES ' A (299) '.
R;
C>T HXKEYLDR LISTING A * * (COL 1-79
```

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                                                        PAGE    1
KEYLDR
LOC  OBJECT  STMT        SOURCE STATEMENT

              0001         HEADER KEYLDR   ;
              0002  ;
              0003  ;
              0004  ; SOUTHWEST TECHNICAL PRODUCTS KEYBOARD HEX LOADER
              0005  ;  WITH BACKSPACE AND ECHO (CANCEL KEY = BACKSPACE)
              0006  ;
              0007  ;       BY JIM BRICK
              0008  ;
     00 FC    0009  SELECT  EQU    0FCH    ;SELECT DEVICE PORT
     00 FD    0010  INPUT   EQU    0FDH    ;INPUT PORT
     00 FE    0011  OUTPUT  EQU    0FEH    ;OUTPUT PORT
     00 FF    0012  CONTRL  EQU    0FFH    ;CONTROL-OUT PORT
     00 30    0013  CANCEL  EQU    030H    ;KEYBOARD CANCEL CODE
              0014  ;
              0015          ORG    0C0H    ;
00C0 3E 01    0016  HEXLDR: MVI    A,01    ;I/O BUS DEVICE ADDRESS INTO AC
00C2 D3 FC    0017          OUT    SELECT  ;SELECT DEVICE
00C4 21 00 00 0018          LXI    H,0000  ;LOAD ADDRESS (CHANGE TO SUIT)
00C7 31 00 01 0019  BEGIN:  LXI    SP,0100H ;INITIALIZE STACK POINTER
00CA CD E1 00 0020  INLP:   CALL   READ    ;GO READ KEYBOARD
00CD 07       0021          RLC            ;SWAP LEFT
00CE 07       0022          RLC            ;  4 BITS
00CF 07       0023          RLC            ;  WITH RIGHT 4
00D0 E6 F0    0024          ANI    0F0H    ;KEEP ONLY LEFT 4 BITS
00D2 77       0025          MOV    M,A     ;SAVE IN MEMORY
00D3 CD E1 00 0026          CALL   READ    ;GO READ KEYBOARD
00D6 1F       0027          RAR            ;RESTORE RIGHT 4 BITS
00D7 E6 0F    0028          ANI    0FH     ;KEEP ONLY RIGHT 4 BITS
00D9 B6       0029          ORA    M       ;COMPLETE 8 BIT WORD
00DA 77       0030          MOV    M,A     ;  INTO MEMORY
00DB D3 FE    0031          OUT    OUTPUT  ;ECHO WORD IN LEDS
00DD 23       0032          INX    H       ;NEXT MEMORY LOCATION
00DE C3 CA 00 0033          JMP    INLP    ;GO GET NEXT WORD
00E1 DB FD    0034  READ:   IN     INPUT   ;READ KEYBOARD
00E3 07       0035          RLC            ;'KP' BIT INTO CARRY
00E4 D2 E1 00 0036          JNC    READ    ;LOOP IF 'KP' LOW (KEY STILL DOWN)
00E7 DB FD    0037  BITS:   IN     INPUT   ;'KP' HIGH, GET NEXT CHARACTER
00E9 07       0038          RLC            ;'KP' INTO CARRY
00EA DA E7 00 0039          JC     BITS    ;LOOP IF 'KP' HIGH (KEY NOT PRESSE
00ED FE 30    0040          CPI    CANCEL  ;PRESSED KEY = CANCEL?
00EF C0       0041          RNZ            ;NO IF .NZ. ,RETURN
00F0 2B       0042          DCX    H       ;DECREMENT MEMORY POINTER
00F1 7E       0043          MOV    A,M     ;MEMORY INTO AC
00F2 D3 FE    0044          OUT    OUTPUT  ;ECHO IN LEDS
00F4 C3 C7 00 0045          JMP    BEGIN   ;GET NEXT CHARACTER
              0046          END            ;
NO. OF ERRORS IN ASSEMBLY =       0
NO. OF LOCATIONS USED = 000037 (HEX)    RELOCATABLE
                                                        PAGE    2
  KEYLDR
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By now, I had hoped to have my text editor TEXTED ready for distribution. However, I've run into problems with my cassette interface being somewhat unreliable. After loosing 3k of nearly debugged TEXTED machine code, I'm ready to change to a different interface. I'll keep working at it though when I find some more time. Also, noisy interrupt lines are driving me crazy.

Back a while ago, I attended the Sphere Corp. demonstration in Boston. They seemed to have a lot of bugs - software and hardware. Their diskette operating system, the line printer interface, the 16k memory boards, and BASIC all had problems at that time. So, we'd all better wait a bit, I guess.

All for now — I'll try to get some good software articles off to you soon. Please continue the N.L.

Sincerely,
Bill Severance, Jr.

at least for the purpose of summarizing the activities of the sharing, while Byte cannot. So, by all means, continue the N.L. — receive help when I request it." The N.L. can foster this information someone just starting out in microcomputers and am also pleased to I get quite a kick out of being able to provide information to other participants, hearing of their plans, problems, and so on. highly pleased with the number of letters I've received from the interchange of information between such hobbyists. I have been freely discuss suppliers, new products, etc. and to aid in the Although Byte is a fine magazine, we hobbyists need a forum to absolute necessity for anyone interested in hobby computers. been most impressed with the N.L. and have found it to be an necessary number of renewals to continue operation. I have issues of the Micro 8 Newsletter. I hope that you obtain the Enclosed is my check number 409 for $6.00 for six more

participants!

12 December 1975
381 Poplar St.
Winnetka, Ill. 60093

Dear Hal and John:

My check for $6.00 is enclosed. Keep up the good work. Please send or publish the names of the administrators at Cabrillo High School to which we should send our congratulations for their generosity and willingness to support this nationwide educational endeavor of yours. There are all too few administrators that have the foresight and vision to recognize the value of such activities - the value not only to the many hobbyists, but to the involved students and the innovative faculty.

But for fear that your stamina may not keep pace with your innovativeness and ambition, I encourage you to publish every other month. I greatly enjoy the newsletter and am obtaining useful information. I want it to keep coming. (But also, how much money can I afford to put into literature? Another reason for publishing every other month.)

At the last meeting of the Chicago Area group with 60 in attendance, the steering committee announced our name: Chicago Area Computer Hobbyists Exchange - CACHE. Now since that is pronounced "cash", there were some interesting, unanticipated consequences when people started writing out dues checks ($10) for the treasurer. He told them to make out their checks to CACHE - verbally, of course. Guess how they wrote the word. Second unanticipated consequence - he could still deposit the checks!

I saw the magnificent first issue of the publication of the Southern California Computer Society magazine. The cover in color, glossy pages, professional printing, a variety of articles (which I didn't have the opportunity to read), and a surprising abundance of advertising. Most amazing.

However, I would urge other groups NOT to try the same thing. Two reasons. One, the hobby will be able to support only a relatively limited amount of advertising. We now have two magazines in the field. I doubt that the field will be able to support more than three magazines selling ads. I wouldn't be surprised to see at least one more commercial venture start. Second reason - and much more serious. The SCCS will soon find that they cannot say things that need to be said. It is extremely difficult to criticise any manufacturer or supplier when he is, or potentially is, an advertiser. Only the most strong-willed editor who is also highly respected by everyone in the field can hope to be able to say what needs to be said. Even then he has to be careful.

Your publication is doing a great deal to help interest groups get started. CACHE formed because of the Micro-8 Newsletter, and others appear to be getting underway. One difficulty that most of these groups will likely have after their first few meetings is deciding, "What to do next?" I have enclosed a number of suggestions that I prepared for the CACHE steering group. I hope that these may be of use to others. I would urge groups to do different types of things at different meetings. If the group is large enough, they should have two or three sessions, "clinics," running in parallel. Each one might be scheduled for 50 or 80 minutes (allowing 10 minutes between clinics). These types of activities have been used very successfully by the various groups within the National Model Railroad Association at their meets. The National has one convention each year (2700 went to Dayton, Ohio, last summer for five days), the 14 regions usually have two conventions a year, and the divisions may have monthly meetings.

There are many similarities between these two hobby groups. Many different kinds of interests can be accommodated under the same "umbrella." Both hobbys attract very interested people with a wide diversity of backgrounds. Some of these people are extremely knowledgable or skilled in many or a few areas; others have lots of interest but near zero knowledge or skill. Both have major problems of standards to allow interchange. The NMRA by setting up good minimal standards many years ago eventually got equipment from different manufacturers to be able to work together. This led to the tremendous commercialization and growth of firms supplying the toy train market as well as the hobby market. The computer hobby will be different in this aspect, at least partially, because of the already existing market for commercial systems. However, I would predict that a hobbyists association, if one is successfully formed nationwide, could have a major impact on computers for the home. This market potentially far exceeds the commercial markets that the IBMs and CDCs currently envision. I would also predict that these same types of companies will not be the ones to develop and successfully address this market. The history of organizations argues too strongly against it. Just look at Xerox, for one example.

Incidentally, looking at the proliferation of organizations, newsletters, etc., we are experiencing, I cannot help but make comparisions with the National Model Railroad Association. It has about 25,000 members whose dues are just now going to $10 per year. Some regions charge dues of $2 - $3 per year. I live in a region that has free dues - convention registration fees cover the costs of its slim publication and mailings. There are two commercial publications in the field with circulations of about 100,000 as a few much smaller special interest group publications. Members of the NMRA receive a monthly publication of about 40 - 48 pages per issue containing much useful information. Information costs are much more reasonable as compared to what we seem to be experiencing. Maybe this is a benefit of having a national organization (which has only one full time employee and an editor who receives a pittance).

There are great dangers in organizing too soon and in a hobby group made up of volunteers overorganizing - but I still can't help wondering when we will have our first national convention. If anyone is interested, they might want to talk to a former president of the NMRA and the present editor of the NMRA BULLETIN, Whit Towers, 171 So. Layton Dr., Los Angeles, Calif., 90049.

Yours truly,

Chuck Douds

Charles F. Douds

MEETING ACTIVITIES FOR COMPUTER GROUPS

LECTURES
Best for famous person, historical narrative, etc. Very sensitive to public speaking ability and training. Can easily turn off a group if too many lectures are scheduled.

CLINICS
Usually less formal and smaller group than a lecture. More than one clinic goes on at the same time. A given clinic can be repeated in a schedule that allows most to get to all the clinics they are interested in. Topics can be most anything. Greatly enhanced if a handout is provided, even if it is just a list of key points. Handout should include author's name and the date. Use of slides or flip charts are usually very effective. If hardware is used or demonstrated, you often need a very small audience or TV camera system to be effective. Very important for host to check up on needed screens, projectors, electrical outlets (are they powered? where are light switches?), and other such details.

DEMONSTRATION ("HALL") CLINICS
Construction, assembly, measurement, and operation techniques demonstrated on an on-going basis. The "author" simply sits at a table doing his thing, talking about it, and answering questions as people stand around - free to come and go as they wish. Can have several in one room or located in halls.

PARTICIPATION CLINICS
The audience - or a significant part of it - gets their hands or heads into the topic with the author helping individuals out after showing them how. Good for such things as lessons on programming or introductory circuit design. Requires very careful preparation and testing of materials by the author. Participants may be required to sign up beforehand so adequate materials can be prepared. Don't call it "participation" if only a very few people can participate!

CONSTRUCTION CLINICS
The audience builds a piece of equipment. They sign up and pay for materials beforehand and are told what tools to bring. Author makes up kits and shows how to build them step by step. Prior testing is a must to insure that the most naive can finish in alloted time. Author (and helper) has to be prepared to troubleshoot completed devices. Good for building logic probes, simple power supplies, etc. Vital to check out facilities beforehand - suitable tables, power outlets, etc.

WORKSHOPS
Experts work with others on special problems such as de-bugging equipment participants bring in, designing special interfaces, etc. May have an audience observing but they probably should be roped off. Can also have discussion workshops, such as developing a chart comparing characteristics of kits. Output of such workshops might become clinics, publications, or "standards" (e.g., for a local computer network), etc.

TOURS
Auto or bus tours to manufacturers, big computer installations, or home set ups. Often best done in the evening. Obviously, careful pre-lanning and time scheduling are required.

TAPE-SLIDE PROGRAMS
Many of the above activities can be worked up into a packaged program recorded on audio tape with accompanying slides. Because of the lack of a human being doing the talking, a higher standard of production is required than for live clinics. Many details become very important and have been pretty well worked out for amateurs by other organizations, such as the National Model Railroad Association. This is an excellent and highly popular way to preserve and widely disseminate good clinics. Note that mediocre live clinics become terrible tape-slide clinics.

SWAP SHOPS & AUCTIONS
Anything from a corkboard with 3x5 cards to a big flea market. Live auctions can be a lot of fun with a good auctioneer. Silent auctions can move a lot of goods without much interference to other activities. Host organization may take a cut (typically 10%).

CONTESTS
A lot of people like them, but what form would they take in the mini-computer hobby? While they can provide an incentive to improve designs and techniques, a major problem is to keep them from getting out of hand in terms of skill or money demands. When this happens, they become just spectator events. In a hobby, a major goal of contests should be to encourage active participation in various parts of the hobby.

BUSINESS MEETINGS
These should be minimal in time with most of the work being done by steering groups, etc. However, procedures should be maintained such that a clique can be over-ruled or thrown out if necessary. (You are never close-minded, secretive, or not doing things in the best interests of the group, of course!) But do NOT over-organize. Any hobby organization always seems to attract organizing types - who are probably frustrated in their jobs. The hobby is computers; it is not setting up committees for everything, or rules, regulations, and procedures inappropriate for an organization of volunteers. Do set up committees - but only as needed to ensure that things get done - or to keep the organizational-types busy. Keep the big business meetings short and to the point.

Dr. Charles F. Douds
381 Poplar St.
Winnetka, Ill. 60093
5 December 1975

I really didn't introduce myself when I subscribed to the ML a year ago, or say much about whatever interest I might have in small computers. Well, I'm a 59-year-old chemist with a long-standing hobby interest in electronics which I'm just recently beginning to pursue more actively. So far my only exposure to the digital side of it has been to take a course in digital techniques using the Malmstadt-Enke text and lab. equipment and to do a fair amount of reading over the past couple of years. I've had no experience in software or programming aside from writing a few programs for a H-P 9820A calculator.

As a chemist I'm interested in modular chemical instrumentation, interfacing, and experimental data processing, particularly statistical analysis, insofar as this can be done by a microcomputer. I'm inclined to agree with Sumner Loomis, who remarks in the current ML that many statistical calculations run on large machines could be handled efficiently by a scientific calculator, and perhaps with better understanding of what is to be done. Statistical programs can be mightily misused if blindly applied. Along this line (the use, not the misuse, I hope!) I've programmed the 9820A to handle 3-way analyses of variance. There's a minor bug yet in the program, but it runs! A 4-way program, though, filled all the H-P's extended memory, leaving no room at all for data, but I believe it could be run ih one pass by leaving out a lot of bells and whistles I tried to put in. So one of my interests is in doing this sort of thing on a micro — that is, to get at small cost the computing power of a good programmable calculator, such as the H-P 9820 or 9830, but not necessarily with the convenience of a high-level language. As I mentioned, I'm weak on software, but do believe this could be done effectively with assembly language and a good arithmetic package.

I'm also interested in analog computation (which still isn't an obsolete art) and have one of the old Heath 15-amplifier jobs. The notion of interfacing this to a micro and doing hybrid computing is enticing!

very truly yours

P. O. Box 723
Rockland, Maine 04841
28 December 1975

Norman F. Stanley

Lee S. Mairs c/o M-Tech Engineering Inc Box C   Springfield, Va. 22151

How would you like to experience the unique feeling of having, through simple stupidity, destroyed $250 in integrated circuits and wasted 300 hours of labor? Better yet, do all of the above less than 24 hours after your Mark Eight has had the last bug removed and is functioning perfectly?

It is really easy. All you have to do is interface your Mark Eight and Digital Group TVT to a TV set and not use an isolation transformer. The sinking feeling in the pit of your stommach after the bright spark and the LED front panel goes dark rivals any roller coaster ride Cony Island has to offer. Beleive me, I know!!!

DO NOT TRY TO USE AN OLD TV SET AS A MONITOR WITHOUT USING AN ISOLATION TRANSFORMER.

The failure mode in my instance occurred when the hotside of the 115 VAC became the ground for the Mark Eight. Evidently the resulting transient shorted the power supply pass transistors. As the -9 volts rose to -25 volts, the 5 volt line rose until a tantalum capacitor in the TVT acted as a crowbar and popped the 7 ampere fuse. The -9 volt line fuse never blew. This disaster carried away all 32 1101 RAMS and all but six TTL packages. As a tribute to Bill Godbout, my 8008 survived! After two months, I now have the system up and running again; however, rather than junk the whole mess an start anew with fresh packages everywhere, I took the time and effort to troubleshoot the entire mess IC by IC. This, in retrospect, was the wrong way to go as it took longer to get the system fixed than it did to build it in the first place by a factor of ten.

By January I should have 5K RAM, 1K EPROM, cassette interface, TVT, paper tape, and a Model 15 TTY running. I also will have implemented the stack register as discribed in one of the early Computer Hobbyist articles. A 1K operating system that, unlike the Digital Groups, performs a useful function is about 65% complete. When finished it will allow keyboard programming and editing, core display on the TVT, cassette loading, and a program to move blocks of code around inside core. After this is completed I will work on an ingenious project suggested by my partner, Chris Sidener, to get wives to agree to buying more computer junk. Essentially it amounts to writing some computer aided education programs to teach the kids math and reading skills. Imagine how much money will be forthcomming when Mom learns that the kids can be silenced on rainy days after school by loading a cassette into Daddy's toy and throwing a switch? Might even be able to promote a terminal and floppy disk if we get a lot of rain...

Hints & Kinks Dept: To adapt Digital Group package #1 software without the entire expansion of I/0 ports (and there are a tremendous amount of errors in the hardware discription, especially the backplane chart) consider the following direct changes to achieve I/0 port designation compatibility:
    a)To make front panel output port 7 (137$_8$),cut foil between pin3 IC10 and pin 1 IC9. Connect jumper from pin 3, IC10 and pin 9, IC9.
    b)To make TVT output port 6, cut existing jumper from A,B,C, or D on output board and connect A,B,C, or D to pin7, IC12.

David W. Johnston, P.O. Box 3781, Washington D.C. 20007, reports that according to the October issue of Microcomputer Digest the price of the 6800 has dropped 60% to $69.00.

COLEGIO SAN ANTONIO ABAD

December 26, 1975

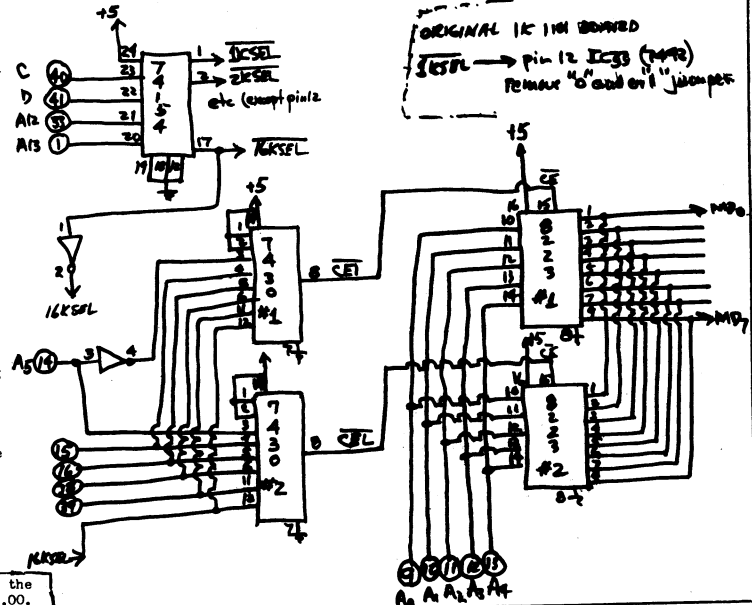BOX 729 – HUMACAO, PUERTO RICO 00661
TEL. 809 / 852-1616

Dear Hal,

Thanks much for your quick reply to my letter last April. It looks like Cabrillo H.S. is well-computerized by this time. The Classic was demonstrated in P.R. last July--looks very good. I read all the Micro-8 newsletters through several times each one. They are so loaded with goodies.

My TVT-I was working very nicely except that the cursor sometimes began to jump wildly around the screen. When the mods started showing up in the newsletters I started hacking the hardware to add scroll and UART to tie it to a Baudot TTY and Cassette. I would like to set up a cassette with a TVT for the students to receive announcements about school affairs or other messages. This should attract more attention than bulletin board notices. But right now the whole thing is in pieces for lack of time to finish its conversions.

The basic reason for the above situation is that last summer we had the singular good luck of being able to get a used PDP-8/I with dual DECtape, H.S. Paper Tape Reader & Punch, 4K memory, Edusystem 30, & TTY. All for the very attractive tag of.2K bucks. One DECtape has an open on Timing Track of the tape head, the TC08 had one bad IC, and a few other little things were wrong here and there but now it works fine business. So, *USING ONE DECTAPE*

of course, the interest in microcomputers was supplanted by the new beast. What I now am working on is to hook a TVT with UART in parallel to the TTY on the PDP-8/I and install the TVT in the front of my science class room. I have most of the DEC educational programs and will be using as many as possible in the classes. I find that a number of these programs can be improved especially in instructions and print-out format. *OF PAPER TAPE--PREFERABLY IN ASCII*

The main reason for writing a letter is to ask for something, of course. Could you punch out for me a copy of your Cabrillo Test Grader? I have gotten some things from DECUS but they are extremely slow this time--an order was placed last June and still has not arrived. Also, if the Micro-8 newsletter is continuing could you include a request for a used TU56 DECtape transport or tape head that somebody may be able to give us or sell? Also in our transactions for the PDP-8/I the DECtape Library software got lost and we would be interested in getting a copy of that for a nominal charge. Thanks much for helping on this.

Sincerely

Bro. Felix Neussendorfer
A SIX YEAR BOYS COLLEGE PREPARATORY SCHOOL FOR BOARDING AND DAY STUDENTS

Memory expansion circuit for original Mark Eights:

The original Mark Eight that we all know and love so well as a capability to address only 4K words rather than the 16K that the 8008 CPU is capable of directly addressing. The expansion cure is straight forward and simple since the additional bits of the Hi address are brought out to two of the 41 lines. Referring to the Address Latch/Manual Board schematic, the Hi address is decoded by IC10 and IC11. The additional two bits necessary to address 16K are labeled A12 and A13 and are brought out to lines 33 and 1 respectively. The other Hi address bits are labeled A,B,C, and D. More appropriately they should be labeled A8 through A11. The following schematic uses a 74154 to decode the Hi address and provide a K select pulse that is low when the designate K of memory is addressed.

The schematic also indicates how two 8223 ROMs may be placed at the upper limit of memory if desired as a bootstrap loader. You have no idea how neat it is not to key in the cassette dumper program prior to playing with you machine!

Charles Floto, 267 Willow St., New Haven, Connecticut 06511, ordered the Processor Technology Video Display Module for his Altair because he likes having the display addressed as memory rather than as an I/0 device. Besides, it adds 1K to his 500 words of memory.

Keith L Kendall
295 E 500 S
Vernal, Ut 84C78
(801) 789 C328
12 Dec 75

Dr. Arthur R. Lepley
Building 2 Room B2-26
NIH
Bethesda, Maryland 20014

Sincerely,
Arthur R. Lepley

Please don't give up the ghost. Here is an envelope & $6.

Yours,
Keith

Keep up the great work with the Newsletter.

I just finished interfacing my 128 ASCII character keyboard and the Digital Group TVT board to my 'orginal' Mark-8 computer. I found that the TVT board outputs a video signal at TTL voltage level, so I added a 27 ohm resistor between it and ground to bring this voltage level down to 2 volts, a video input standard according to Don Lancaster's TVT Cookbook.
I accquired a Sears 12" AC/DC BW TV set (Model 5033) and modified it for direct video input. This modification circuit is shown below.

2320 Skyline Way
Santa Barbara, Cal. 93109
18 November 1975

Direct Video Input modification Circuit for Sears Model 5033 (12" BW AC/DC TV SET) by L.L. Plate
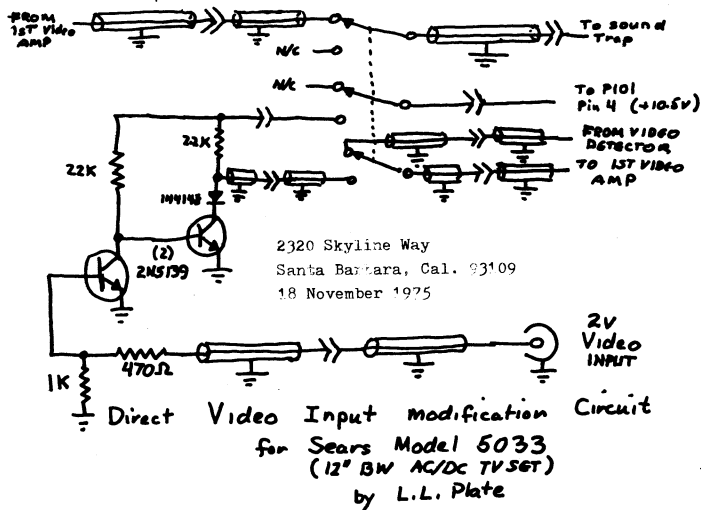
I glued a small piece of Vectorboard with copper bus strips to the shield lid of the 3rd PIF AMP so that the piece is perpendical to the set printed circuit board with the copper side next to TP101. I drilled two holes on the shield box side next to a jumper which is removed to open the video detector stage. I removed C201 and relocated it on the glued piece, thus it can be rewired more easily according to the above modification circuit. I located my direct video input receptive and DP3T switch, (RF shielded and grounded), about three inches from the TV side controls. Due to added capacity in shielded cables, the sound trap has to be readjusted. It may be possible that the sound quality will be improved like in my case!
As shown in my circuit, three events occur when the switch is flipped to the video input stage. The video detector stage is cut out and the offset voltage regulator is cut in; the source voltage which is tapped from the P101 pin 4 is cut in to the regulator; and the sound trap is cut out. The 470 ohm resistor is necessary to drop the input voltage to about 1.6 volts (white) and the regulator brings it up to 3.4 volts. The sync level is 1.8 volts at the 1st video amplifier base. It requires two 2N5139 and one 1N4148 to match. Credit should given to Don Lancaster as I merely applied his so-called (?) theories with excellent results!

There is an error in my Mark-8 interconnection scheme. The -9v line should read MM instead of MA. A guy wired his bus to my scheme as is and I apologized to him!?

The Digital Group TVT software works okay but not to my satisfication. Thus I wrote a new TVT software which lets me to use line feed and carriage return keys as intended, yet they can be overridden by pressing underline key to select Greek letters in leiu. Hence all characters can be ulitized, except for DEL which is used to home and erase the 'slate'. I am using Input Port 0 and Output Port 1 for awhile. This program is listed below.

IMPROVED SUDING TVT/KEYBOARD PROGRAM by L. L. Plate

Address	Code	Instruction	Comment
xxx000	006	MVI A, -1	Send DEL to TVT to home
xxx001	377		
xxx002	123	OUT 9	Output to Port 1
xxx003	220	SUB A	
xxx004	310	MOV B,A	
xxx005	123	OUT 9	
xxx006	006	MVI A,SPACE	
xxx007	240		256 Spaces output to TVT
xxx010	123	OUT 9	
xxx011	220	SUB A	
xxx012	123	OUT 9	
xxx013	010	INR B	
xxx014	110	JNZ xxx006	Loop if all spaces not outputted
xxx015	006		
xxx016	xxx		
xxx017	046	MVI E,-40	Set space counter to 32
xxx020	340		
xxx021	036	MVI D,0	Clear subset flag
xxx022	000		
xxx023	101	IN 0	Input from keyboard
xxx024	074	CPI 200	ASCII code in?
xxx025	200		
xxx026	140	JC xxx023	Not yet, loop back
xxx027	023		
xxx030	xxx		
xxx031	074	CPI -1	One in, DEL code?
xxx032	377		
xxx033	150	JZ xxx000	
xxx034	000		Yes, go home and erase all!
xxx035	xxx		
xxx036	310	MOV B,A	Save input code
xxx037	303	MOV A,D	Subset flag non-zero?
xxx040	074	CPI 0	
xxx041	000		
xxx042	301	MOV A,B	Restore input code back
xxx043	110	JNZ xxx117	Yes, Greek subset to be output.
xxx044	117		
xxx045	xxx		
xxx046	074	CPI 337	Underline code?
xxx047	337		
xxx050	150	JZ xxx136	
xxx051	136		Yes, set subset flag non-zero
xxx052	xxx		
xxx053	074	CPI 215	CR code?
xxx054	215		
xxx055	110	JNZ xxx074	
xxx056	074		No, skip the CR space countdown
xxx057	xxx		
xxx060	006	MVI A,240	Load space code to be
xxx061	240		outputted
xxx062	123	OUT 9	
xxx063	220	SUB A	
xxx064	123	OUT 9	Output to TVT
xxx065	040	INR E	Count one space off
xxx066	110	JNZ xxx060	
xxx067	060		Space counter still non-zero
xxx070	xxx		
xxx071	104	JMP xxx126	CR simulated now,
xxx072	126		Jump to reset this counter and flag
xxx073	xxx		
xxx074	074	CPI 212	Line feed code?
xxx075	212		
xxx076	110	JNZ xxx117	
xxx077	117		No, skip LF space countdown
xxx100	xxx		
xxx101	016	MVI B,-40	32 spaces to be outputted
xxx102	340		
xxx103	006	MVI A,240	Space code
xxx104	240		
xxx105	123	OUT 9	to TVT
xxx106	220	SUB A	
xxx107	123	OUT 9	
xxx110	010	INR B	Count one space off
xxx111	110	JNZ xxx103	
xxx112	103		More spaces to go
xxx113	xxx		
xxx114	104	JMP xxx140	Skip to the delay timer
xxx115	140		
xxx116	xxx		
xxx117	123	OUT 9	Output keyboard code to TVT
xxx120	220	SUB A	
xxx121	123	OUT 9	
xxx122	040	INR E	Tick off a space
xxx123	110	JNZ xxx130	
xxx124	130		Space counter still non-zero
xxx125	xxx		
xxx126	046	MVI E,-40	Reset to 32
xxx127	340		
xxx130	006	MVI A,0	Clear subset flag and A
xxx131	000		
xxx132	330	MOV D,A	
xxx133	104	JMP xxx140	Skip to the delay timer
xxx134	140		
xxx135	xxx		
xxx136	036	MVI D,-1	Set subset flag non-zero
xxx137	377		
xxx140	016	MVI B,-3	Delay timer to debounce keyboard
xxx141	375		
xxx142	026	MVI C,0	
xxx143	000		
xxx144	020	INR C	
xxx145	110	JNZ xxx144	
xxx146	144		
xxx147	xxx		
xxx150	010	INR B	
xxx151	110	JNZ xxx142	
xxx152	142		
xxx153	xxx		
xxx154	104	JMP xxx023	Return for more inputs
xxx155	023		
xxx156	xxx	END	

The xxx 'prefix' represents any high address chosen by the user.
This program is excellent for 256 byte memoried computers and to add scrolling to the program will require 256 bytes for data storage.
I would like to hear from PACE bitters regarding setting up an information exchange.

An ancient Mark-8 humbug,

Laurence L. Plate, Jr.

Andrew W. Lepp, 1517 Alta Vista, Owosso, MI 48867 hopes to see honest user appraisal of products and more hardware in the newsletter. He finished a TVT-1 about 8 months ago and is looking for a computer kit to invest in and would like to see a side by side comparison of the 8080, 6800, and PACE in the newsletter.

Gary L. Dickman, Box 41, Colby, KS 67701 says that where he lives, population is very sparse making any computer clubs very hard to start and at this time, non-existant. A friend 200 miles away and Gary seem to be the only ones in the western half of Kansas doing anything with minicomputers at the hobby level. His Mark-8 is still inoperative due to some small parts on backorder. He plans to have a keyboard, octal loader, keyboard monitor, 7-segement front panel, TVT, card reader, cassette i/o and a modem.

Chuck Burton, 2309 Hazel Avenue, Dayton, OH 45420 has a Sphere system running nice and is very impressed with the Digital Group flyer on DG Systems. He believes they have the best thought out system yet!

Lee Teicheira, 1239 Stewart Ave., Chico, CA 95926 guesses that a large number of participants are not located near one of the user groups and the NL is their lifeline to the People of our hobby, and that is what it is all about.

David Metal, 28 Splitrail Place, Commack, NY 11725 tried to obtain a TVT-II board thru John Bottoms, is still waiting for it to arrive, and wonders if anyone else received a board from him? He wonders if anyone can tell him the best computer system to go for? He will soon buy an Altair 8800 unless someone comes up with some better ideas. He has a tape interface up and running using a cassette and the standard amateur TTY equipment. He has tied together a model 15, a model 14, and a teletype memory (from a ham article) and can record and recover almost error free. His next project is a UART converter to the computer code and would appreciate any information anyone can supply.

Desmond J. Carron, 10541 Farnham Drive, Bethesda, MD 20014 wants to thank all NL contributors. He can truthfully say that his equipment would now be collecting dust on the shelf in an inoperable condition were it not for the encouragement he extracted from the many letters, comments, etc. from newsletter participants. He has a Scelbi with 16K, and a keyboard, TVT-II and both TCH and Scelbi cassette interfaces neither of which seem to work as designed.

Tate Yoshida, 2951 S. King Dr., Chicago, IL 60616 has a Mike-2 up and running and is getting the parts together for a MOD-80.

Bruce Kendall, 334 A Camille Ct., Mountain View, CA 94040 provided a clipping from the Nov. 20, 1975 Minicomputer News describing a hardware multiply/divide option to speed up 8080 micros. Order information from Gnat Computer, 8869 Balboa Ave., Suite C, 92123.

Jerry Scott, 812 East 91st St., Kansas City, MO 64138 (816) 765-6470 has a Mike-2, KSR-15 TTY, a non-functional TVT-1 and a Digital Group Keyboard. He has available five CDC Model 601A 7 track ½" mag tape units for around $250 to $300 each depending on shipping method.

Richard A. Peterson, 9004 184th Ave. E, Sumner, WA 98390 would like to see us advertise a bit more to expand the number of members (yea gods, its hard enough keeping up with everything the way it is!). He dosen't expect in-depth technical articles but just likes to read the B.S. from other guys, since most of us find few people in our daily lives that we can discuss our hobby with (in detail).

Don Stevens, PO Box 159, Sheboygan Falls, WI 53085 is trying to form a group called the Wisconsin Area Computer Hobbyists. Interested parties should contact him.

Wallace T. Many, 62 Glendale Ave., Middletown, CN 06457 (203)632-1240 home (203)236-4511 business is seriously thinking of an 8080 based system and wonders about IMSAI. It's been a month since he ordered MITS manuals (with a charge card and a request for priority mailing, yet).

Bruce Segal, 64 Summit Crescent, Montreal, Quebec, Canada has an Altair 8800, TCH cassette interface, 12K of MITS dynamic memory, Proc. Tech. 3P+S interface, prom board, and a MITS cassette interface. He is still waiting for the MITS extended BASIC and monitor-assembler which they say should be delivered by DEC. He is interested in some sort of mass storage device and the Digital Group Phi-deck controller.

Howard Spence, Port Moody Senior Secondary School, 300 Albert St., Port Moody, B.C., 939-6656 enclosed information on a Fairchild F-8 PC board and parts package put together by R-A-E Industrial Electronics Limited, 1629 Main St., Vancouver, B.C. V6A 2W5 (604)687-2621. He is going to check into it more carefully and report his findings.

John D. Turner, NAVSEEACT Japan, Box Five, FPO Seattle, WA 98762 has an Altair 8800 with kybd/crt/printer/modem. He is very happy with quality material supplied by the Digital Group/mits/Proc. Tech./Cybernetics/ Godbout. He is stationed in Japan near Tokyo (U.S. Navy) and train fare to the electronics buying area in Tokyo is $5.60 round trip, so complete kits are important to him. He is very unhappy with Maury Goldberg of Micro-Mini-Mart having experienced inadequate instructions and assembly details and problems with solderability on their PCboard plating. He will soon supply a calculator program for the Altair/CT-256/µ-mini-mart calculator interface. He would like help on inputting and getting displayed on CT-256 following FCN's 0, 1/X, and needs help on string programming also.

Darrell Collins, 8638 E. Solano Drive, Scottsdale, AZ 85253 writes: "I have a Mark-8 that has been running for more than a year now, even much to my surprise! The system was completed in Oct of 74 but did not run until December. I had trouble with IC's (Poly Pacs), PC boards (Techniques sure didn't put much glue on the foil), banjo harness (cost effective but a real pain) and misc. learning stuff encountered with a new product. The chip was a $100 special from Martin Research and such a bargain I eventually bought two of them. Ha! I tend to agree with others in the newsletter about keeping things low-cost or free of cost for software. My machine is currently housewatching. It controls heating, cooling, serves as a burglar and fire monitor and will auto dial fire and police with recorded message and monitors yard moisture conditions controlling an auto sprinkler system to water when required. I plan to package the whole mess up and stuff it into a wall someday. When it comes to putting the thing to use, anyone will soon learn that building the sensors and interfaces will take more time than building the darn machine. With all the activity going on, several things need comment:
1) EVERYBODY should use edge connectors and sockets! The mere fact that hobbyists are building the machines will indicate a long 'learning' time. A person should be able to work on his own problems, not hasseling with hardware configurations too.
2) A big limitation of the Mark-8 is the I/O. Suding had a modification scheme and expansion was discussed in RE but no one has made boards available. Why? How many Mark-8's are limping along without enough I/O? It takes a week to lay out an interface, two weeks to etch and drill and a week to stuff it and fix the thing. It does not have to fancy as long as it provides the 8 input and 24 output ports.
3) When a company makes a unit for general use, they should be able to give detailed interconnection information to various systems. I ordered a Monitor-8 PROM system from Mini-Micro-Mart in May, it was delivered in late October (enough said about that already) with only a unreadable mimeograph of layout and functions. I spent 1½ days on the telephone trying to anyone about how to connect the thing to the Mark-8. I still have not succeeded. That's $90 spent and I have no return for it yet. Can anyone out there help me?
4) What happened to Rogers Baudot to ASCII interface? Southwest Tech was to make boards and have proms available but only much silence to date. (Robert Cook has boards, see NL #12)
4) I do not like MITS policies about a) information about the 8800 bus b) outrageous prices for software c) indifferent attitude. Contrast this with those of Sphere Co. Talked on the phone nearly a full hour and they told me everything I asked about and more. There was such a difference, I persuaded the company I work for to purchase a Sphere rather than an 8800.
6) Will or can there ever be a BASIC for the Mark-8? I get the feeling that no one is working on it and the 8008 may pass into history the same as the Stanley Steamer."

Darrell Collins

R. E. Smallwood, 20 - 12 St. N. W., Calgary, Alberta, Canada 72N 1Y3 has yet to choose a micro-computer yet but thinks the MOS Tech 6502 looks good. He would like to know if anyone has info on the Ohio Scientific Instruments boards/parts advertised in the DEC. 75 Byte. He says that Tri-Tek, Inc. in Phoenix has the Intersil CMOS PDP-8E chip at $65 and are hoping to have a kit for it in '76.

Jeff Lesinski, 1241 Staley Road, Grand Island, NY 14072 reports that he is still building a 2K Mark-8 and TVT-1 and just ordered an Altair 8800.

David Cook, Apt. 417, 5541 S. Everett Ave., Chicago, IL 60637 (312)PL2-4280 has just finished building a Martin Research MIKE-2 using a Creed TTY and interface designed by Bob Cook. He will soon have 5K of RAM and is trying to get Cook's monitor running. He is planning to build the Computer Hobbyist graphics display as soon as possible so that he can begin programming games using a TV screen as a graphics display.

William J. Serviss provided the following roster for the Mid-Michigan Micro Group
Michael Martins, 805 Dryer Farm Rd., Lansing, MI 48917 489-9740
Karl Coulman, 2412 Heights Ave., Lansing MI 372-4619
Claude M. Watson, 1922 Autumn Lane, Lansing, MI 48912 489-9323
Philip A. Dawdy, 711 Ridgewood, Lansing, MI 48910 882-5946
Bruce Smith, 519 N. Logan, Lansing, MI 48915 485-6504
William Serviss, 13121 Tucker Dr., DeWitt, MI 48820 669-3179 has breadboard 16K 8008 with stack, mod 15 TTY, PTR, Suding cassette, keybd (Honeywell)
Larry Miller, 826 Halstead Blvd., Jackson, MI 782-9706 has Mark-8, Creed TTY, SWTP kbd, Suding Cassette, TVT-1
Bob Forkner, 7052 W. Howe Rd., DeWitt, MI 48820 626-2104 has breadboard 2K 8008, mod 15 TTY, Suding Cassette, keybd
Joyce and Marvin Church, 4307 Mar-Moor Dr., Lansing, MI 48917 482-9452 have Altair
Randy Rouse, 2500 E. Mt. Hope Ave., Lansing, MI 48910 487-8299 has Mark-8
Lee Hodges, 109 Wilson St., DeWitt, MI 48820 669-3258 has Mark-8 and Mod 15 TTY
Fritz Roth, R#7, Carbondale, IL 62901 (618)549-1370 has MIL Mod-8
Rick Schultz, 611 Dexter, Lansing, MI 393-9438 has MIL Mod-8, Creed TTY, Suding Cassette, SWTP kbd, and TVT-1
Daniel Herrick, 1214 Frederick St., Owosso, MI 48867 723-3264 has Altair 8800

Russ Gladstone, Gladstone Electronic, 1736 Avenue Road, Toronto, Ontario M5M 3Y7 (416)781-6811 is considering issuing a Canadian Newsletter or information exchange to assist the local groups across Canada. Anyone interested should write him.

My current projects are a Pt Video Monitor and the Digital Group 128-key ASCII keyboard. I am hoping that the two will satisfy my I/O needs for quite awhile. The total cost with a purchased monitor will be about $330 which is much more that I ever planned on. The size of display and invariable background really sold me. I will let you know how they work out.

I have evaluated the IBM 5100 computer for office use and find it very expensive, with a rather simple BASIC language, and with a very tiny screen. However, since my group is composed of non-computer science types (all have WS or higher) with rather limited abilities at programming I have recommended purchase on the simple economic justification that it will pay for itself the first year and save an additional $16K. It is a very easy machine to use. My five and seven year old sons were able to plan games in about 10 minutes.

Best of wishes for a successful and happy new year.

Sincerely,

George W Rompot

216 Collier Dr.
Springfield, IL 62704
1 Jan 1976

John Burger, 1440 Leopold St., Jasper, IN 47546 is trying to acquire some data on the Intersil 6100 microprocessor and plans to get a system built around it in the near future. He has an 8008 up and running almost a year now and is using it to control a modified Suding TVT. He converted the 32 x 8 display to 64 x 16, and also added a cursor. The only problem is that it practically needs his 8008 just to control it. Semiconductor Specialists, O'Hare Airport, Indianapolis, IN (317)243-0271 has the Intersil 6100 for $52.50 - that's cheap.

Bill Risch KMMTH/1, 103 Spit Brook Rd., Apt. A12, Nashua, NH 03060 is presently involved with a group attempting to organize a hobby group known as the "New England Computer Society." At present they have no mailing address for the club but he'll forward it once a slate of officers have been elected in Jan. 76. At present the membership exceeds 100 people and splinter groups are already forming depending on the area of New England, and type of hobby computer. Clubmembers presently represent New Hampshire, Mass., Rhode Island, and Conn.

Vern Brannon, 3671 McElrath Drive, Dayton, OH 45432 would appreciate any information on the IMSAI 8080 micro-computer. He is being transferred to Germany in February and wants to buy a micro-computer kit to work on in his spare time. He likes the 8080 processor and would like to have it as the heart of his system. He recently went to a MITS seminar in Cincinnati at a cost of $12 and was impressed but in a negative way. How could they say it is not a sales pitch and charge $12 is a mystery to him. The only thing he got out of it was a look at an 8800 that he had only seen pictures of before. Therefore, if the IMSAI is of near equal or better quality, he'll buy it.

Enclosed is my vote of confidence for the new six issues of the newsletter.

The half size format is a little taxing on the eyes but its good to see more material. Enough listings of mem bers for the time being, lets have more news and solid material.

1) Latest word I have on the Sphere system. Dr. Larry Schramm at Johns Hopkins Hospital finally got his system after a string of broken promises and misrepresentations. This $2,000 + system preassembled, arrived misassembled with an inoperative PROM, no Basic language. The cards were wedged into the case with pieces of styrofoam - no card cage. Dr. Schramm told me that his CPU chip was running too hot to touch. He also said if he didn't get satisfaction quickly he would return the system and demand a refund.

2) The Atlanta Area Microcomputer club is off and running. Boards are being cut for a TVT- II, main and memory board at $25. Get this,one of our members has modified and given a working demonstration of his SWTP TVT II that is able to display 64 fully legible characters per line. He does it by interleaving the memory pages, No modification required to the TV other than specified by SWTF. All that is required is two additional IC's some point to point wiring and a few capacitor changes. The rest of the TVT functions as usual. The only problem is that a complete written copy of the modifications is not yet available but hopefully we will have them by February - he is going away on a work-study program now.

3) People interested in the Atlanta Club can contact me at the above address.

4) There is a good article in the November issue of Modern Data on CRC codes for those who want to understand the principle of this kind of error correction scheme.

5) If any one out there is interested in buying my TVT-I based computer terminal I am interested in selling it, make an offer. It includes Microswitch Hall effect keyboard with enclosure (alone worth over$150) ,twelve feet of cable connecting keyboard to the display chassis, built in acoustic coupler 300 baud, TVT I display mounted in a Lamb case, audio cassette data record and play back., TVT I control switches. Complete documentation on all the above - and it works. I am making new purchases and want to recover some of the money I had spent on this original setup. It won't do me any good gathering dust and may be will help someone get started in computing without a lot of hardware nassles. No, I will not give it away. Please include a SASE if writing or call me at 404-377-4907 (not collect).

Thats about all for now, hope to see the next Micro 8 out soon.

Yours truly,

Gary Alevy
Emory University
Box 21393
Atlanta,Georgia 30322
November 30,1975

I sure hope that this is the 351'st subscription request! Your newsletter is a great service to those of us that are interested in home computers and to lose the newsletter before there is a viable substitute would be an unfortunate event. Whether the rapid rise of local club newsletters represents this substitute is moot. Reliance upon local groups to desseminate information of general interest may result in simply denying the bulk of the information to most people... Anyway, thank you for a fine newsletter!

I'm a graduate student in computer science at New Mexico State University and have drifted into this hobby through an interest in programming. I have an Altair 8800 with 12 K attached and another 8 K on order. My I/O is a DECwriter II and an Omnitec 703A acoustic coupler that allows me to access the school's 360/65: an intelligent terminal with fantastic local capability. My software consists of MITS BASIC and assembler, Processor Technology Co's assembler (software package #1 - FANTASTIC bargain), and a subset of NELIAC.

JAMES E. RANDALL
609 SOUTH JORDAN
BLOOMINGTON, INDIANA 47401

December 1, 1975

Micro-8 Computer User Group Newsletter

Here is a response to Vol #1's request for evidence of interest in Volume #2. Besides the renewal I wish to indicate what has been of most interest and use to me.

The names of other hobbyists have the least personal pay-off and it is like looking for a needle in a haystack for a person in a low-population-density area. Two other aspects are very useful in helping me get reasonable equipment quickly and being able to put it to use. For example, the NL is the only reference to Solid State Music's Altair boards that I have seen. In less time than it takes for a reply from the great company I have had two filled orders plus a personal answer to a technical question. Their 4K memory is a best buy; the sockets, the neat DIP switch to select higher address bits and waiting cycles (not needed), and the chips themselves. The connector pins are not gold-plated however. I bought their I/O kit and was surprised to see that it included not only sockets (as mentioned) but also the IC's too...at a cost less than the MITS prototype board which will not handle 24-pin DIPs.

Only through the NL can I understand what happened to the Suntronix Sanders scopes...an order still in limbo. As with others I have had phenomenal delivery from James Electronics, generally within a week. I have gone to their DIP connectors and ribbon cables as an inexpensive way in and out of the Altair as suggested in the NL.

The E & L Instruments Bugbook III is an absolute must for the 8080 user. The Scelbi editor with 8080 code is so well documented that it is easy to modify it for local needs.

I want to pass along some small comments of the kind I like to see in the NL, the kinds of things not warranting space in BYTE. 1) As MITS now points out, the Altair front panel letters wear off quickly. Protect the new panel with a non-glossy spray. 2) An early project should be an I/O board with 3 LED displays out, one for Hi, Lo, and contents, and other things. I value the experience of working with latches, 7-segment decoders and drivers but now feel that the Hewlett Packard BCD displays with built-in latch and logic (from James Electronics) are not as expensive as they look.

3) Experience with the Altair front panel (use and trouble-shooting) is invaluable, but after one develops a ROM monitor and LED displays and keyboard input the panel only supplies a reset and a start/halt function. As an alternative one could buy the Altair CPU board, the Solid State Music Memory, mount a mother board on aluminum angles between two chassis containing power supplies. 4) I have sprinkled a few NOP's in new programs, then inserted a RST which called a typeout of all registers. This has helped greatly in debugging. A hardware halt on a specific address would be most helpful...it should be relatively straight forward to do.

What am I going to do with all this crud? The usual things: control the world, build an electric grandmother, fry fish, and play. If I thought it would help I would also build a prayer wheel asking for a cheap diskette unit.

Applause for Jim Brick's letter in vol.1, #12. For all the people that have been asking for free BASIC you might mention that the People's Computer Company Vol.4, #2 (Sept.) contains the first installment of a BASIC translator series that shows you how and gives code. The ACM Special Interest Group on Minicomputers says that it is publishing a bimonthly newsletter. Vol.1, #1 was dated July 1975, contained 13 pages, had very little content, and was (as of Dec.1) the only issue sent out. Let's send them hope but hold back our money. For fun and games with computers I would suggest subscribing to Creative Computing, P.O.Box 789-M, Morristown,NJ 07960 ($6.00, $8.00/student, regular subscription) or the PCC.

Prosper,

John E. Wahl
P.O. Box 3491   December 1, 1975
Las Cruces
NM 88003

Enclosed please find a check for six dollars ($6) for the first six issues of volume 2 of the µ-8 Newsletter. As an active member (Corresponding Secretary, Group Purchase Chairman, Newsletter staff) of one of the larger local clubs (San Diego Computer Society) I feel compelled to make the following comments regarding your future.

1) "Hot news tips and rumors" - You have a unique opportunity to do this. Other publications are constrained by lack of contacts, advertising (Byte, Interface), and/or space (Personal Systems). Tip - Robert French of Radio Shack is a member of the North Texas Club. He is in charge of Radio Shack's 6800 based kit to be available in March for approximately $200. You can contact Lannie Walker, President, Computer Hobbyist Group of North Texas, for further information.

2) "Reader's comments regarding suppliers" - Clubs are not set up to do this. We can not publish individual comments (particularly negative) due to space and/or advertising limitations. We seem to be limited to publicizing group buying opportunities for our members.

3) "Summarize local club newsletter material" - We all have a problem here - µ-8, PCC, Byte, local club newsletters. As you are aware by my cover letter with your complementary copy of Personal Systems for November, I am trying to promote a free exchange of information at the publishing level. There is bound to be some duplication in how we each use this information, but feel this is necessary since we each reach a slightly different set of readers. I hope most of this information will remain in the public domain, although I foresee a problem with those who pay for articles and copyright their publications.

4) "Local contacts and group formation" - This is one of my few criticisms of your NL. Although you have been instrumental in forming many local groups by publishing individual letters, I feel you should become more structured in this area by writing a regular column and/or publishing a complete mailing list of all known groups.

5) "Group purchases" - We certainly appreciate any publicity you can give us, particularly on large items such as the LSI-11 order. You have provided invaluable leads for suppliers. I am concerned about protecting our suppliers by not publicizing our prices to individuals. For example, John Burgoon of Solid State Music offered 1702A's in µ-8 NL #11 at $14. His group purchase price is now $6.00! The San Diego Computer Society welcomes participants in our group purchases subject to the following conditions: club membership ($2.50 per year, includes newsletter), handling fee (1%, $1.00 minimum), postage, and California State sales tax (6%). If substantial out-of-state business develops, I will apply for a tax number so that out-of-state participants will not have to pay sales tax.

6) "Future accomplishments" - A) Your format of essentially reproducing readers' letters in a newsletter is unique and needs to be continued. B) You need a series of regular features such as review of club newsletters, group purchases, group addresses, hardware and software reviews, etc. C) You provide a unique forum for special interest groups, e.g., a MIKE user's group. I am in no position to publish another national newsletter, nor do I feel the public should be asked to finance another one. However, I hope that I can find time to write a one-page column on MIKE systems for distribution in the µ-8 NL.

New subject - I welcome and appreciate your offer of additional interface and other information on the MIKE system from yourself, John Ford and Richard Lerseth. I hope to go to press about December 20th, in order to complete mailing of the MIKE information packet before the postage increase. Therefore, I need your inputs by December 15th. I have collected over 100 pages thus far, and will photo-reduce (a la µ-8) where possible to cut down on paper and postage costs. If there is sufficient demand and interest, I hope to set up a clearinghouse operation patterned after the Digital Group where royalties (1¢ per page per copy) can be offered to contributors. More on this later.

Sincerely yours,   December 9, 1975

James W. Forschon
3949 Mt. Everest Blvd.
San Diego, Calif. 92111

I/O-PROM-UNIVERSAL CARD DESCRIPTION

Part No. IO-2 From SOLID STATE MUSIC

This card was designed to provide an I/O interface for the Altair 8800 computer. Additional pads have been provided to facilitate the addition of EROMs, a UART, RAMs or other circuits as required. The basic kit provides the necessary parts for the implementation of two I/O ports. Other kit options are being prepared for supplementary functions such as TTY interface, video monitor interface, etc.
Figure 1 shows the layout of the committed areas for the I/O and the uncommitted areas for the other circuitry.

I/O Card Connections (refer to figure 2)
    Jumpers - If this card is used for I/O functions a few connections have to be made on the board with jumpers first.
1) Connect "SM" (U5, pin 12) to the 1k ohm pull-up resistors (5 pads - 1.25" to the right of SM and up 0.625").
2) Connect "SO" (edge conn. pin 45) to "SOUT" (U6, pin 5).
3) Connect "SI" (edge conn. pin 46) to "SINP" (U6, pin 9).
4) Connect "OUT STB" (5 pads) to pin 13 (DS2) of all of the 8212 ICs that will be used as output ports.
5) Connect "INP STB" (5 pads) to pin 13 (DS") of all of the 8212 ICs that will be used as input ports.
Port Address Selection - The Altair computer can drive up to 256 I/O ports by decoding eight of the sixteen output lines from the Intel 8080 CPU chip. The 8-line address decoder on the Universal Card can enable eight consecutive port devices in the range "0" to "256". As shown in Figure 4, U3 drives up to eight ports in a group range selected by jumpers (or DIP switch) at U7. If you want to select ports 0 thru 7, then the code for U7 is "00000" and no jumpers are needed for U7 (pins 12 thru 16 connected over to pins 5 to 1). Note: U7, pin 16 is the most significant bit and U7, pin 12 is the least significant bit of the group address for the ports.

U7 selects group address   U3 selects port address within a group
 B B B B B   B B B
  MSB   LSB   comes out on 8 pins
Binary Value 128 64 32 16 8   4 2 1

    Now to connect the addressing circuit to the port, place a jumper from pin 1 (DS1) of the 8212 IC to pins 1 thru 6 or pins 8 thru 10 depending on what address you want that port to be.
    Types of Ports - For additional information on some port configurations that can be constructed with the 8212 IC, get a copy of "8212 Eight-Bit Input/Output Port....Microcomputer Peripherals-Schottky Bipolar" pamphlet from Intel Corp., 3065 Bowers Ave., Santa Clara, CA

1K/2K PROM Card Connections (refer to figure 3)
    Jumpers, If this card is used for ROM functions a few connections have to be made on the board with jumpers first.
1) Connect "SM" (U5, pin 12) to pin 47 (edge conn. pin near "SI").
2) Connect the data outputs of the 1702 type ROM to the appropriate data input lines (edge connector pins) of the Altair bus.
3) Connect the address lines (edge conn. pins) A0 to A7 to the appropriate address control pins of the 1702 type ROM.

Speed Considerations. The Altair Computer uses a 2MHZ clock to time all its functions which gives a single cycle period of 500 ns. If the Prom/Rom you are using has an output data access time of greater than 500 ns, then a slow-down circuit has to be built on the unused part of this card or the computer will not be able to read the rom. (See appendix 1 for a slow-down circuit.)
    Rom Addressing. The addressing of Rom is similar to Port selection described above.
    U7 selects the starting page   U3 selects up to 8 pages (Roms)
       B B B B B   B B B
Binary value 32,768   1024 256
              MSB   LSB
Connect the outputs of U3 (pins 1 thru 6 and 8 thru 10) to the chip select (CS) pin of the Rom. Note: U3-pin 10 is the enable for the first page, U3, pin 9 is the second page enable, etc.

Parts List   U1-SN7485, U2-SN74L04, U3-SN74L42, U4-SN7486, U5-SN74L00 U6-SN74L00, U7-Dip Switch, U8-Intel 8212, U10-Intel 8212
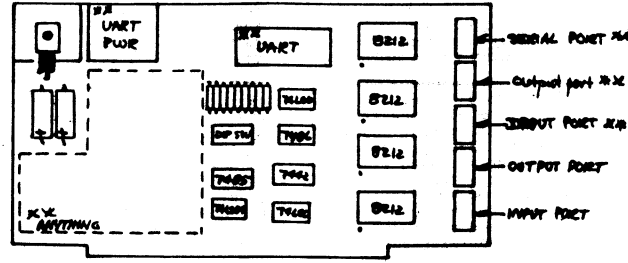
I/O Card Layout - Fig. 2

1K/2K Prom Card Layout - Fig. 3

General Card Layout - Fig. 1

IC's Needed
1 SN74L03
1 SN74L74

RA	RE	NUMBER OF WAIT CYCLES ADDED
GND	GND	NO WAIT CYCLES
RC	GND	" " "
GND	RC	ONE WAIT CYCLE -- 0.5µs Added per byte
RC	RC	TWO WAIT CYCLES -- 1.0µs added per byte

≤0.5µs Fast PROM
≤1.5µs PROM

Slow Down Circuit
Appendix 1
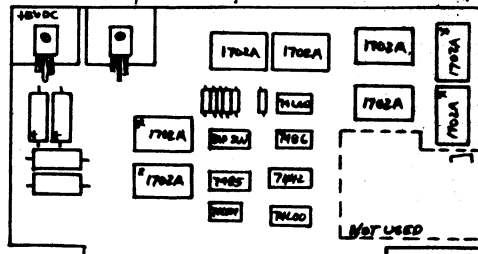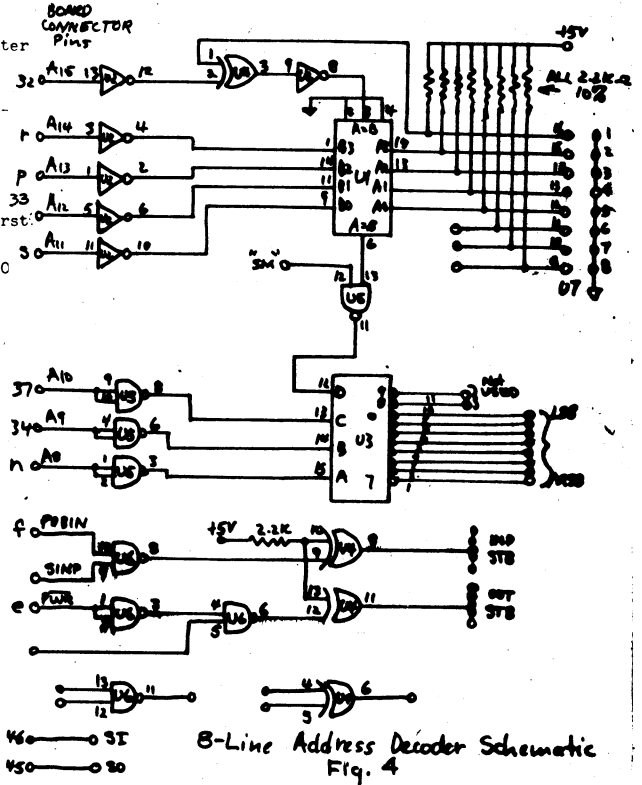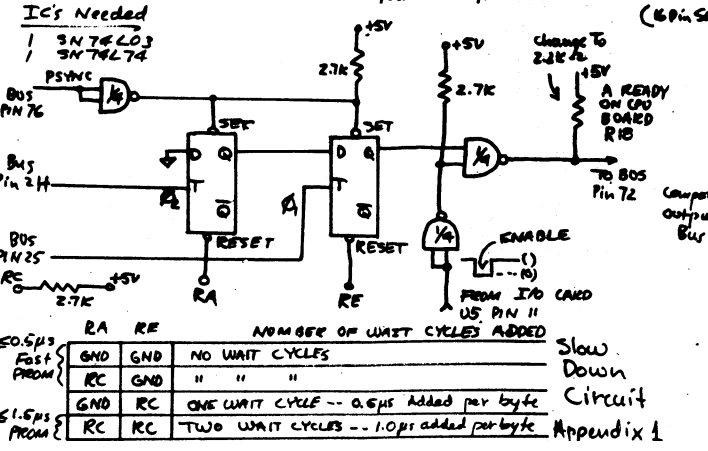
8-Line Address Decoder Schematic Fig. 4
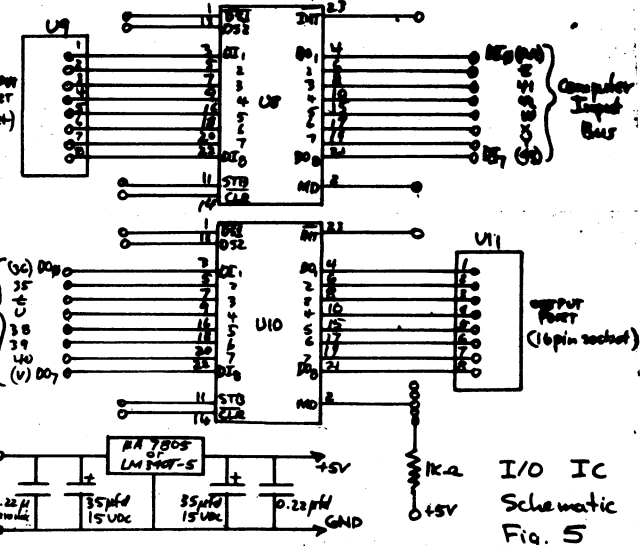
I/O IC Schematic Fig. 5

THE LAST MEETING OF THE SB COMPUTER GROUP BEHELD AN INTERESTING PRESENTATION OF THE JUPITER II MICROCOMPUTER BASED ON THE MOTOROLA M6800 MICROPROCESSOR CHIP. THE UNIT WAS PROFESSIONALLY PACKAGED WITH INDIVIDUAL REGULATORS FOR EACH CARD, A HEFTY POWER SUPPLY, HIGH QUALITY CARD CAGE, HIGH QUALITY RIBBON INTERCONNECTS, BURNED IN ICS, ETC., ALL THE WAY DOWN THE LINE. WHILE DEFINITELY NOT THE CHEAPEST (APPROX $1800 IN OWES), IT LOOKS QUITE PROMISING FOR THE HOBBIEST INTERESTED IN QUALITY PARTS AND WIRE WRAP FLEXIBILITY. DENNIS BROWN, DESIGNER OF THE JUPITER II AND ALSO PRESIDENT OF WAVETECH,INC., GAVE THE 3 HOUR PRESENTATION. THEY EXPECT TO DELIVER IN FEB 76, AND SOFTWARE WILL BE AVAILABLE.

THE RANDOM ACCESS PERIOD RESULTED IN NOT MUCH MORE THAN RANDOM EXCHANGE OF IDEAS AND INFORMATION, WHICH IS ENCOURAGED IN THIS GROUP.

FORMAL ORGANIZATION SEEMS EMINENT AT THIS TIME, AND SHOULD BE SERIOUSLY DISCUSSED, AS THIS DOCUMENT WAS WRITTEN IN THE NICK OF TIME (7:20 TONIGHT), AND A LITTLE BIT OF ORGANIZATION NEVER HURT ANYONE.

IN THIS DOCUMENT I HAVE INCLUDED A LIST OF ALL PEOPLE AND OTHERS WHO ATTENDED THE FIRST OF THE SECOND MEETING. PLEASE CHECK TO SEE IF YOUR NAME IS ON THE LIST ON THE WALL; IF NOT, ADD IT. IF SO, PLEASE BE SO KIND AND PUT A CHECK NEXT TO YOUR NAME. IF NOT, YOUR NAME WILL BE PURGED FROM THE LIST.

ALSO INCLUDED FOR YOUR INFORMATION ARE DATES FOR ALL FUTURE MEETINGS THRU 1976.

GLENN A. MCCOMB

Meeting Dates for all of 1976:

Jan 6   Feb 11   Mar 10   Apr 14   May 12   Jun 9

Jul 14   Aug 11   Sep 8   Aug 13   Nov 10   Dec 8

ARAKI, LENNIE	165 SYLVAN DR	GLTA	964 1842
BAUMAN, CARL	404 ELLWOOD BEACH DR #14	GLTA	968 3774
BELLOMY, FRED	BOX 2400	SBAR	963 8055
BIRD, JAMES	7560 DURHAMPI	GLTA	968 5092
BOLARD, RALPH	131 SANAT ANA PLACE	SBAR	967 1771
BOLLAY, DENNY	240 LAS ALTURAS	SBAR	963 5960
BRAINERD, DAVE	2117 PIRN	OXND	487 6905
CHAPMAN, ANDY	22729 IRONBARK DRIVE	OT 714	956 7183
CYR, DON	800 PALERMO DRIVE	SBAR	687 6029
DOLAH, BOB	800A MIRAMONTE DR (WORK)	SBAR	965 3011
FISHER, GLEN	122 CARDINAL AVE	SBAR	964 5307
FULLER, TOM	BOX 13727	SBAR	964 8212
GEORGIOV, BILL	FRANCISCO TORRES #731	SBAR	685 2029
GORRELL, JOHN	400E PEDREGOSA	SBAR	963 7570
GROVE, JOHN	282 CARLO DRIVE	GLTA	964 6527
HAMILTON, SCOTT	157 SAN ROSSANO	GLTA	968 7990
HOBIN, CHUCK	4185 LA LADERA RD	SBAR	964 7177
HOGG, DOUG	2516 CASTILLO	SBAR	687 5668
HOLMES, JIM	6272 PARKHURST	SBAR	967 6725
JEFFRIES, RON	767-C CYPRESS WALK	GLTA	968 9905
JOHN, W.	221 PEBBLE BEACH DR	SBAR	968 3955
JOHNSON, BILL	551 CHADWICK WAY	SBAR	964 2944
JOHNSON, BRION	1423 ALTA VISTA ROAD	SBAR	961 1346
JOHNSON, DAVE	621 PARRA GRANDE	SBAR	969 2477
JOHNSON, GREG	120 LOMA MEDIA RD	SBAR	966 4628
KAEMPF, LARRY	342 RAVENSCROFT DRIVE	GLTA	964 2203
KIMBERLEY, JOHN	5041 YADLE AVE	SBAR	967 2066
KREYER, LARRY	4 MARINE CENTER	SBAR	963 2071
LICHTJAM, FRED	314 EVANSHINE	SBAR	964 4953
MCCOMB, GLENN	210 BARRANCA, APT D	SBAR	965 4306
MCCORD, JIM	330 VEREDA LEGENDA	SBAR	968 6681
MCELROY, RALPH	BOX 507	GLTA	968 7404
MCLOUGHLIN, KEVIN	1033 NEWTON ROAD	SBAR	963 8344
MCNIEL, DANNY	1343 LA MANIDA	CARP	684 3777
MCNIEL, RUSSELL	1343 LA MANIDA	CARP	684 3777
MOLINE, ROY	155A SAN ANGELEO AVE	SBAR	964 1339
PENROD, DOUGLAS	1445 LA CIMA ROAD	SBAR	962 3337
PETERSON, RICHARD	383H CANNON GREEN DR	GLTA	968 8795
PICKENS, JOHN	206 RAVENSCROFT	GLTA	964 7981
PICKLES, GREG	766 CYPRESS WALK	GLTA	968 0356
PLATE, LARRY	2320 SKYLINE WAY	SBAR	965 1466
RICKS, GARY	209 E PEDREGOSA	SBAR	962 8540
RUDNICKI, SUE	312 ELLWOOD BEACH DRIVE	GLTA	968 1741
RUNYAN, GRANT	1146 NIRVANA ROAD	SBAR	962 7734
SCHIFERL, GLENN	6549 CAMINO VENTUROSO	GLTA	964 6015
SCHIFERL, RALPH	6549 CAMINO VENTUROSO	GLTA	964 6013
SINGER, NAT	4350 CONSTELLATION	LMPC	RE5 1596
SHERICK, MIKE	1112 ACACIA ST	VAFB	734 3723
SMITH, BARRY	235 PACIFIC OAKS #205	SBAR	968 0327
SMITH, ERIC	529 CHADWICK WAY	SBAR	967 9904
STAPLETON, GERRY	967 ST MARYS LANE	SBAR	964 2739
STEFL, BOB	BOX 14002	GLTA	961 2216
STEPHENSEN, JOHN	383H CANNON GREEN DR	GLTA	968 8795
TEPPER, STEVE	BOX 14330	SBAR	961 3896
TROUT, DANA	52 MENDOCINO	GLTA	968 7870
WILK, MIKE	4384 VIA PIKSADA	SBAR	967 3045
WINTER, FRED	813 EAST ANAPAMU #1F	S3AR	962 8534
WHITE, ROBERT	1008 HAWTHORN ST	VAFB	734 3797

SOUTH FLORIDA COMPUTER GROUP

A brief note to inform everybody about the formation of the SOUTH FLORIDA COMPUTER GROUP - with the main purpose of being a microcomputer information gathering and exchange organization.

Group activities are being coordinated by:

Terry Williamson
P. O. Box 430852
So. Miami, FL   33143
(305) 271-9909

The correspondence coordinator is:

Roberto Denis
11080 N. W. 39 Street
Coral Springs, FL   33065
(305) 752-7067

No formal newsletters are planned, there being many good ones in existence. (Have you seen SCCS INTERFACE? It's great!) But as developments break, or as group buys occur, a FLASH bulletin will go out to all other computer groups and clubs. There are no membership dues, and all So. Florida computer freaks are welcomed.

We would like to know or kept informed of any other group notices.   SOUTH FLORIDA COMPUTER GROUP

(Please note that our name was prematurely published in PCC as South Florida, we are one and the same.)

Some Simple Port Circuits

The 8212 IC is an 8-bit latch with a special mode control circuit and tri-state outputs. With pin 2 (MD) of the 8212 connected to ground the IC will act as an input device with data loaded to the latch on the trailing edge of a positive pulse to pin 14 (STB).

Using the above input port circuit and connecting pin 23 (INT) to pin 13 of the connector bus a port with interrupt is created. When the interrupt is interrupted it will execute the 8-bit machine instruction on the bus after it has finished its program instruction. If you do not want a special interrupt system, have the interrupt will place a RST-7 instruction into the CPU.

The output port function is selected by connecting pin 2 (MD) to a logic one. The 8212 will be loaded with data from the bus when it is addressed by the computer thru pins 13 and 1.
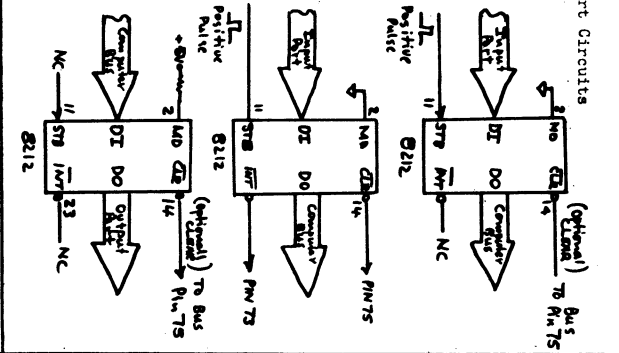
Dear Computer People:

Peoples Computer Company has been promoting programming in BASIC. Several companies have produced inexpensive microprocessor chips. One of these, Intel has made the Intel 8080 chip. Currently available versions of BASIC take 4 to 8k words of memory.

PCC is working on a TINY BASIC. It will be oriented to:

+ kids having fun
+ teaching BASIC
+ games
+ elementary school arithmetic
+ mathematical recreations
+ send us your ideas....

It will run on an Intelec 8/Mod 80 or an ALTAIR 8800. It will use 16 bit (double word) interger arithmetic. Its design will be public so that others may reorganize the I/O and mathematical subroutines for floating point. Specialized functions may be added by the user.

The proposed syntax and grammar for TINY BASIC is described in the PCC newspaper Vol 4 nos. 1 and 2. The design philosophy is to keep it simple and use as little memory as possible. Speed is sacrificed.

PCC would greatly appreciate any help and ideas. Sixteen bit (double-word) addition, subtraction, multiplication, division, decimal-binary and random number routines are needed.

Sincerely,

Bernard R. Greening

Dear Hal and John:

I would like to know if anybody else has these problems:

1. BUGS IN MARK-8:
   a. While not in Jam mode: interrupt momentary while a halt instruction is in the switch register, then turn Jam on, change the switch register to anything but the 3 halt instructions--in our Mark-8, this causes the 8008 to get out of halt and start running again, the instant the switch register is changed.
   b. If the 8008 waits about .4 seconds on an input instruction, this causes reg. B to be loaded from the value of reg. A before the input instruction about 90% of the time(after about 15 min. warmup); similarly, if 1.5 sec., then it loads D from B. Has anybody had trouble with registers being changed during an input instruction on the 8008?

2. Notes on other problems:
   a. 30A surge rated CROWBAR BLOWN before a 5A fuse, when 2 heat sinks touched, causing crowbar to get directly across large capacitor-- I measured the short circuit current with scope across .05 ohms-- about 80A.
   b. CROSSTALK IN TTL CIRCUITS: apparently few people are aware that you can get in trouble with using long wires in TTL circuits (remember Terry Ritter's 10-foot bus?), because changing current in one wire can induce a voltage in other wires (mutual inductance)--no coils as in a transformer necessary--all it takes is a "snarl" of 2-foot (more, or sometimes less, depending on number of wires, and current through them) and you've automatically got problems.

3. Techniques:
   a. HARDWARE MEMORY TEST: I've used a very simple method of testing memories-- without the need for good memories for the test program or even the 8008 in its socket--using a pulse generator/oscillator to run the Deposit signal via one of the external switch contacts. (555 short-proofed by resistor could be used.)
   b. SHORT CIRCUITS--I've developed a method to actually trace/track down them (not merely hunt over the entire board), based on a sensitive voltmeter (could use op-amp and vom).

4. I have working:
   a. HARDWARE: ASYNCHRONOUS I/O PORTS that automatically make the 8008/or device wait until the other is ready (up to the point where loss of data would be inevitable for an input device). With these ports, the program merely inputs, stores data in memory, loops back to input again (no delay loops),etc.--hardware automatically controls timing. These could be adapted to any computer that can be made to wait, and can also be used as normal ports (like on the original Mark-8). I have interfaced these to:
   i. Suding-compatiable tape interface with automatic hardware serial/ parallel conversion
   ii. Keyboard input interface
   iii. TVT-I output interface that runs 180 characters/sec. with an asynchronous queue element (FIFO) (=2 7475's,#7474,NAND gate, and R-C delay) or 120 characters/sec. without (i.e., using only latches/etc. data paths already present in Mark-8). This enables my loader/monitor to display any 128-byte halfpage in octal in 3 sec. These asynchronous ports are a later version of my circuit in issue 10,p41-43 of Micro-8 without the "speed limitation" mentioned there. The Mark-8 end of the circuit uses 3 or 4 gates (additional) for each I/O port converted to asynchronous mode and 2 IC's overhead--in addition to what is already in the Mark-8. The device end uses a flip-flop (usually #7474) to interface the asynchronous control signals, and whatever circuits are needed to synchronize with the I/O device's environment.
   A future version will allow more than 1 device to be used at the same time by allowing interrupts during the I/O wait, 1 or 2 other modes.

b. 8008 software stack routines that require no hardware modification and push, pop registers D through L at the expense of regs. A and B (could be modified slightly to push/pop any subset of C through L, or with 256 more memory bytes, destroy only 1 register)

c. monitor that allows the user to see what he is replacing as he types octal bytes in.

d. BCD,"BASE100" Addition,subtraction,conversion between each other and ASCII programs for 8008

Thomas R. Amoth
228 Fox Rd.
Media, Pa. 19063
ph:(215)566-1068
12/12/75

Sincerely yours,

Thomas R. Amoth

WILCOX ENTERPRISES
25 W 178 · 39TH ST
NAPERVILLE, ILL. 60540

11-8-75   312 357 3021

-CHANGES IN PRICE LIST OF 9-20-75

RS-232 connectors, 25 pins, male or female	each	4.50
8 conductor cable, 2 are heavy power leads, 50 feet		
with male RS-232 conn and case on each end (2 1/2 lb)		11.00
Jim Fry's 4K 2102 board, not drilled	POSTPAID	13.00
Roger Smith's Baudot to ASCII and ASCII to Baudot boards		
2 boards.		available 12/1/75
2102-1's as in 9-20-75 list, same discounts		2.25
1702A's as in 9-20-75 list		18.00

ADDITIONS
Connectors - Mated pairs	24 pins 1.00 ,	36 pins	2.00
8008-1 Intel - limited number			15.00

USE OF CREED TELETYPE WITH VARIOUS MICROCOMPUTER SYSTEMS

The hardware interface included with the Creed model 75 teletype
accepts TTL level signals and generates the correct signals to drive the
message and control solenoids that control the printer and paper punch,
as well as converting the keyboard switch outputs to TTL level signals.
Three TTL signals must be supplied for the printer, one to provide the
serial bit stream to send characters, one to enable or disable the printer
and one to enable or disable the punch. In some rare applications it may
be disirable to use two additional bits to control the message sender or
fast form feed function. The control bits must remain in the desired state,
i.e. they must be flip flop outputs rather than pulses off of a time shared bus.
Many microcomputer systems as supplied in their basic form do not have
input or output ports. An output port is a number of flip flops and control
circuits to load the flip flops from a time shared bus when an output
instruction is executed. An output port is a number of gates and control
circuitry which gates a number of signals from the external world onto a
time shared bus when an input instruction is executed.
In order to use the Creed teletype you must have at least three bits
on an output port and six bits (one if it is rewired for serial output from
the keyboard switches) of input port. For a number of systems as follows, I
can provide some basic information on implimenting input and output ports
if your system does not have them.

1. Mark 8 - This system came with input and output ports .

2. RGS   - I have drawings of input and output ports as actually used with
   a Creed.
3. Altair 8800 - Basic version does not have Input or Output ports. I can provide
   a drawing of a basic circuit to be built on a wire wrap board or other
   board of your choice, or you can buy I/O board from Altair or
   Processor Technology.

4. MIKE2 - Basic version does not come with Input or Output ports. I have a
   complete information package for building the required input and
   output ports and the Creed Interface on a MIKE2 breadboard. The
   package includes schematic, parts layout, wiring list and instructions.
   The design includes an 8 bit output port so that if desired the
   MIKE2 can be used with the Creed monitor in place of the MIKE 2
   console board and monitor. All that is then required for an
   operational system using the Creed monitor is a CPU board, a
   PROM/RAM board and a Breadboard with the Creed interface built
   on it. The information package is free on request to Creed owners,
   $1 to others.

NEWS RELEASE

MIKE 2 MANUAL

An extensive Manual has been prepared for the *MIKE 2* microcomputer

offered by Martin Research. Consisting of over 150 pages, the Manual

contains complete circuit diagrams and theory of operation for this 8008-

based computer. Included also are software listings for *MONITOR 8*, a

versatile operating system for the computer. Provided free of charge

with the *MIKE 2*, the Manual is also available separately for $25.00

(a certificate worth $15.00 towards purchase of a system is included).

modular micros ◄─ **martin research**

The *MIKE 2* microcomputer features a modular structure. A typical

system includes a calculator-type keyboard with six large LED digits; a

Monitor program in PROM, for easy program loading and debugging; and a

crystal-controlled CPU board. Computers start at under $400. An 8080

version, the *MIKE 3*, is also available. The system's bus structure i

compatible with these and other standard eight-bit μPs, meaning that

accessories--such as the 4K static RAM card--are interchangeable between

systems.

Available from the manufacturer and from Semiconductor Specialists.

Martin Research, 3336 Commercial Ave., Northbrook, IL 60062;

(312) 498-5060.

ENCLOSURES: MIKE 2 Manual; Catalog. More Information: Mr. Kerry Berland.

ANNOUNCING A NEW NEWSLETTER

A XEROX NEWSLETTER FOR SERIOUS
TINY BASIC IMPLEMENTORS. 3 ISSUES
FOR $3.00. CONTRIBUTIONS CHEERFULLY
ACCEPTED. (SEE PAGE 30 FOR MORE DATA).

New PCC Publications

HELP! (cried the Dragon)

I'm overwhelmed... too much information to stuff into PCC. Each issue could be all letters, or all games in BASIC,
or all machine language stuff about the ALTAIR, or stories about people using computers in schools, or listings of
interesting programs or circuit diagrams, or how to buy a personal computer, or energy stuff, or ...
And... people are sending us reams of paper about TINY BASIC.
And... for 13 years, I have been accumulating ideas about kids learning how to use computers. In one corner of our
office sits a big, clunky Xerox machine. Chug, chug, chug, it grinds out copies. Every day, I look at it quizzically, wondering
how to use it in some interesting and creative way.
So... we will crank up our Xerox and start (1) a newsletter called TINY BASIC and (2) a series of booklets called
COMPUTERS IN THE CLASSROOM.

TINY BASIC is about building your own BASIC and... maybe...it might
grow into a publication about learning how to build your own software
for the home/school/personal computer. We will publish ideas and software
in the public domain for anyone to use. TINY BASIC will be a sharing thing
with explicit permission to use the information in a non-commercial way.
We will start modestly, promising 3 issues over the next few months. Bernard
Greening is the editor of TINY BASIC with help from Dennis Allison and
whoever wants to help.

TINY BASIC, volume 1. Three issues for $3.
First issue: January 1976.

Send your $3.00 to TINY BASIC, P.O. Box 310, Menlo Park, Ca, 94025.

[And send us some TINY BASIC stuff to publish.]

COMPUTERS IN THE CLASSROOM will be a series of Xeroxed booklets,
mostly about BASIC. Learning BASIC, teaching BASIC, using BASIC at
school, at home, wherever. The first booklet is about BASIC in secondary
school math. Ideas, problems, games, listings of programs, sources of
information, workbook pages you can copy on your Xerox and hand out
to your students.

COMPUTERS IN THE CLASSROOM, Book I. Available Jan. 1976.
Xeroxed, 60 pages. $3.00
from PCC Bookstore

P.S. COMPUTERS IN THE CLASSROOM is the name of a University of
California extension course that LeRoy Finkel & Jerry Brown & I have
"taught" during the last 6 or 7 years at UC Berkeley, UC Davis, UC Riverside,
UC Santa Cruz, UC San Diego, UC Irvine, UC Santa Barbara. About 1000
elementary and secondary school teachers have mendered through these courses.

FIRST CLASS MAIL

ROBERT BAER
921 LINCOLN AVE.
PALO ALTO, CA
94301

MICRO-8 COMPUTER USER GROUP
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

David Schultz, RT #1 Box 396B El Rancho, Espanola, New Mexico 87532, asked us to publish
this paragraph from his latest letter: "I am currently working on a device which will
allow a microcomputer to generate continuous speech output. I am toying with the idea
of developing this into a marketable form (probably PC boards and/or a kit). However,
I don't know how many hobbyists would want a 'talking' computer. Would this be a use-
ful form of output? Is there much interest in such a device? Please drop me a note to
voice your opinion. If I don't get any response, I will assume that there is no inter-
est and will stick to a breadboard version for my own use."

I'm pleased to be able to mail out another news-
letter in less than a month. In searching for needs
that the newsletter can fill, rapid dissemination
of the chatter from participants regarding what is
going on has turned out to be the most important.
To that end, several changes will be made. 1)News-
letters will continue to be 12 pages as this one is
so they can be mailed out on a 10¢ stamp. 2) We
will try to mail out nine or more of these smaller
issues, depending on the final number of partici-
pants and costs. Two small issues cost a little more
than one big one but I can get them out faster by
keeping them small. 3) I'll try to reduce the in-
terval from one copy every one and a half months to
more like one every three to four weeks. 4) Polish
will be sacrificed for speed. Byte, 73, and Inter-
face can provide the gloss and the heavy technical
stuff, and we'll continue to print your cards and
letters. Please share your experiences with the
rest of us. It will really speed the printing pro-
cess if you can type your letter as you would like
it to appear, and squeeze all the white space out
of it. It doesn't cost any more to print black
than white.
Thanks. Hope to hear from you.

HAL SINGER

News from the
the digital group

January 10, 1976   **po box 6528, denver, colorado 80206**

The Clearinghouse. The Clearinghouse is in a holding pattern for
a few more weeks. The order rate on our systems even without advertising
was more than we expected and we could not spare the people to get
the Clearinghouse produced. There is also some contention among Group
members to shut down the Clearinghouse and refund everyone's money
which would be far and away the easiest solution. However, I still
believe that it can serve a very useful purpose. Meanwhile, we have
been lining up two people to handle it on a consistant basis. As soon
as that is accomplished we will fire it up again and keep it rolling.
Should these people fall out then we will give up and mail back the
money.

On to much better news. The Digital Group Systems are off and running.
Including delivery. We have shipped all the local 8080 orders and
will continue to work the 8080 backlog on all other orders. We will
soon be reaching the 100 systems shipped mark and are very close to
remaining within our "off-the-shelf to 3 weeks" target on everything.
The new TV Readout is extremely successful and is shipping (until last
week) at about a 50/month rate. Memories passed the 100 mark long ago.
The major hangup we have always run up against has been documentation
production. But we're getting a lot smarter about it. The 6500/6800
systems CPU cards will begin shipment next week as Dr. Suding has
finished the last part of the systems manual.

Software. Joe Cimmino has had one of our systems (8080) up for about
2 months and is actively engaged in demonstrating and selling them
on the east coast. I was able to hand deliver him his system early
as IBM sent me to a class in Washington DC. He has been able to
accomplish a number of things with the system in very short order.
The first announceable product is the Video-based Monitor-80. He
took a copy of the package from Robert Swartz (with his permission)
and converted and enhanced it in less than a week. The kid is fast
and good. Even impressed Robert Suding (which can be a challenge).
We will send you a copy as soon as we announce. Remind me if I forget.
A number of BASIC's and Assemblers, etc. are in the works but there
are no details until we get a little closer to announcement. The
software area should soon turn into one of the Digital Group's major
strong points.

Color Graphics. We have been sitting on 25 kits for color graphics
since November. However, Robert and everyone else has been completely
buried in order to get the systems out the door so we were unable to
produce any software for it that was meaningful. Robert Swartz got
ahold of his color graphics board in December and immediately began
telling us that it would not work with his system. We couldn't believe
it. He finally discovered that his system had an inoperative port on
it that was causing all the trouble. He is now putting a number of
versions of color Life on his systems. And now that Robert is some-
what unburied, he has also been able to get Life running on his system
in both black and white and color. Very pretty.

Phi-Deck. The Economy Co. (which produces the Phi-Deck) sent their
lead engineer (Jack Breimeir) to Denver for the full dog & pony show.
I'm afraid we may have overwhelmed him. The demonstration of course
included a demonstration of the production model of the Phi-Deck
controller. 300 characters per second with a fully operational
operating system. Give it a block number and it will give you back
your data within 20 seconds on a random basis (avg = 11 seconds).
There are flys in the ointment however. The first is that the Economy
company cannot deliver the deck as quickly as we would like. They
have an improved version which we are insisting on which we cannot
obtain in production quantities until mid-February at the earliest.

I guess I better explain a few more of the details. The standard
Phi-Deck is a folded-metal deck that has severe mechanical problems.
These problems are very significant when you wish to interchange
cassettes between drives (a reasonable thing to want to do) as they
effect cassette/head positioning. In other words, the error rate
for soft errors drops from 1 bit in 10^8 to around 1 bit in 10^3 when
cassettes are written on one drive and read on another. The error
rate is fair if cassettes are restricted to a single drive - therefore
the guys who have the original drive will still get some use out of
it. The Economy company has redesigned the drive and gone to a
cast-metal headbar which greatly helps to alleviate the problem.
The capstan is now much thicker and dosen't bend. Heavier parts
were used everywhere required. Etc. etc. The catch is all these
improvements are not yet in quantity production. So we wait. As
usual, we will not announce until we are assured that we can deliver.
And that means in this case we must have our initial shipment of
decks in our hands or be satisfied that they will soon be there.
(Really is a neat system though!)

ICs are checked faster with audible voltmeter

By Thomas F. Piatkowski

Dartmouth College, Hanover, N.H.
From Electronics Magazine
Date Unknown

Ears are sometimes more useful than eyes in mak-
ing electrical measurements. As an example, proper
voltage levels in microcircuits can be checked
faster using an audible voltmeter. A unijunction
transistor discharges periodically through a speaker
providing the audible output. The higher the input
voltage is to the voltmeter, the higher will be the
audio frequency out. The circuit was built to check
and debug DTL and TTL logic circuits where visual
readout is inconvenient.

The measured positive voltage is applied at E_1.
The high-impedance voltage divider, R_2, is adjusted
so that the maximum expected input voltage places
about 1 volt at the gate of the field effect transistor,
ensuring its operation in the linear region. Emitter
followers Q_2 and Q_3 keep points A and B at about
the same potential while letting negligible current
flow through the load resistor R_3. The UJT is dis-
charged through the speaker with a period deter-
mined by R_4, C, the supply voltage V, and the UJT's
intrinsic standoff ratio.
The adjustable resistors R_2, R_3, and R_4 allow this
circuit to operate over a wide range of input volt-
ages and output frequencies. R_1 biases Q_1 nega-
tively if E_1 is an open circuit causing a lower out-
put frequency than would occur for a positive E_1.
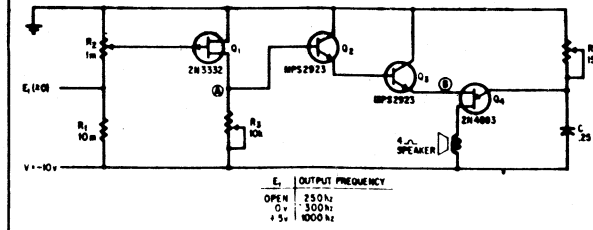
Sounding the alarm. Q is biased to operate in it's linear region. Q₂ and Q₃ maintain points A and B at
about the same potential while diverting negligible current from load resistor R₃. Q₄ discharges through the
speaker, sounding the audible voltmeter

The following letter was mailed to the Micro-8 Computer User Group,
Cabrillo Computer Center, by Special Delivery, with a MITS Inc.,
PO Box 8636, Albuquerque, NM 87108 return address. Although Bill
Gates' comments are well taken, it does not seem to be the most pro-
ductive way to carry this message. Rumor mill reports suggested
that original development work was done on a university time share
computer, and that there was some question as to the propriety of
selling the results, if not the legality. With receipt of this let-
ter, it seems appropriate to ask MITS to include full details on the
development and acquisition of ALTAIR BASIC, so these rumors can be
set to rest. A letter requesting this information has been mailed
to MITS.

An Open Letter to Hobbyists

To me, the most critical thing in the hobby market right now
is the lack of good software courses, books and software itself.
Without good software and an owner who understands programming, a
hobby computer is wasted. Will quality software be written for the
hobby market?

Almost a year ago, Paul Allen and myself, expecting the hobby
market to expand, hired Monte Davidoff and developed Altair BASIC.
Though the initial work took only two months, the three of us have
spent most of the last year documenting, improving and adding fea-
tures to BASIC. Now we have 4K, 8K, EXTENDED, ROM and DISK BASIC.
The value of the computer time we have used exceeds $40,000.

The feedback we have gotten from the hundreds of people who
say they are using BASIC has all been positive. Two surprising
things are apparent, however. 1) Most of these "users" never bought
BASIC (less than 10% of all Altair owners have bought BASIC), and
2) The amount of royalties we have received from sales to hobbyists
makes the time spent on Altair BASIC worth less than $2 an hour.

Why is this? As the majority of hobbyists must be aware, most
of you steal your software. Hardware must be paid for, but soft-
ware is something to share. Who cares if the people who worked on
it get paid?

Is this fair? One thing you don't do by stealing software is
get back at MITS for some problem you may have had. MITS doesn't
make money selling software. The royalty paid to us, the manual,
the tape and the overhead make it a break-even operation. One thing
you do do is prevent good software from being written. Who can af-
ford to do professional work for nothing? What hobbyist can put
3-man years into programming, finding all bugs, documenting his pro-
duct and distribute for free? The fact is, no one besides us has
invested a lot of money in hobby software. We have written 6800
BASIC, and are writing 8080 APL and 6800 APL, but there is very lit-
tle incentive to make this software available to hobbyists. Most
directly, the thing you do is theft.

What about the guys who re-sell Altair BASIC, aren't they mak-
ing money on hobby software? Yes, but those who have been reported
to us may lose in the end. They are the ones who give hobbyists a
bad name, and should be kicked out of any club meeting they show up
at.

I would appreciate letters from any one who wants to pay up, or
has a suggestion or comment. Just write me at 1180 Alvarado SE, #114,
Albuquerque, New Mexico, 87108. Nothing would please me more than
being able to hire ten programmers and deluge the hobby market with
good software.

February 3, 1976

Bill Gates
General Partner, Micro-Soft

February 2, 1976

Dear Hal;

I beleive I sent you a copy of OVERMODULATION the newsletter published by the Poinsettia Amateur Radio Club. In case I didn't I am enclosing a copy of the relevant page. You are welcome to reprint it but credit should be given to OVERMODULATION.

I am almost finished with the first pass read of the back issues of the micro-8 newsletter. You've got more data per square inch than any publication I've ever seen. My input buffers got completely clogged and I wasn't any good for a couple of weeks while reading them until I got smart and started reading less at a sitting. Thats a dangerous NL. Seriously, I would be very unhappy if you decide to cease publishing especially since I just found it.

SUPPLIERS

I have gotten very good service from James Electronics and poly paks; slow but reliable from Ancrona; and terrible from Lafayette.

MY SYSTEM

I have an Altair 8800 (the only way to go) with 8k, parallel I/O, Altair casette, TVT-2, and an el cheapo cassette recorder by Webcor (about $30) which seems fairly reliable (I can't load Altair 8k Basic but have no errors with any other tape either my own or Altairs). I also have a Model 15 Teletype (Baudot), and a small plotter which I hope to interface. I need information on a Clare/Pendar keyboard 97564 7106 700610-K15 sin 2866A or at least on the encoder chip which is labeled SO77D-6 G 7116

I was hopeing to use the system thru the Amateur Radio to other similar computers but the FCC quashed that. I am a professional programer and I am more interested in developing software than in playing with hardware. I hope to develope higher level languages, operating systems, advanced games etc. My first projects will probably be limited operating systems and Amateur Radio related programs. I have my own code generation program running which is unique in that it requires only one word for each character in the morse code table yet it allows all letters, numbers, punctuation, and up to 32 special codes. I hope to write a program to receive morse code and others to send and receive RTTY (Baudot code).

TAPE DATA FORMATS

I suggest that any standard tape format require a file name, say up to 17 characters, the location in memory at which it is to start, the length of the file, and provision for checksum or parity words. This way all the necessary information is included in the tape file and no auxiliary papers must be kept except possibly a listing of program names in the library and the starting address on the tape so the computer doesn't have to read the whole tape to find a particular program.
It might also be worthwhile to include in the tape an ASCII comments section describing the program but which section need not be put in memory when loading the tape. I expect a loader to load this sort of file could be written in well under 256 words and committed to PROM.

Well I guess I've run dry for now. Keep up the good work.

Phone (805) 486-8087

Amateur Radio - 2 Meter FM
Moniter 14.28-146.88
Sulfur Mountain Repeater

Sincerely,
Glen Charnock WB6JAM
560 W. Gonzales Rd. #22
Oxnard, Calif. 93030

Reprinted from OVERMODULATION, the newsletter published by the Poinsettia Amateur Radio Club and edited by Glen Charnock.

COMPUTERS

You may remember that Dave WB6DHW and I had great plans for interfacing our computers through our amateur radios so that the two computers could talk to each other thus facilitating the exchange of information and programs and allowing the use of both machines to attack problems too large for one machine. Unfortunately we're going to have to scrap some of these plans because of the stand of the FCC as expressed in the following letter dated January 13, 1976.

Dear Mr. Charnock:

This is in reply to your letter dated September 27, 1975. The delay in responding to your letter is due to the enormous increase in CB applications and correspondence received in this office. Please accept our apologies for the delay.

You indicate a desire to use microcomputers in conjunction with amateur radio stations so that "two computers could communicate through the radio link." We fully appreciate the significance of your proposal, however, the purpose of the amateur service is to provide a hobby radio service to amateur licensees rather than an operational, over-the-air computer service. Section 97.1(b) of the rules sets forth the principle of continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art. Please note that there is a definite distinction between advancement of the radio art and advancement of the computer art. Accordingly, the interconnection of an amateur radio station with a computer would not be within the scope of the basis and purpose of the Amateur Radio Service.

Of course, computer technology may be employed to assist amateurs in connection with their radio hobby provided computer data is not transmitted over the air on amateur frequencies via a computer-transmitter interconnection.

Section 97.69(a) of the Commission's Rules presently restricts teleprinter emissions to the use of the International Telegraphic Alphabet No. 2 single channel five-unit (start-stop) teleprinter code. The use of the ASCII 8 unit code is presently prohibited. Also the amateur Rules presently does not provide for the transmissionof A9 or F9 emission types.

The Commission is presently considering the initiation of a Rule Making Proceeding to relax the emission limitations in the Amateur Radio Service. We encourage you to file written comments to this proceeding when it is released to the public.

Your interest in the Amateur Radio Service is appreciated.

Sincerely yours,

John B. Jolute
for Charles A. Higginbotham
Chief, Safety and Special
Radio Service Bureau
****

VENTURA COUNTY COMPUTER CLUB

The first meeting of the VCCC was a big success. We had over 40 people show up. 2 systems were up and running on display, and the Oxnard Press Courier sent a photographer. There seemed to be no doubt that we will form a club though there was considerable discussion about whether to affiliate with the SCCS (Southern California Computer Society). This question has been referred to a committee for study and a mailing will be made next month to all who signed the check-in sheet. If you would like to be placed on the roll, send 50¢ (to cover mailing and copying costs) to Eric Strohbehn 4409 Vinyard Ave, Oxnard, Ca. 93030. Information is also available from John Borders weeknights after 6 pm at 985-1631. We have not yet decided on an official structure and no officers were elected. The next meeting will be Saturday February 28 at the Oxnard Community Center, 800 Hobson Way in Oxnard.

Page 2 *********************

AMATEUR COMPUTER CONVENTION on MAY 2nd

The first Convention of Amateur Computer Hobbyists will be held on Sunday May 2nd, 1976, at Trenton State College, Trenton New Jersey. Called the "TRENTON COMPUTER FESTIVAL", it will include: a convention of amateur computer clubs, technical talks related to home computing, door prize contests, demonstrations by computer amateurs and groups, program duplication service, manufacturers booths and seminars, and a flea market area for swapping and selling of components by amateurs.

The Festival is sponsored by the Amateur Computer Group of New Jersey(the largest such group in the east with over 160 members) and Trenton State College.

The amateur computer hobby is off and growing at a phenominal pace. It is anticipated that over 1,000 amateur computer enthusiasts will attend this first convention.

For more information contact:

Prof. Sol Libes(President ACG-NJ)
Union County Technical Institute
Scotch Plains NJ 07076
201-889-2000 x247
201-277-2063(eve)

or:

Dr. Allen Katz
Trenton State College
Trenton NJ 08625
609-771-2487
609-443-3184(eve)

NOTE TO MAGAZINES: Magazines furnishing publicity for festival will be furnished *** at no charge *** a table and booth space for soliciting magazine subscribers. This offer is good until March 1, 1976. Contact sources above to register for this.

Thank you for the reprint of the MIL cassette interface. I have the system running on the 8008 and 8080. I plan to make other cpu boards to run other 8 bit microprocessors in the same system. This interface will save a lot of paper tape.

Sincerely,

David Gillespie

1331 North Lotta Drive
Los Angeles, California
90063

Leon A. Streng, 5213 N. 16th St., Philadelphia, PA 19141 has an Altair 8800 with 4K, audio cassette interface, and a home made octal keybd. He is saving money to buy another 4K and BASIC from MITS. He picked up 2 flexo-writers which he hope to interface, and is interested in developing a home control system (temp., security, fire, etc.).
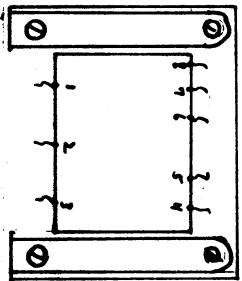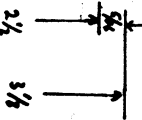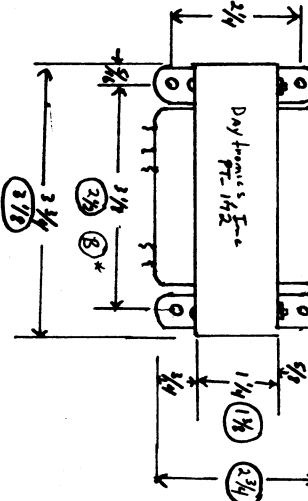
Paul Potter Reinhardt II, 352 Pheasant Run Circle, Apt. 6, Ann Arbor, MI 48104 sent the following modifications to MIT's Octal Keyboard that is cheaper and more reliable because of a reduction in the number of chips.

KEYSTROBE=K

$ONE SHOT = f(K)$

$COUNT = f(Q)$

$SELECT = f(\overline{C})$

$INT = f(S)$

$f(Q,\overline{C},S)$

LATCH SELECT

$f(Q,\overline{C},S)$

X = Key depressed
Y = Key down and data valid
Z = Key released
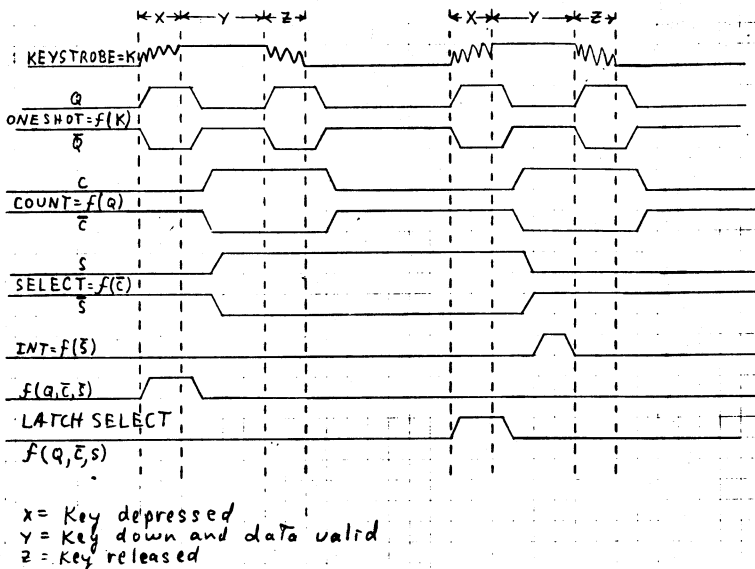
Editors of the Micro-8 NL
2377 Dalworth 157
Grand Prairie, Tx. 75050
Jan. 27, 76

In a previous letter I indicated that I had come across a Daytronic Inc transformer that might be used as a replacement for the Altair 8800 5 volt transformer to eliminate some of the limitations not inherent in the system. The following is additional data which is incomplete but may be enough to let a transformer expert say if it is a valid re-placement.
I wrote Daytronics and received a spec sheet which I have redrawn and attached. The information is sketchy like do you remember how to figure voltages and currents from wire sizes. I didn't so I took it to an 'old time transformer designer.
With a few assumptions, like not knowing the core material or the exact measurements of the core size, he was able to give this amount of data. Since I lost his scratch pad and hardly could read them anyway this is what I remember.
Assuming a 110 volt input, the output voltage will be 9.3 based upon ITT Radio Handbook formula.

$$E_s = \frac{Ns \times Ep}{Np \times 1.05}$$

Ns = sec. turns   Ep = pri. volt.
Np = pri. turns   Es = sec. volt.
1.05 is a cookbook constant to allow for a 5% IR loss.
After some fast shuffling thru wire gage tables and flipping terms around like ohms per sq. meter etc., he figured the secondary would put out about 17.5 amps without any problem. He went on to figure the characteris-tics of the other secondary, but I didn't pay attention, since I was inter-ested in the first secondary. Anyway, it puts about 2 ma. not much use except special regulation.
Anyway, he went on to say that normal design practice is to design for 70% of the input current capability which would be 17.5 x .70 = 9.4 amps.
Considering the power supply which contained the transformer was designed for 5v at 10 amps and rough calculations, the figures don't look that far off.
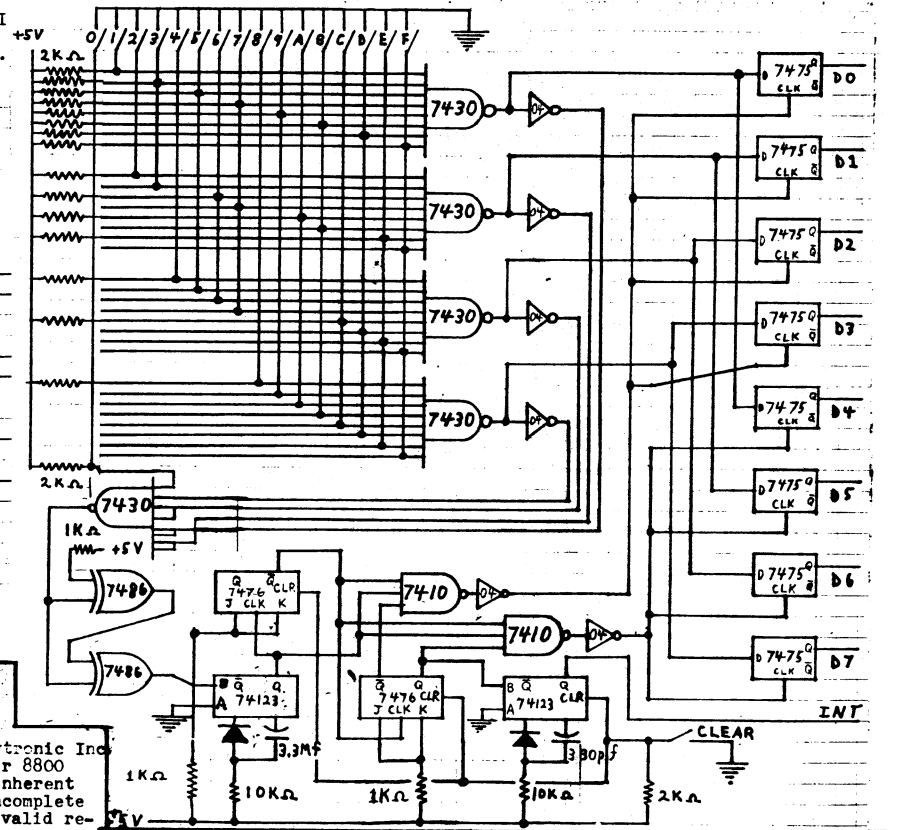
The physical dimensions are very nearly the same as the Altair transformer. See sketch. Included are all the other information contained on the spec sheet I received. Perhaps someone in Cal. (Mountain View) could call Daytronics and find out for sure the above values and see if any are for sale.
I've been told power supplies are easy to design, but I smoke tested too many to be confident enough all you have to do is trade out transformers. I don't have a schematic of the supply that used the transformer, but it does use a couple of 31,000 uf, 15 volt capacitors. MITS uses 4 3900 uf, 16 volts capacitors or 13,200 uf total. Any power supply expert want to volunteer his services?

Pax,
Bill Fuller
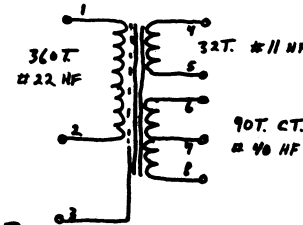
Page 3

CORE
S4 STK EI-125
BOBBIN WOUND
INTERLEAVE 2X2

MAX 2⅝" across core

Dear John and Hal:

I really appreciate it that the newsletter is being continued. The Newsletter is the only excellent source of information for the 8008 microcomputers and I could not have made it without the helpful information I obtained from reading it.

I have a Mark-8 up and running with 8 K memory, total keyboard control, TVT 1 video output, Suding Cassette interface program in two 8223 Roms, and TCH cassette interface and prom. The computer is controlled by the Scelbi Monitor with modifications. (I might add that this is a very good monitor for the 8008 systems.)

I have a complete ASR model 32 Teletype. I am working on an interface and a program for ASCII ---Baudot Conversion. These should be completed in approximately two weeks.

A money order is enclosed for six dollars to continue my subscription. Thanks for everything and keep up the superb work.

Sincerely,

Charles A. Lewis EET
3435 Woodmar Court
West Lafayette, In. 47906

Charles A. Lewis EET

P.S. I have 1 K 1101 memory board with chips for sale or trade.

Thank you and good luck on the Group.

Dave Beetle

I would appreciate any help that you might give in alerting members of the Micro-8 User Group to this publication. I will send a free sample issue to any interested party on request.

Sincerely,

Dear Hal,

Enclosed are several copies on the announcement of ON LINE, a classified advertising newsletter for computer hobbyists.

Micro-8 User Group Newsletter
Hal Singer, Editor
Cabrillo Computer Center, Cabrillo HS
Lompoc, CA 93436

(K3R2G/2)

Mark W. Baker
Mark W. Baker 4R
New York, N.Y. 10025

Enclosed is my check for Vol. 2. Thank you and your students for this wonderful resources.

Peaceful computing,

Well, that's my vision, parts of which, anyway, I plan to implement. More immediately, my plan for my machine is to turn it into an "intelligent" terminal so I can call up some smart ones—and maybe learn something.

Micro Processors Unlimited

provides THE BEST Microcomputer Course
January 11, 1976

Gentlemen:

1. Please continue your publication; please by all means!

2. Enclosed please find a flyer on our new local club. We would appreciate it if you could publish all or part of same.

3. As soon as the club doubles in size we will split it into two chapters, at least: one for Washington, DC vicinity, and one for Baltimore vicinity.

4. I am especially proud of the club's initial meeting as I personally formed it by mailing out the flyers, etc. Our first meeting had 100 people! It was A-ok and damned exciting.

5. If anyone is interested in our club, please call me on weekends.

Thank you for you help, sincerely,

John R. Gilchrist

P.S. Algorithm for the club = Second Wednesday every month.

Contact: John Gilcrest, PO Box 1087, Glen Burnie, MD 21061 weekends (301)761-5864 or Philip Hisley, 236 St. David Ct., X4, Cockeysville, MD 21030 (301)667-9690

Capt Trent Eyler, 936 Belmont Dr., Biloxi, Miss. 39532 - (601)374-1353 says that the Digital Group System appears to be the best deal, but would appreciate opinions from others.

Wayne Splawn, 1680 S.E. Second Place, Gresham, Ore. 97030 sent in $6.50 for Vol. 2 of the Newsletter. He says unbiased opinions are hard to come by now that more commercialization has come into being in the hobby field.

Malcolm T. Wright, 366 W. Olive Ave, Apt 6, Sunnyvale, Ca 94086 enclosed a copy of the Micro-Loader/Monitor he is using on his Altair 8800, which is available in PROM from Solid State Music.

Dr. Mark Sebern, 36 Wedgewood Rd, Stow, Ma 01775, Director of Ultra Low Cost Systems Development for Digital Equipment Corp., renewed for Vol. 2 of the NL.

During the development of BEISC MARC I (Barker Research Information System & Catalog, Multiple-Access Retrieval Configuration, #1, as I pretentiously dubbed it), my biggest difficulty was the classification/cross-indexing scheme. At first, I tried to devise one based on the Dewey Decimal Classification. I began using the abridged edition (Edition 10), but ultimately moved to the unabridged version (by this time, Edition 18 was off the presses) for its greater topical depth. The books of schedules, for those who may be interested, are published by Forest Press, Inc. of Lake Placid Club Education Foundation, 85 Watervliet Avenue, Albany, N. Y. 12206. I chose Dewey for several reasons: I was familiar with it; only numerals are used (letters very occasionally); despite its many structural short-comings, especially in technological subjects, it covers topics with sufficient depth; and it was a lot cheaper than the Library of Congress schedules.

I tried to keep cross-indexing to a minimum, but it is inadequate in any case. That is the biggest problem with MARC I. As I fantasized, even then, a computer could lead to a solution. I imagined some sort of partially computerized version, MARC II, which would "solve" those problems. And MARC III would be a fantastic combination of hardware and software which would not only locate information but would display it as well. The New York Times information system beat me to it technologically—but their system has me beat economically.

Page 4

For years I had pushed bits and bytes around in 'number-crunchers', wishing fervently to possess my own computing resources for personal gaming and simulation -- but in those days (the crush of technology makes last month antiquity) it cost a mega-buck or a surreptitious entry in the program library with a suitably business-like catalog name.

Then came the Intel 4004 and 8008, and computer construction articles in electronics magazines. I rejoiced! No longer would I have to go it alone, wondering where everyone else was; the movement, however, still remained pretty much underground. The technology was there, but it was difficult getting a hook into it.

Then came Scelbi and MITS and Byte Magazine; one day, early in December 1975, John Bird, an associate professor of electronics at the Community College of Baltimore, mentioned to me that a fellow by the name of John Gilchrist was sponsoring an open seminar on microprocessors. The meeting WAS and we ARE -- the CHESAPEAKE MICROCOMPUTER CLUB, INC., the evolutionary end-product of that meeting.

Thirty participants were expected; more than one hundred attended. In the course of the evening presentations were given on PROMs, the Mostek F8 uP, the Intel 8080 uP, the Altair systems, and a system being offered by the Digital Group. The enthusiasm and response was overwhelming. Since the first meeting a group of volunteers have drafted articles of incorporation and by-laws, giving the organization form and a flexible structure within which to operate.

The main function of the Chesapeake Microcomputer Club is to provide a forum for COMMUNICATION -- vital in a field which deals with the processing and manipulation of information. I know of a fellow in the Mathematics Department at Towson State College who is developing an interface between an Altair 8800 and a Selectric typewriter; at the first meeting of the organization I found at least three persons doing the same thing.

Are you into gaming, hardware development, software development, have an idea, perhaps a problem, or maybe just an interest? The resources are now at hand, and you are a part of those resources -- won't you join us!!

My first software project will be to write a more complete assembler. After that I hope to work on a series of compilers, gradually bootstrapping into a full-fledged PL/M-type compiler. Once that is implemented, the sky's the limit -- imagine the programs operating systems, information retrieval systems, ... other compilers. But I do have some plans as well.

In late October, 1975, I called Doug Hancey of the Sphere Corporation and placed my order for their "SYS-2" after a ten or fifteen minute discussion with him. (I was convinced before I called, but I had to assure myself they were for real.) After getting a loan from my credit union, I sent off the check, and began my long, anxious wait for the machine. My fantasies and dreams haven't stopped growing. But I do have some plans as well.

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DIV.

of
Service Dynamics Inc.

P. O. BOX 445 PERU, IND. 46970

TEL. 317/472-2126

A. L. ST. CLAIR
PRESIDENT

PAUL D. BUROKER
VICE PRESIDENT

Gentlemen;

I received your sample copies of your newsletter and I am enclosing
a check for $ 12.00 to cover your expenses plus a little extra to
cover someone else. I want to thank you for your efforts in putting
together this newsletter and above all do not stop it. Your main
problem in obtaining new subscribers is public relations. For the
last month or longer I have been searching for micro-computer
publications that have circuits, tips for the builder, etc. that
would provide good reading without getting too technical. When I
saw the very small blurb about your group in the recent issue of
P.E. I was stabbing in the dark to locate someone who could give
me enough information about equipment and publications as to where
I could write. I had contacted engineering libraries, local and
at Ft.Wayne Ind. but nobody had any info. Do not be afraid that
your newsletter will lose it's punch to the local groups, because
local groups in this area are far between , in fact I doubt that
there is 30 people in the state of Indiana close enough to make a
viable club and even then, the news would be old hat. It will
be the input from all over the country and our friends north of the
border that will make the publication grow.

Public relations is the key: The young people interested in electronics
and getting into computers have to be informed about the clubs
in their areas and the publications available otherwise it will
be years before you see a real growth. I have been busy calling
around our area to the vocational schools, high schools, etc.
giving them your address and also where to write to obtain packets
on circuits that is available through Mr. Delp   that could be
used in electronics class. I have had a tremendous response from
the area schools, all interested in the publications and packets
available from the professionals and the hobbyists that could be
intergrated into their courses. Just a little P.R. and away it
goes.

My interest in micro-computers is to develop teaching devices with
the capability of analysis of the answers; restricting the student
from moving on to the next training segment before the correct
answer is given to the previous questions. Programmed instruction
is the term used for this type of training method.

The size of the final prototype would be similar to the unit
being advertised from Sphere Corp.(micro-Sphere 200) however,
the micro-computer I need would have the graphics capability,
Cassette memory feed, full keyboard(73 keys) with math entry
to ± 127 scientific notation min. 32 characters per line min.,
16-8 lines single height or double height characters,programable
from the cassette according to the function it has to perform.

If anyone is interested in working with our Co. to develop such
hardware for a profit or has such a device in the mill,let us
know. Education and bringing better meaning to our lives is
one of our philosophies that we founded our company on. We have
currently designed the Career Guidance Systems(Copyright 1975)
plus developed the TV Shopper System for C.A.TV cable systems.
Effective communications is our moto and by developing services
and equipment that can better communicate ideas and products
plus the available services to serve the people;we have provided
another essential link in the chain of effective communications.

"The most brilliant of ideas are totally without value, until
they are successfully communicated to others."

Eoough of the "Philosophies". Please publish a list of the publications
available with address and a brief description of content plus
any technical application manuals available on TTL logic,

---

micro-processers, etc. that is of a practical nature and not of
a total High engineering nature that you can't understand unless
you have had five years of electrical engineering.

Thanks for the time and keep up the work.

Send info to: Sincerely,

Paul D. Buroker   Paul D. Buroker C.E.T.
Tele-Communications Div.   V. President
Service Dynamics Inc.
263 West 5th. Street
Peru, Indiana 46970
A 317-472-2126

►◉ SMITH ENTERPRISES ◉◄

4502 E. Nancy Ln.   Phoenix, Az. 85040

Dear Hobbyist,   Jan. 22, 1976

IT'S TRUE-- after months of waiting, my ASCII to
Baudot and Baudot to ASCII articles will be in the
March and April issues of Radio-Electronics!

Better yet -- the boards and kits will be avail-
able Feb. 1!! The ASCII to Baudot kit is $24.50 and the
Baudot to ASCII kit is $19.50 from Southwest Technical
Products Co., 219 W. Rhapsody, San Antonio, Texas 78216.
Either P.C. board by itself is $4.35.

Both kits will need a few additional parts if you
want to put the board in a TV Typewriter (either TVT I
or the CT-1024). No additional parts are needed if
you mount the board in your computer. Of course, you
will need solenoid drivers to interface your TTY (several
methods are shown in the instructions).

If you should have any troubles programming your
computer to handle the TTY, send me a S.A.S.E. and I'll
send a listing of my program.   Sincerely,

Good luck with your TTY!

Roger L. Smith

PS: There was a minor (but important) change to the
ASCII to Baudot circuit in November. Check the
article. The connection to IC2 pin 3 was changed.

I would definately like to hear more on the subject of
computer conferencing mentioned by David Christianson
in issue #12 volume 1. Is it at all conceivable that the
Micro-8 Newsletter could move in this direction?

Sincerely,

Gary Fox   384 East 194th Street, 2M
                             Bronx, New York 10458
                             JAUUARY 28, 1976

Page 5

I would like to commend you on your efforts with the NL
I receive several hobby publications - TCH, TDG, BYTE,
RE, and the NL - and while they all have their merits,
it is definitely the case that the NL stands unique.
In an age where so many people are concerned about
"computer dehumanization" of life, your highly personal
approach is refreshing and most welcome. Basically,
I'm in agreement with the remarks of Sol Libes whose
letter you published in V2#1.

A few words about myself, Professionally, I'm an
engineer/programmer employed at the University of
Connecticut. I work on a NOVA 2 computer with 32k
of core, disk, line printer, A-D/D-A, graphics scope,
XY tablet, and a speech synthesizer. I build interface
equipment and do systems and applications programming.

I haven't yet taken the plunge into building my own
home computer. One reason, I guess, is that I have
access to such a nice system at work. And then there
are the old bugaboos of time and money. Nonetheless,
I hope to begin a system sometime this year. I don't
know which microprocessor it'll be, at this point I'd
choose either the MOS Technology 6502 or National's
PACE. I plan to have both floppy disk and cassette
and a graphics display. My primary interests in using
the system are graphics and games.

In the meantime, I enjoy keeping up with the action,
and the NL is a big part of that.

Sincerely,

386 Browns Rd.
Storrs, Ct. 05268
27 Jan. 76

Tim Rand

Bob Wallace, designer
PO Box 5415, Seattle, Wa. 98105
December 30, 1975

Gentlepeople,

The first issue of Comindex, a directory of information and people involved
with computer alternatives, is in this issue of "Rain". I realize it's long
overdue, but I have collected much good information, and hope to get more of it
out in the future. The material in Comindex focuses on community and communi-
cations uses of computers. Orginally, it was to include a computer hobbyist
directory, a great idea, but one needing more time than I have available. The
material selected includes papers, magazines, projects, and organizations active
in fields such as community memory, conferencing, grass-roots networking, and
utilities for social change groups. Computer hobbyist info, computers in docu-
mentation and in art, privacy, and other issues are included to some extent.

Comindex is sent to subscribers, and selected magazines and individuals.
Subscriptions are $2.00 for issues one through four (this is issue one). Issue
two will be out in two to six months.

Some news - the Journal of Community Communications will have its second
issue soon; it costs a dollar from LGC Engineering, 1807 Delaware St., Berkeley,
Calif. 94703. It focuses in pretty much the same areas as Comindex. A Seattle
area amateur computer club is being formed; first meeting is January 12, 1976
at 7 pm, at 1531 NE 63rd Street. Call 524-6359 for more information (11am to 5pm
"Rain" magazine is highly recommended; as you can see, it contains much good
information on appropriate technology.

Bob Wallace

New World
Computer
Services, Inc.

I feel compelled to write and contribute something to your excellent newsletter. I am an electrical engineering student at the University of California at Davis with a major in Computer Science. My own system consists of an Altair 8800 with 10k of static RAM and 8k of ROM containing the PT ALS-8 and simulator packages. I have an ASR-33 TTY hooked into a PT 3P+S, a non-functional SWTP TVT-II, a PT VDM with monitor, several Clare-Pendar keyboards, and various assorted goodies too numerous to mention. My room-mate here is a software nut; I'm into hardware, and together we're almost compatible.

I would like to throw in some comments on varied subjects, so here goes:

1) The PT 3P+S is an excellent board of superb quality, and I highly recommend it. The documentation on it can stand some improvement in the section dealing with status bit selection for the ports, but the guys down at Berkeley assure me that they are working on it.

2) My TVT-II has never worked but I hope that with diligence and time (I have little of it these days) I can get it going. I will then sell it as quickly as possible. My advice is simple; don't get one. Several people I've talked to here have had problems with the sync circuits. Their power supply constantly fails at the crucial moment, and every main board I've seen has had at least one small hole that was not plated through. The PT VDM is a better deal for the money any day.

3) the Clare-Pendar keyboards are fine as long as the ROM holds up. Some boards have bit problems while others have troubles with the strobe line. These can all be traced back to the ROM. This ROM is a TI TMS-5000 which was made only for the keyboard supplier and is not available for replacement. If you're lucky you can usually get around the problem by hooking up a 7430 to the ROM inputs and generating your own strobe pulse, or hooking the nand gate to the data lines to generate a missing bit.

4) I hope to write an article for BYTE on a computer-controlled burglar alarm system. I feel that such a system could have definite merrits. Any Ideas?

5) I am subscribing to the following letters of magazines: Micro-8 NL, The Digital Group NL and Clearinghouse, The Computer Hobbyist, Byte, Mits Users Letter, Peoples Computer Company, and SMUG (Sacramento Minicomputer Users Group). Of them all, I think your NL is by far the best for dissemination of user information. I find your NL has a lot of interesting little tidbits that don't get into any of the others. Please definitely CONTINUE!

.Enclosed is a check for $6.00 to cover volume 2 of your NL.

Thanking you in advance, I am,

Sincerely Yours,

John Moorhead

928 J Street
Davis, CA   95616
December 8, 1975

Page 6

January 9, 1976

Regarding the future of the "Micro-8", although the type is a trifle small (understandable) it is the most informative and most enjoyable publication that I subscribe to (among 6 monthly and 1 semi-monthly periodicals). I know that I speak in the company of many when I say that to discontinue the "Micro-8" would be a great disservice to all computer hobbiests. Please consider continuation of the newsletter.

I have recently purchased from Martin Research most of the parts of a computer system for use in the business. The service from them was outstanding as well as the quality of the merchandise. (Unfortunately, I don't seem to have time to get it together). I haven't read the manual as yet, so can't comment on that.

We are presently offering several kits that may be of interest to your readers:

TVT-II Video Terminal $112.00		Screen Read $11.64
Manual Cursor $9.50		Serial Interface $35.50
Audio Cassette Computer Interface $27.50		
CT7001 Clock/Calendar $45.50		
5V, 2A, Regulated Supply (LM309K) $7.95		

All kits sold minus power supply and case. All P.C.B.'s are double-sided and plated thru except for the CT7001, which is single sided. All boards are available seperately at the following prices:

TVT-II; $35.50		Screen Read: $8.10
Manual Cursor: $6.70		Serial Interface: $17.50
Audio Cassette: $14.50		CT7001 BD.: $10.50

We are in the process of working-up kits on;the Pace, 16 bit microprocessor; 4½ Digit D.V.M; and the Pocket Data Terminal as appeared in Jan.'76 Radio-Electronics.

Have to run, good luck to all at the Cabrillo Computer Center.

Jim Heil, owner
Electronic Discount Sales

I AM GLAD THAT YOU HAVE DECIDED TO CONTINUE THE NEWSLETTER. I DIDN'T WANT TO ADD MY PLEA TO THE OTHERS THAT YOU CONTINUE (EVEN THOUGH I WANTED TO) BECAUSE I KNOW HOW BIG A BYTE THIS TAKES OUT OF YOUR TIME.

SEVERAL PEOPLE HAVE ALSO COMMENTED ON SOMETHING ELSE THAT I FEEL STRONGLY ABOUT - AND THAT IS THE FORESIGHT OF THE ADMINISTRATORS, STAFF AND STUDENTS OF CABRILLO HIGH FOR THEIR SUPPORT IN ALLOWING THE MICRO-8 USERS GROUP ACTIVITY TO GROW AND DEVELOP INTO THE MOST USEFUL VEHICLE OF THE COMPUTER HOBBY THAT IT IS. MY SINCERE THANKS TO EVERYONE THERE THAT HAS CONTRIBUTED IN ANY WAY — YOU HAVE PUT THE CABRILLO HIGH SCHOOL COMPUTER CENTER ON THE MAP!

THANKS ARE ALSO IN ORDER TO THOSE THAT HAVE TAKEN THE TIME TO SHARE THEIR KNOWLEGE WITH THE REST OF US. NAMES LIKE RITTER, MORK, SEVERANCE, PLATE, AND FRY COME TO MIND (OTHERS THAT SHOULD HAVE COME TO MIND PROBABLY DIDN'T).

I HOPE THE CONTRIBUTIONS KEEP YOU PRINTING FOR YEARS TO COME! (AND FIE TO ALL THOSE THAT PROMISED SOMETHING AND THEN NEVER DELIVERED...)

THATS ABOUT IT FOR NOW. MY MARK 8 IS NOW UP TO 12K OF MEMORY! I WOULD NEVER HAVE BELIEVED THAT I WOULD EVER HAVE OR NEED THAT MUCH MEMORY A YEAR AGO, THINGS SURE CHANGE FAST. ALSO WISH SOME SMART COOKIE WOULD COME UP WITH AN 8008 'BASIC" IN THE MEANTIME WE'LL LOOK FORWARD TO THE NEXT MICRO 8 NEWSLETTER.

3 FEBRUARY 1976

M. PAUL FARR
3723 JACKSTADT
SAN PEDRO, CA 90731

Editors of Micro-8 NL   2377 Dalworth 157
                             Grand Prairie, Tx 75050

Gentlemen:

Congratulations on your volume number two. I was wondering
for some time if you would keep going with your fine
newsletter. I know that in my case I would have a hard time
to find a replacement for it. A magazine like BYTE just
does not have the wide variety of information that lets
you know what other poeple are doing and what kinds of
problems they are running into. This minicomputer hobby
is growing and as poeple get into it they will find that
they need the information that you provide so I do not
think you will have trouble finding another 100 subscriptions.

It's been almost a year since I wrote you the 14 reasons (or so)
of why I bought an Altair 8800. Time for an update since many are
asking the same questions I asked back then and really got no definitive
answers. All that follows is generally my own opinions based upon a
years experience which ins't much when you realize how much things have
changed in that time. So based upon Vol 2, No. 1 here's my yearly memory
dump.
One or two asked for an owner's report. Speaking as an 8800 owner what
do I think about it? First off its a good machine for various reasons,
but can also be a limited machine. Many of the good technical features
were covered by Hal Chamberlain in the Computer Hobbyist so I won't cover
them here. Other 'good' features. If you can afford it, you have one
source of supply--somewhat like the DEC setup for the PDPs. If it doesn't
work send it back, you don't have to learn all that logic stuff presuming
that you get it assembled which is recommended highly for those who don't
know or care to learn hardware--not everybody is good at soldering and
splicing etc.. It has established somewhat of a standard in that many
suppliers are providing directly compatible add-ons. Presently, it still
seems to be the best supported (the 8080 based CPU), not necessarily the
Altair.
Many of the complaints related to how MITS designed certain circuits is
probabily valid when you are judging from a processor chip point of view,
but those new chips wern't available then and are still scarce. Some other
technical complaints are valid--like an arbitrary acting deposite circuit,
hot running zeners at the CPU, a 7.5 volt supply that craps out with four
boards in the system, and of course the weird cabling from the front panel
(possibly that has been changed?).
Another 'good' point is that MITS tends to admit their mistakes and has
made some effort thru the Computer Notes to help the hobbyist, unfortune-
ly its not worth $10 if you don't own an Altair or 8080 based unit. So
to find out where they're at you need to subscribe which is kinda strange.
Another good point--you don't have to buy from one supplier, you have
many options for memory boards, I/O boards, video displays. Try getting
this with some of the other kits now available.
Another favorable point, software is starting to crop up everywhere for
the 8080 based Altair.
I guess there are probably other good points, but at 2AM all can't be
wine and roses. Therefore, the bad points not already covered. It's a
limited machine, at present at least. The primary limit is the power
supply--to fill those 16 slots will require you purchasing all the boards
from MITS. The only alternative I see is to know what the hell you're
doing if you don't. Like if you want to get 16K memory in it you better
stay away from those good buys on 2102s populated on a nonMITS board.
You also have to learn good things like how many boards can I really use
before blowing it up. Perhaps in another year this will be solved with
some of the newer chips, but who wants to wait? Another poor feature is
inputting data. It would have been so simple to put in a monitor program
on a couple Proms to get you started. Other kit manufacturers learned
this fast and are supplying something to get you going. This is the main
reason people have units in their homes not being used--its not necessarily
that they just like to build things. OK so it hasn't been a definitive
owners report, just a few points early in the morning, therefore, the
conclusion---Would I buy the Altair now? In the future? Now? No. Why
for some of the above reasons and because my choice of what I want to use
is limited if I want to pack everything into the one case without redesign
or modification of the power supply. Future? If the price were right
and delivery right. The latter has been somewhat resolved by MITS and
the new mail order law, the former has not. Thus my unit consists of
a Godbout board, a Solid State Music board, a Processor Technology board
and a kluge or two. Its more like a MGSPK than a MITS.
So my very final conclusion--I did it my way, maybe some of the above
will help you all who asked to do it your way.
If I may presume some more space, here's some info for the other Altair
8800 owners. I came across an Information & Computing Centers Corp.
5 volt, 10 amp supply--the transformer is Daytronic PT-172 4028 which
has the same dimensions as the existing transformer. Anyone have
information on either company so that the specs for the transformer
may be checked out? If you plan on using many proms, change the -16
volt transformer--Proc. Tech. sells one. If you plan to use more than
12-16K memory, get boards that are buffered in and out otherwise noise

becomes a prime consideration.
Solid State Music I/0 boards are an excellant alternate.
Avoid use of 2102s or other high power static memory unless you remain
with a small memory system, or modify the P.S.
Don't be afraid to experiment--create your own MGSPK.

Now some basic criteria in selecting a machine.
Determine what you want to do with it. If you plan on taking over the
world try another route. But if you've had no experience with hardware
or electronics--don't buy a kit unless you have a patient friend who
knows how to put one together. You may save $150, but have a $1000 head-
ache. Of course if you want to learn about digital circuits and know
your machine a kit is one way, but know what you're getting into.
Which has the best instruction set and can do more? I don't know, perhaps
no one else does either, why else all the different CPUs. If you're a
software type, you might be able to solve this by just evaluating the
way the CPU operates on data. The most obvious difference is in the
instruction word length..8, 12 or 16. Right now more is available to you
with the 8 biters. Very few make a 16 · bit wide memory board that is
readily available and fairly cheap. The 12 bit machine using the 6100
chip by Intersil will let you use all of DECs software for the PDP-8,
but the LSI-11 will let you use DECs software also. Main problem presently
is availability of economical assemblies for these units.
Once you feel committed or you can't get rid of the urge to set up a system
expect to spend at least $1000 to put everything together, i.e. hardcopy,
video display, modem, cassette interface, etc. This expense can be spread
out over a period of time, but so will your system. An alternate to
committing to that much right away would be to start at the very minimum
with something like the OSI boards for the 6800 and 650X or the new E&L
Instruments protoboards for the 8080. Spend the minimum to learn what
these units are doing. None of the investment is wasted, just read what
others have applied the unit to doing. By going small and spending a
couple months, you'll be in a better position to determine what you really
want. There always will be bigger and better this and that appearing on
the scene. You have to jump in sometime and just start thrashing the arms
and go to meetings to commenserate with others thrashing.
The very last 8800 owners evaluation---am I sorry I bought one? No, con-
sidering its been nearly a year ago. Do I consider it obselete? Limited
yes, for the above reasons. Would I buy one now? From the economics
point of view, probably not. From the limits point of view probably not.
But you must remember the limits reason also applies to many of the other
kits being offered. The SWTP 6800 can only address 32K memory without
modification and its set up for a 33ASR TTY, you would need modification
to use a 5-level machine. I Might State And Indicate that the power supply
limitations have been solved by another Altair 8800 compatible machine.
Expect to get burnt once in awhile; it indicates your enthusiasm for your
own system is still alive.   Pax, Bill Fuller

Jan. 27, 1976

Sargent's Distributing Co.
10268 Rosecrans
Bellflower, Ca. 90706
213- 925-6315

We have the ALTAR 8800. We are waiting for Polymorphic Video display board.

     We have some excellent ASCII keyboards, complete with top case and

bottom cover, conector& schematic for $53.50 plus shipping. Watch for a picture

of it in FEB. INTERFACE.

     Also we will be featuring a Universal wire wrap proto board complete

with socket pins in the $30-35 price range. We are members of SAAS and hope

to provide your members with many bargains.

PWS/aaz   Peter W. Sargent
                                         (Owner)

P.S. We have 1702's for $10.00

TO THE MICRO-8 NEWSLETTER READERS

I was somewhat surprised to see my LLX KEYBOARD loader program printed in NL V2N1. There is one thing that I failed to mention about that program, which is, I tried to keep it to a bare minimum (for keying in thru the front panel) so I cheated and derived hex A-F input from the : ; < = > ? keys because the right four bits of their ascii codes is A thru F and none require a shift on the SWTP keyboard. I labeled, with tape, the front of these keys as A-F. Since then, I've added six more instructions to allow use of the real A thru F keys. After program statement number 39 (JC   BITS), insert:

```
        MOV   B,A     ;SAVE AC
        ANI   80H     ;NUMERIC?
        MOV   A,B     ;RESTORE AC
        JZ    TCAN    ;OK IF NUMERIC
        SUI   02      ;-1 (SHIFTED)
        ADI   14H     ;MAP TO A-F
TCAN:                 ;CONTINUE
```

TCAN is a label for the (CPI   CANCEL) statement.

I have a hot item which should be released immediately (next NL if possible). How about 8K of low power, fast, static RAM on ONE Altair board for around $230, or 8K of standard RAM on ONE board for under $200 ... It's true, it works, and it's fantastic... in the Jan 5, 76 Electronic Design, on page 120 is a technique for stacking two memory chips (one on top of the other) and soldering all leads together except the chip enable pin, and plugging them into memory as a 2k double chip. I've been stacking low power ttl chips for a long time (to get more drive) but it didn't dawn on me to stack memory chips. Thanks to E. R. Fisher of Lawrence Livermore Labs, Livermore, California, my Altair memory has just doubled without adding any new boards. And again, too good to be true, the SOLID STATE MUSIC MB-2 (Altair 4K memory board) is designed as if it were made especially for this technique. The addressing for the second (top) 4K is already there - remove a resister, re-route a couple of traces, connect pin 13 of the top 2102's to the proper pins on the 74L42A (see figure 4) and that's it... I suggest wire wrap wire or a vector wiring pencil (I've used both) for the chip enable connection. ...Again, too good to be true, the MB-2 has a lamp regulator for each 1K of memory (four regulators) which is super overkill to start with. 8K of 91L02 just barely warms the regulators. 8K of Signetics 2602's pulls over 250ma per 1K so I added Altair style heat sinks to the regulators just for insurance. I also left an air gap between the top & bottom of the soldered-together memory chips (the 2602's) so the fan could do it's thing (2602's like to be cool).

Of possible interest to computer hobbyists, is a system controller that I developed and burned into prom. I'm reluctant in calling it a monitor because the term monitor and operating system seem to be used interchangeably, and this is not what I classify as an operating system. It is a systems programing/debugging tool. In order to stay compatible with industry, I've named it "JIMBUG". JIMBUG requires 512 words (2 1702A's) and has the capability of almost unlimited command and routine expansion WITHOUT re-burning the original two proms. I bought a PTC 2KRO and designed the system around it, although any prom board can be used with equal ease. My design criteria for JIMBUG was as follows:

The major interests of computer hobbyists is in designing hardware and software therefore JIMBUG must not interfere with this end. JIMBUG must initially replace most of the computer front panel; allow displaying, modifying, loading, and copying memory to memory; be able to read from and write to cassette; and must provide breakpoint capability. A good 8080 operating system must use (occupy) some of low memory because of the RST instructions. JIMBUG, therefore, resides in higher memory and does not use any RST instructions. When designing hardware, quite often memory mapped I/O using address bit 15 as the I/O indicator is the easiest method, therefore, JIMBUG resides below the 32K mark. JIMBUG must not use any expensive hardware for operation as the hardware will (should) be pretty much dedicated to JIMBUG.

As I have it in my system, JIMBUG begins as loc x'7400' (29696 decimal) and likes to think there is at least 256 bytes of space behind it (for future additions) followed by some RAM for a work area. My PTC 2KRO provides 1996 bytes of expansion area. RAM occupies the last 1K before the 32K middle-of-memory mark. Currently only the first 256 bytes are used (which provides a nice home for my original Altair 1K memory board). The I/O hardware I have dedicated to JIMBUG is a parallel keyboard (SWTP) and four 7 segment leds (driven in hex) mounted in that big blank spot on the upper right side of the keyboard PC board.

JIMBUG uses the technique stolen from LSI-11 (ODT) and MONITOR-80 terminology (CLP) of providing a window into memory through which all (most) transactions pass. For lack of something better, this window is called "CLP" (current location pointer). There is also an "ELP" (end location pointer) for delimiting memory space used in memory-to-memory, memory-to-cassette, and sometimes cassette-to-memory transfers. The 512 byte JIMBUG system controller provides the following commands: LOAD CLP; DISPLAY CLP ADDRESS; EXAMINE MEMORY; EXAMINE NEXT; DEPOSIT; DEPOSIT CONTINUOUS (hex keyboard loader); LOAD ELP; DISPLAY ELP ADDRESS; EXAMINE MEMORY AT ELP; SET BREAKPOINT; CLEAR BREAKPOINT; DISPLAY BREAKPOINT ADDRESS; RETURN FROM BREAK; // the following display commands operate upon saved breakpoint data; DISPLAY H&L; DISPLAY D&E; DISPLAY B&C; DISPLAY PSW; DISPLAY STACK POINTER//; COPY MEMORY TO MEMORY; TAPOUT (jump to users tape routine); TAPEIN (jump to users tape routine); EXECUTE (transfer control); INITIALIZE (reinitializes JIMBUG); AUX jump to loc x'7700' (4th prom) .

The AUX command is provided so that a user may put a function in the 4th prom and get to it without extending the command table, that is, no need to burn the 3rd prom (command extension table) for a single command extension.

I have made up a complete JIMBUG package which includes EVERYTHING. Complete assembled source listing, command reference guide, hardware hook-ups, and how to add your own commands & routines. I will also provide JIMBUG proms - complete details will be provided for a SASE and/or with the JIMBUG package. The JIMBUG package is $10. If you are interested, send a SASE for more info or $10 for the JIMBUG package to:

PAN-TEC
820 Sweetbay Drive
Sunnyvale, CA 94086

Many thanks for a winning publication - here is my belated renewal.

Should anybody have problems with the memory expansion (double chip) technique, I'll be happy to answer questions via SASE.

Thanks again,   Jim Brick

Sincerely,

Jim C. Brick

Page 8

figure 4

8-BIT LATCH

INPUT PORTS

Two Simple Input Ports With Interrupt For ALTAIR 8800

PARTS

2 — 8212
1 — SN7400
1 — SN74L00

M.T. WRIGHT
Nov '75
See Page 10

January 13, 1976

Altair 680 UPDATE INFORMATION

Dear Customer,

Thank you for your patience in waiting for delivery of the Altair 680 microcomputer.

Due to delays in shipment of the first generation Altair 680, it has been decided to upgrade all Altair 680's to the second generation design. This means that the Altair 680 will include the following items at no additional cost:

1) PROM monitor. 1702A PROM chip programmed so that you can immediately load paper tape. Also contains interrupt vectors for software, reset, maskable, and non-maskable interrupts.

2) Asynchronous Communication Interface Adapter (ACIA). Allows machine to transmit and receive a character at a time rather than one bit. Minimizes software needed for I/O routines. Contains crystal clock for baud rate synchronization. User-selectable for RS232, TTL, 60 mA, or 20 mA current loop. Baud rates of 110, 150, 300, 1200, and 2400.

3) Compatible with all Motorola 6800 software. This software will be available from MITS, Inc.

While these changes will greatly enhance the Altair 680, they will delay initial shipment for 30-60 days from the date posted on this letter. Should this delay cause undue hardships, we are giving you the option to cancel your order. If you decide not to cancel, you will be given a 10% discount on Altair 680 8K memory boards (to be announced in February and scheduled for delivery in March). To cancel your order or to qualify for the discount, please fill out the enclosed form.

Sincerely yours,

Again, we thank you for your patience.

MITS, Inc.

Herewith is my $6.00 to start Volume #2 coming. Please continue your good work with this endeavor if at all possible, as none of the other publications with which I am familiar fill the need that you do. This includes PCC, Byte, TCH, and Interface.

Particularly exciting for me was the news that you had a Mike 2, as I purchased one assembled by Tom Kasper some months ago. Along with it came 1K of RAM and a Suding cassette interface. Since then I bought a Model 15 Teletype and it is now up and running. Warning, if you ever buy an old teletype, try to determine if it has a synchronous or a governed motor, and stay away from the governed type, or be prepared for some difficulties. For instance, mine seems to be running at about 65 words per minute, which means I had to first determine the speed, and then jigger the timing loops in my software, and this takes days of valuable programming and troubleshooting time. Also, according to "Specialized Communications Techniques for the Radio Amateur" by the American Radio Relay League, Teletype doesn't make gears to convert my set to 100 wpm. If they do, my book doesn't list them. Also, my software isn't portable without modification of the timing loops.

I also have a 4K RAM board which will soon be installed, and a Scanlin Electronics Inc. Model 830 keyboard which seems to be RTL or DTL, with an unknown (to me) code. However, the keys have a nice feel and it looks very pretty!

Jim Farschon and I are in close communication, and he should be able to help me immensely with software systems, especially after we get a hardware stack installed in our Mikes. It is then but a short step (I hope) to a translate from 8080 to 8008 routine.

Have you looked over Martin's modifications (?) of the Mod 8 Monitor? Is it any good?

Does anyone have a good way to run a TTY without tying up my system doing timing loops? Cheap and easy wouldn't hurt.

Does anyone have any software for the TTY that might instruct and amuse a 7 year old?

If anyone wants the benefit of my limited knowledge of hooking up and operating an old Model 15 TTY send an SASE and info on your machine, like does it automatically shift from FIGS to LTRS when you hit the space bar? Does it have automatic CRLF at end of line? Do you know its speed? etc., and I will try to help.

If you guys at MICRO-8 have any info that would be helpful to Mike users here in San Diego I sure would appreciate it. On the off chance, I will send a large SASE and some stamps, and you can keep the stamps if you have nothing.

Sincerely,
Jim Ward

2909 Adrian St.   January 25, 1976
San Diego, CA 92110
AC714 224-1627

MY SYMPATHY GOES OUT TO LEE MAIRS (NL V2/#1) WHOSE COMPUTER WAS BLOWN BY A CHEAP T.V. SET. TRANSFORMERLESS RADIOS AND T.V. SETS ARE ABOMINATIONS THAT SHOULD NEVER HAVE BEEN PERMITTED BY THE UNDERWRITERS LABORATORY. LEE'S SUGGESTION TO ALWAYS USE AN ISOLATION TRANSFORMER IS A GOOD ONE BUT THERE IS MORE: TUBE TYPE T.V. SETS HAVE HIGH VOLTAGES OTHER THAN FROM THE POWER LINE WHICH ARE POTENTIALLY DANGEROUS TO A LOW VOLTAGE DEVICE. IF IT WERE MY COMPUTER TO BE CONNECTED TO A T.V. SET WITH ITS 300 OR SO VOLTS DC PLATE SUPPLY, I WOULD BE HAPPIER WITH TOTAL ELECTRICAL ISOLATION. (FOR J.C.)

WHY CAN'T ONE USE OPTICAL ISOLATORS WHOSE INPUTS ARE DRIVEN BY THE COMPUTER? THE ISOLATOR CAN BE POWERED BY 3 OR 4 SIZE D FLASHLIGHT CELLS, ITS OWN SMALL POWER SUPPLY, OR YOU MAY BE ABLE TO STEAL POWER FOR THE ISOLATOR FROM THE T.V. SET ITSELF (OR RECTIFY THE FILAMENT VOLTAGE).

IN THE OLDEN DAYS OF TUBES, DIRECT CONNECTIONS BETWEEN STAGES, UNITS, FUNCTIONS, ETC., WERE RELATIVELY INFREQUENT. COUPLING FOR SUCH AS PULSE WAVEFORMS (WE CALLED IT "VIDEO") WAS FREQUENTLY VIA CAPACITORS, AND FOR THOSE APPLICATIONS WHERE AN ABSOLUTE REFERENCE LEVEL WAS IMPORTANT WE FREQUENTLY USED A CIRCUIT TECHNIQUE CALLED THE "D.C. RESTORER." THE MOST BASIC D.C. RESTORER IS REALLY QUITE SIMPLE. THE CAPACITORS (OF EQUAL VALUE) ARE SELECTED EXPERIMENTALLY TO BE LARGE ENOUGH THAT THE WAVEFORM TO THE T.V. SET IS SATISFACTORY --- VOILA! THE CAPACITORS SHOULD BE RATED AT 300 VOLTS OR SO (DO NOT USE ELECTROLYTICS). D2 WILL NOT ALWAYS BE NEEDED, ITS PURPOSE IS TO COMPENSATE FOR THE FORWARD VOLTAGE DROP OF D1. AN INTERESTED READER WILL PERHAPS WISH TO LOOK THIS CIRCUIT UP IN AN OLDER REFERENCE SOURCE ALONG WITH THE "D.C. CLIPPER" AND "D.C. CLAMPER."

1559 ALCALA PLACE
SAN DIEGO, CA 92111
JANUARY 26, 1976

SINCERELY YOURS,
WEBB SIMMONS

David O'Meara, 2232 Webster St., San Francisco, CA 94115 (563) 563-4321, extension 2469 or 2461 supplied the following information about the upcoming Douglas PDP-8 compatible machine built around the Intersil 6100 chip. He is now working on a keyboard interface for an original PDP-8. He has a type 34D oscilloscope display and wants to find some graphics hardware for generating alpha-numerics and graphics on a CRO.

DOUGLAS ELECTRONICS, INC.
LSI-80 — A COMPLETE MICROCOMPUTER

PRICE LIST (Tentative)

Item	Price
CPU BOARD	350.00
1/4 K RAM	200.00
1 K RAM	260.00
UART (non TTY)	135.00
UART (TTY)	155.00
I/O BREADBOARDS (each)	90.00
64 WORD STARTER BOARD	125.00
RACK & BUS (19 slot)	
POWER SUPPLY	110.00
4 K PACKAGE — CPU 4x1K RAM, UART (TTY), START UP BOARD, RACK, BUS, & POWER SUPPLY	1500.00
1 K PACKAGE — SAME AS ABOVE BUT WITH ONLY 1 K RAM.	875.00

Request LSI-80 catalog.

Douglas Electronics, Inc., 718 Marina Blvd., San Leandro, CA 94577
(415) 483-8770   Page 9
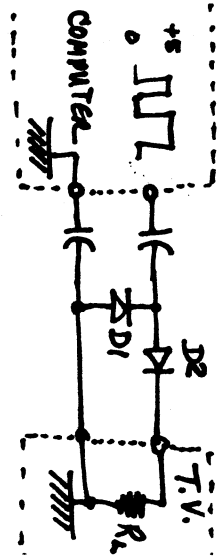
CHARLES M. PHELAN
1817 N. Edgewood Ter.
Ft. Worth, TX 76103
817 534 2071

1/25/76

The continuing existence of the newsletter is good news. All of my issues are dog-eared from heavy usage, and continue to be a major reference source. Thanks for all the hard work you've done.

A number of members of the North Texas Computer Hobbyist Group have obtained used Syner-Data BETA terminals (formerly belonging to Carterphone) on the local surplus market. We have not obtained documentation or information on parts sources; and, should any of your readers have such information, we would be most interested in hearing from them. I will be happy to pass on any information available to me if there are others in a similar situation.

I have an Altair 8800 up and running (mostly) with MITS 8K BASIC and ASSEMBLER. I'm using a borrowed ASR-33, when available; but hope to get the S-D BETA on line, along with a cassette interface based on the BYTE conference recommendations. The deposit circuitry works perfectly but the examine circuitry, as well as the protect on 2 MITS 4K boards is still marginal. Fortunately the software can be utilized without these panel functions.

Thanks again for the newsletter.

Sincerely,
Chas. Phelan

Software by
Malcolm T. Wright

September 19, 1975

Micro-Loader/Monitor Rev.B

Introduction

The program that will be described in the following pages was developed to be used on the Altair 8800 computer to simplify the loading and execution of programs written in octal. The whole Micro-Loader/Monitor is only 256 bytes long and can be loaded into one PROM like the 1702A* from Intel. The program should be located in the upper most page of memory which is 377, 000.

I/O Used

The Micro-Loader/Monitor program is written around three computer ports. Input port 001 is for the keyboard interface (7 or 8 bit ASCII must be used) and the computer has to be under a keyboard-strobe to CPU interrupt-line control. Input port 002 (optional) is for a paper tape or card reader interface (8 bits) with strobe control. Output port 001 is for displaying the results of the special control codes used in the Micro-Loader/Monitor routine.

Input port 001 and 002 are software selected by the sense switches (A8 thru A15) on the front panel of the Altair. Placing switch A8 to a one and all the other sense switches to a zero will select port 002. Placing the sense switches at any other eight-bit code will select port 001 (keyboard). The sense switches can be used for a third input port in a software program, just don't use the code 001.

Control Codes

X(lower case):	Execute a program from the starting address set by the I-code. The program must end with a RET(311) instruction if you want control to return to the Micro-Monitor after execution.
I(lower case):	Load registers H & L into memory to be used as the starting address of a program to be executed.

*....The 1702A is available already programmed from Solid State Music, 2102A Walsh Ave., Santa Clara, Calif. 95050 Write for price quote.

L(lower case):	Load register L with the character that was constructed.
H(lower case):	Load register H with the character that was constructed.
> or . (upper case) :	Get character from memory, display character and increment memory address.
< or , (upper case) :	Decrement memory address, get character from memory and display.
@ :	Construct character in ASCII (no parity). You can input any keyboard code into memory except the control codes.
CTRL-O :	Construct character in octal (three numbers).
CTRL-L :	Display low memory address (reg.-L).
CTRL-H :	Display high memory address (reg.-H).
CTRL-B :	Load register H&L into the stack pointer.
Return (CR) :	Load constructed character into memory and increment memory address (H&L). Note: "CR" can be changed to any other ASCII character of your choice by using this program.

Special Routines

The Micro-Loader/Monitor Rev.B also has three subroutines written into it. Use a Call(315) instruction to use

them.

Decimal addition routine[1] (address 377,311)

1. Set registers D&E to the starting memory address of the augend.
2. Set registers H&L to the starting memory address of the addend.
3. Set register C to the number of BCD pairs in the addend.
   Note: Be sure the augend and addend are the same number of BCD digits.

This →			Not this ↓		
68	7421	09	XXX2	0543	34
+21	+0016	+03	+9021	+XX24	+X5

X=Don't care state.
4. Call address 377,311.
5. Results put into memory at starting memory address set for D&E and up.

[1].... Routine from the Intel 8080 Microcomputer System Manual, January 1975.

Decimal subtraction routine[1] (addr. 377,325)

1. Set register D&E to the starting memory address of the minuend.
2. Set register H&L to the starting memory address of the subtrahend.
3. Set register C to the number of BCD pairs in the subtrahend. Watch out for don't-care BCD digits, see note on decimal addition.
4. Call address 377,325.
5. Results put into memory at D&E starting address and up.

Binary multiplication routine[1] (addr. 377,347)

1. Set register A to the value of the multiplier.
2. Set register E to the value of the multiplicand.
3. Set register D to zero.
4. Set registers H&L to zero.
5. Call address 377,347.
6. Results will be in registers H&L.

How to initiate the program. (Be sure to un-protect memory)

1. Turn-on computer.
2. Hold stop-switch to stop position and reset the computer.
3. Examine location 377,000.
4. Switch to run.
5. Load H&L with the maximum address of memory that is in your computer.
   256 max. then type 000-H and 377-L.
   1024 max. 003-H and 377-L.
   4096 max. 017 007-H and 377-L.
   etc.
6. Load the stack pointer by typing CTRL-B.
7. Now load H&L with the starting location of your program to be loaded. Start programming and Good luck!
   (Be sure not to destroy any of the byte instructions from address 000,070 to 000,077 since this program uses RST-7.)

Change "CR" to a new character.

1. Initiate program.
2. Type 000-H and 073-L.
3. Type @.
4. Now select and type in the new ASCII character and type carriage-return.
5. Type CTRL-O to get back to octal load.

Branch to a new outout routine

The Micro-Loader can be set-up to branch to an additional output routine needed for future peripherals like a CRT display, printer, etc. This modification is done by changing three bytes in the RST-7 location in memory.

Bill Harnell,
165 Merkley Square,
Scarborough, Ontario, M1G 2Z1
January 28, 1973

First and foremost, enclosed please find my cheque for $6.00 for an additional one year's subscription to the NL. Please do continue to publish the Letter. Unfortunately for me, I didn't know of the NL until late last year; too late much to my chagrin. I got involved with Mini-Micro-Mart last April 25 by ordering some simple things from them. One 4-card extender for my Altair 8800, 4 100 pin edge connectors, 2 Viking 100 pin edge connectors and the request that he charge the purchase to my Mastercharge account. Now I know why he doesn't use Mastercharge..... he can't get the service! The order was reconfirmed June 29th. I received a letter from Maury August 27 thanking me for my letter. The last paragraph goes like this " Now that I have turned the page and realize that we have talked on the phone, and that you did send us an order; I will later today check to see what we have shipped you and what we still owe you".

I had sent a cheque June 29th, which he quickly cashed (July 3rd) I had received no answer by Sept 15 (in the way of received goods) so I wrote him again. He responded on an inter-office memo form Sept. 29 saying that he regretted not being able to find any record of my order. Would I please send him a copy of my cancelled cheque. This was done Sept. 29th. By Nov 10th still no word from dear old Maury so I called him for the third time. (You'd think he'd recognize me by now). A postal strike was upon us and my Altair's progress was very slow. I needed the expander board. He told me then that the merchandise had been shipped October 13th and that he couldn't see why I didn't have it yet.

To make a long, and final, story short, I did finally get the stuff Jan 7/76 after a very long and trying time. The expander board had 6 open lands in it, took over 2½ hours to solder in versus about 25 minutes for the MITS unit and I have my wife's solemn promised that she'll kick my arse from here to Bloomington, Illinois if I so much as mention buying from "dear ole Maury" again regardless of the relative attractiveness of his promises! Amongst his other attributes is that of being able to lie very convincingly. ENUF!!!

Now...... the good news. I cannot speak too highly of one other supplier, Process Technology, their products and their responsiveness. I have found them, particularly Terry Holmes, very eager to help. Their products appear to be of the highest quality and their answers to my dumb pleas for assistance have been almost immediate. One very small disappointment was the lack of sufficiently comprehensive information for me to effectively put my 3P+S to work as I would have liked. I have been assured that this data is being rewritten and will be released in the relatively near future. An order for 8K of their low power Ram was also delivered 'bang on'. They have been somewhat delayed with deliveries of the ALS-8 and SIM-1 by late board deliveries from their suppliers but I fully expect them to live up to their schedule. When they do screw something up, do they ever get their tails in high to make up for any inconvenience which may have been caused!

Thanks for the shoulder to cry on. I just had to get that out of my system. I have also been very pleased with deliveries by S.D. Sales of Dallas, Bill Godbout, Scelbi, and James. Too bad that James and Digi-key

(also excellent response) do not accept Mastercharge accounts. I'd be more than pleased to pay an additional 5% just to get the attention and the variety of items they carry. Maybe they're listening and can do something of that nature for people who wish to order in that fashion; simply forget the discounts as it costs them 5% to be able to use the credit system.

My Altair at present has 1K of MITS RAM, an EBCDIC keyboard that is in the process of learning ASCII via EPROM, an ASR 32 which is (and so am I) also learning to use ASCII in conjunction with the Pop. Electronics Monitor. Waiting in the wings are an IBM selectric printer, a beautiful floppy disc, the previously mentioned P.T. ALS-8 and SIM-1, a 60 cps paper tape punch and a HS paper tape reader. I'm trying desperately to get cassette unit attached to my 3P+S (my switch fingers are all raw) but I guess I'm too long an ambition and too short on moxy to get Don Lancaster's interface working with it. I would appreciate any help which any reader could provide to this end and to getting Baudot/ASCII/Baudot hardware installed. A letter to Roger Smith resulted in the information that he had "run out of copies of the article" Of course, the letter was a form letter conveniently printed on a photocopier!!!! By the way, before you ask, I did send a SASE and $1.00 U.S. in an attempt to cover his expenses. Perhaps it wasn't enough. We'll wait for the March/April issues of R-E.

As a matter of interest, I have learned more about computers since last April 15th when I received my ALTAIR 8800 than I was able to learn in the previous 21 years of being a customer engineer for a computer manufacturer. (Can't explain why since the interest was always there. I suppose that the point of view is slightly different when you own it. Your NL has contributed more that a little to this educational effort and I would like to express my thanks and appreciation for it.

ENUF!!
I'll write again, at length, later.

Best regards,
Bill Harnell

First, I apologize for being so slow with the enclosed $6 and SASE. I hope you decide to continue the NL.

Second, I hope I can contribute to the NL in the not too distant future. I have a design for a graphics display using 256x256 dots on a standard TV. It uses an 8K block of computer memory to generate the grid. It's fairly simple and economical since no I/O ports are used and the CPU can use this 8K block of memory if graphics are not being generated (or even while graphics are generated).

I am very busy right now finishing a Master's degree at the Univ. of Florida (EE with Biomed specialty). I will be moving to Indiana in August to attend Indiana Univ. Med. School. I will have more time to "play" between now and August and will hopefully get this project finished. I'll let you know how it comes out.

502-11 S. W. 34 St.
Gainesville, Florida 32607
January 29, 1976

Sincerely,
Lawrence J. Richter
Lawrence J. Richter

We have just recently formed the Ithaca Computer Group. Mostly homebrews with a scattering of Altairs, Intellecs, and a lot of would-bes. Anyone interested and in the area is welcome. Call me at 273-2339.

All good computer freaks know that the more you buy, the less each one costs; SO one of our first orders of business is getting together a group order of RAMs. At present it looks like we will be buying some 500 91L02 (2102-1 equiv. 500 ns.) chips for locals. Sure would like to increase this to 1k or more. If all goes as expected the price should be about $1.50, but this is NOT firm yet. We also are purchasing over 1000 16 pin sockets, at around 16¢.

So if you need RAM send me a SASE with all the vital info plus how many RAMs, and how many sockets you need. The price should be settled in around 3 weeks, with the order scheduled for 6 weeks. The latter is flexible, and the order may even be shipped in two parts to allow time for everyone.

SEND NO MONEY, PLEASE. Just the SASE and I'll contact everyone when the price is set, so that you can decide if the price is good and settle on a final order.

And in the news- Rockwell Corp. announced in Electronic Design last month their new LSI Floppy Disk controller. The whole ball of wax, as they say. According to the release, Rockwell expects Floppy prices to drop to around $250. by next year.

I also have a pre-production sample of Texas Instruments new TMS 5501 controller for the 8080. It is nothing short of fantastic. 1 serial I/O (UART), 1 parallel IN, and 1 parallel OUT port, vectored interrupts, programmable delays for the interrupts, masking + more all on one chip! My entire I/O is this and a decoder. The thing is set up for memory mapped I/O so you get to use all those lovely memory instructions for your ports. Should be out in a month. I may be able to get a few but they probably won't be cheap until somebody else gets in on the act.

If anybody in the area (or even not) needs help or info call up and I'll do my best.

Sincerely,
Steven Edelman

Steven Edelman
204 Dryden Rd.
Ithaca, N.Y. 14850

On January 19th, I sent a Bank Draft by registered mail for $680.00 to THE DIGITAL GROUP. Yesterday I got my 'return receipt requested' back. They had received my order on January 23rd (sure took that letter a long TIME). I hope to have the system up and running in about 3 months after delivery.

I looked at all of the systems and the digital group's looked like the best for me. I met Dr. Suding at the Dayton Hamfest last year and was impressed with his Mark 4. I would like to correspond with others who are assembling the Digital Group System.

One company from whom I've had great service is MESHNA Lynn, Mass. I just placed an order with Delta Electronics and haven't heard from them yet.

Keep up the good work and I hope to be reading the News Letter next month.

January 27, 1976
R.R.#1, Box 479
Berea, Kentucky 40403
606-986-3072

Yours truly,
F.W. Seals

martin research

MR

February 2, 1976

MICRO-8 COMPUTER USER GROUP NEWSLETTER
Cabrillo Computer Center
4350 Constellation Rd.
Lompoc, CA 93436

Our Model 471 CPU board, based on the 8080, is now being shipped in quantity.
It is being used by several industrial customers as the intelligent controller
in their equipment.

We have announced a new price for this computer. The 471 CPU board, complete
with 8080A microprocessor, comes completely assembled and tested for $149.00.
The board is completely socketed, allowing for easy troubleshooting; all MOS
parts are first-quality, as usual--no thermal rejects, no factory seconds.
Three interrupt levels are provided; DMA is supported; and there is an automatic
reset if the interrupts have been masked for an excessive period, while an
interrupt request is waiting. The board includes power bus drivers, which
allow for full system expansion--25 TTL loads on the data bus, and 30 TTL loads
on the address bus. As planned, the 471 CPU board is compatible with our
earlier 8008-based computer, and will be compatible with our upcoming *MIKE 65*
(6502) and *MIKE 68* (6800).

A *MIKE 3* computer is made up of the 471 CPU board; a 420 Console board (keyboard
plus six decoded digits); and a 423 PROM/RAM board (512 bytes of RAM, plus an
8080 Monitor program in 256 bytes of PROM). This three-board system now lists
for $395.00, fully assembled and tested.

The new price for our 405 4K RAM------static, 450 ns access time, 5.0 V at 1.0
A max.--is $195.00, fully assembled and tested.

And, our book *MICROCOMPUTER DESIGN* went to the press last week in an extensively
revised edition, with lots of new material on the 8080. It will be bound as
a paperback book, and will sell for $25.00 in single quantities. (Volume dis-
counts are available; first-edition holders can write for details on a special
discount.) We expect to be able to ship by the last week of February. We have
a special through March--*MICROCOMPUTER DESIGN* plus the complete *MIKE 2 MANUAL*,
$30.00 postpaid.

Finally, our *modular micro* series is now distributed through Semiconductor
Specialists--for your readers who are associated with industrial purchasing.
Semi Specs has offices in LA, Dallas, St. Louis, and a number of other Midwestern
cities, as well as in England and Germany.

Keep up the good work!   Sincerely,

KB/hs   Kerry Berland

modular micros ○ consulting ○ microcomputer design

I believe that the newsletter should go on, adapting
itself to the changing needs of the small computer community,
irrespective of the existence of other groups, letters, and
magazines. Don't be afraid to shift emphasis as time goes on
to included Altairs, (8080 and 6800 based), 16 bit machines,
the whole banana, wherever the interest goes. The important
thing not to change is the informality, the emphasis on
user contribution and free expression. A limited amount of
abstracting from other pubs is useful to call readers attention
to sources of which they may not be aware, but don't become
an abstract journal either... hold costs down by giving only
a sketch and then referring the reader to the source.

I make these recommendations for continuing in spite of
the fact that I now subscribe to Byte, Interface, Computer
Design, Proc, IEEE, Trans. on Electronic Computers, TCd,
PCC, HP65 group, and about fifteen (15) other journals in
the field.

Very truly yours,

William L. Paterson

Box 1396
Santa Monica, Ca. 90406
1 Feb. 1976

Dear Hal & Group: February 4th

Previously I wrote asking you for information about the
IMSAI 8080 computer. Well, I went ahead and ordered one
with 1K of RAM. I am having it sent to my new address in
Germany. I will let you know what kind of service I get and
how the assembly goes.

Please change my address, effective this date, to read as
follows:

    Msgt. Vern Brannon
    7450 TIS, Box 6924
    APO New York 09012
        Sincerely,

Page 12

      Vern Brannon

FIRST CLASS MAIL

I tried to get NL No. 3 out in 3 weeks but missed it by a little. You wouldn't believe the number of things that have been going on around here. One of my students has our Centronics line printer running at full speed on a 120 cps serial interface and learned a lot about adding handlers to an operating system in the process. We have three more projects to finish on the PDP-8s and then I can get back to serious micro work: 1) modify the time share BASIC (Edu 25) to handle floppy disks 2) add a magtape system (Dectape emulator) 3) interface a Dura Mach 10 selectric typewriter.

Bob Albrecht, Keith Britton, and myself presented a session at IEEE COMPCON on Feb. 26 entitled the Personal Computer. My presentation was "The Hobby Computer Explosion", a slide show on what's happening. Keith's presentation was on the IBM 5100, a fantastic machine with state of the art electronics and something only IBM could do--miniaturize a dinosaur. His presentation was extremely thought-provoking and he stunned us all by asking us to name the cheapest output device for a home computer in a couple of years. Everyone automatically says a TV set. He proved that VOCAL OUTPUT will be cheapest. The circuitry will involve a processor controlled ROM and about 4 to 5 chips--about $25 worth of electronics. Think about that one!

SASE's
The SASE idea was a great idea but didn't work too well. At least we didn't have to send the checks back (subscriptions are up to about 425 now). Those that did send an SASE will be rewarded with some kind of worthwhile goody in it eventually.

Consumer Legislation
I think we should get mean and nasty (at least by letter) with any supplier that violates the new consumer legislation. If you don't receive something you ordered within a month, please write a letter demanding delivery or your money back and report to the FTC if you don't get satisfaction.

Ad Policy
As always, no paid advertising is accepted. However, I always mention to inquirers that informative literature that in my opinion will be of interest to the hobbyist may be printed. I try to select stuff that has not been published as ads or articles elsewhere but there is bound to be some duplication. The M6800 board that will plug into an ALTAIR on page 11 is my idea of a fantastic item that guys need to know about.

Duplicate Newsletters
I'm having trouble getting the mailing list for Volume 2 straightened out. You may have gotten 2 copies of No. 2 but better two than none. Thanks to those that let me know. If you ever get cheated out of one, please let us know.

Tiny BASIC Newsletter
Bob Albrecht of PCC sent out the first issue of Tiny BASIC. It's fantastic if you have any desire to

#*#

SUBSCRIPTION FORM
(Copy if you don't want to mess up NL)

☐☐☐ ....Volume 1 back issues 1 thru 4 $3.50
☐☐ ....Volume 1 back issues 5 thru 12 $6.00
☐☐ ....Volume 2   1 thru 6 $6.00

NAME _____

ADDRESS _____

_____

ZIP _____

TELEPHONE # _____

(May be published -- leave blank if you prefer)

Also include (if you desire) a little note or letter describing your equipment, plans for the future, experience, etc.   Thank you.
#*#

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know what's in a high level language interpreter and will worth $3 for 3 issues. You also have to have the PCC newspaper. Bob will send you a sample issue (the last) for $1.00. You won't be disappointed. Write PCC, PO Box 310, Menlo Park, CA 94025.

Byte Boffer PC Board
Owen Phairis, 1908 12th Street, Santa Monica, CA 90405 will provide PC boards for the Lancaster unit for $3.00.

Ohio Scientific Instruments Logic Trainer
I ordered a $99 OSI 300 computer trainer. The order was recorded Feb 3 and the unit arrive at the school Mar. 3. I was almost disappointed--I was ready to write a nasty letter demanding delivery. They do deliver!
What they deliver is a different story. For $99, you can't expect much and I didn't get much. The PC board quality makes the MARK-8 boards look good. Assembly quality was terrible, complete with cold soldered joints. The switches are barely useable. The experiment manual is poor and difficult to follow. Design does show how little hardware is necessary to make a 6502 work. Has anyone had any experience with their super boards?

Digital Group System
The DG sent the Cabrillo Comp. Center a DG8080 three board system on a temporary loan. Some initial impressions: Nice quality boards, does exactly what the ads say, software performs exactly as described--press the button, load a cassette, and you're read to do things, documentation excellent but more than a project for a beginner. You are asked to evaluate your resources and abilities in the beginning pages of the manual and decide whether you're up to it and if not, to send the unit back for assembly or a refund. The Suding cassette circuit seems to work flawlessly on the $120 Sony cassette unit provided. The Sanyo video monitor produces the sharpest picture you could ask for. Very impressive. On the negative side, it's not ALTAIR bus compatible and the PROM bootstrap resides in page zero making it a hassle to use programs that use page zero (but then you shouldn't use page zero).

IMSAI
Reports from people viewing and purchasing IMSAI machines are fantastic. Apparently super quality but then a few reports are coming thru about price increases and parts dribbling in by mail. You should also check out how really ALTAIR program compatible it really is. I heard one report that there are differences that have to be compensated for in software.

PCM-12 -- PCM's PDP-8 Compatible Machine
Do you suppose that PCM has won the award for the biggest credibility gap in initial advertising literature? They led us to believe a 4K machine with I/O would be about $600. If I read the price list correctly, the true price is closer to $1200. A Fabritech 4K core memory PDP-8 compatible machine is not much over that.

Sincerely,
Hal Singer - Editor

Dear Hal,   March 10, 1976

My Digital Group 8080 System was up and running only 14 hours after the parts were taken out of the envelopes! It consists of the Suding TV and cassette interface, four parallel input and four parallel output ports, an 8080A microprocessor, and 2K of 500ns 2102s. The system also includes a 256 byte PROM, which contains a cassette loader and several other useful subroutines, all of which are user-callable for programming.

Assembly directions were clear, but not Heathkit type, and some knowledge of electronics is assumed. However, I believe that anyone who knows resistor codes and can find pin 1 on an IC can assemble the kit successfully. Soldering requires a low-power iron with a fine tip. An O'scope and a frequency counter were the only test instruments used for final checkout. I assembled the input-output board, and it worked perfectly the first time it was plugged in. It is the first kit I have ever built. The uP board and the TV-cassette interface board were assembled by Robert White, a close friend and experienced kit-builder. The uP board worked perfectly the first time. The TV-cassette board had the only assembly error, we misread the color codes for two resistors. After we located the error, it only took ten minutes to replace them with the correct values. No other problems. All ICs were good, which is remarkable. Two capacitors were not supplied, but were easily scrounged in Robert White's junkbox.

Software supplied by the Digital Group consisted of a game program like Tic-Tac-Toe, a memory check routine, a Bicentennial music routine, and a System Monitor program allowing for keyboard programming in octal from an ASCII keyboard, Cassette read and write routines, and a storage dump routine useful for debugging programs. After working with the supplied software for several days, I rewrote it to include many of the features of Monitor-8. When I am satisfied with it, I will make listings available to other Digital Group System owners, if they want it. The software supplied is good, but should be regarded as just the beginning, not as the final word.

I'm using my system with a surplus Clare-Pendar keyboard purchased from the Digital Group (it works perfectly, but I'm not too happy with the feel of the keyboard.), and a power supply borrowed from Robert White. My own power supply from the Digital Group has not been received yet. Everything else ordered from the Digital Group was received within 5 weeks of the time I ordered.

Future plans include 8K of memory (already ordered), another cassette interface allowing for motor control, and a scientific calculator interface. Programming is my main interest, and now that my system is running, I can get to work.

Samuel H. Daniel   Yours,
402 Juniper   Sam
Vandenberg AFB, Ca 93437

Hal:

Enclosed is a check for $9.50 for NL issues 1-11 of volume 1.
(I've got #12, so don't need another.) To me, the NL provides
an invaluable source of gossip, trivia and useful information,
and I'd hate to see it leave the scene. Keep up the good work!

As far as the letter from Bill Gates in the 10 Feb issue, I've
got the following comments:

(1) Pirated software, as far as I'm concerned, is not the way
     to do things. I will not argue the point that MITS has
     some (to me) unsatisfactory requirements for the legal
     acquisition of MITS BASIC... that doesn't ok piracy.

(2) I do not possess a copy of MITS BASIC, nor do I plan to
     buy one. Starting from PCC's "Tiny BASIC", I feel that
     I can write a quite satisfactory BASIC compiler/interpretor
     of my own. The reason why I will not get MITS BASIC is
     quite simple: I don't like "black box" software, and
     MITS wants $3000 for source listings for 4K and 8K BASIC
     (see Computer Notes, July 75, page 6). In other words,
     MITS is not interested in letting out the source listings.

(3) As far as Bill Gates' comment that $40,000 of computer time
     went into the development of the various BASIC versions,
     I find that unbelievable. Where I work, the accounting
     charge for IBM 370/168 time, which includes overhead, staff
     salary, etc., is somewhere around $2000 per CPU hour.
     If we had three programmers on a project who used 20 CPU hrs
     in a year for program testing and development, they'd be out
     in the streets looking for employment suited to their abilities.
     (When I was in school, I wrote a compiler for something on
     the order of Tiny BASIC for a term project -- 2 months of
     evenings and 1/2 hour of IBM 7074 time, the standard student
     account allotment.)

(4) In Computer News of October 75 (page 3), H. Edward Roberts,
     MITS president, states "We made a $180,000 royalty committment
     to Micro Soft in order to have BASIC available to our customers."
     I certainly wish I could have put in a bid on that project!
     A price tag like that to me indicates someone trying to get
     rich in a hurry... a top systems programmer in this neighborhood
     might make $18-20K a year, if he's really good

                                        Joseph Mockus
                                        682 Riverview Drive, #83
                                        Columbus, Ohio 43202

S. A. COCHRAN, JR.
ATTORNEY AT LAW
P. O. BOX 607
TYLER, TEXAS 75701

February 23, 1976   PHONE 592-3833

     This letter confirms our phone conversation this evening. Since my brief note
to you, I have acquired an IMSAI 8080 system. Module I of this system has already
been delivered and assembled. This included IMSAI's very business-like cabinet,
MPU board, front panel, power supply (rated at ± 16 v at 3 amps, +8v. at 24 amps.)
and 1K of RAM. In the bargain, IMSAI delivered, wihtout any special request,
paper tape and code listings for its loader, editor and assembler, all of which
require approximately the lower 6K of RAM. IMSAI uses select Intel 8111's, which
are capable of times of 500 ns and better, rather than 2101's or any equivalent thereof.
As received, the power supply consisted of a (sizeable) transformer, two .015 Farad
20v condensers (for the +16 and -16v supplies) and an 0.1 Farad 10v condenser for
the +8v supply. In this respect, they have gone in for, not overkill, but *sufficiency*.
The rating for this supply, as delivered, was de-rated a little by the insertion of
voltage dropping diodes in series with the transformer. It was suggested that if
the power supply began to load up, the diodes be replaced by low resistance jumpers,
and if additional +8v were ever required, the power supply could be upgraded to
30Amps of +8v dc by adding another 0.1 Farad condenser in parallel with the one
issued. I haven't gotten the system up yet; am waiting for IMSAI's 22-position Big
Mama mother board, replacing the 6 board position mother board originally issued me.
     Module I was delivered in Tyler within 14 days of the date I mailed in my order.
Module II has not yet arrived. It will include an additional 7K of RAM, 2 serial
I/O ports, IMSAI's Vector Interrupt and Real Time Clock Board, and IMSAI's Cassette
Interface Board, which is switch selectable between the Popular Electronics standard,
published in P-E for September, 1975, and the Kansas City standard, announced in BYTE
for January, 1976. For hard I/O, I have acquired a FridenModel 9350-2 automatic
typewriter, with controller, which is already encoded in full 7-bit ASCII. Thus far,
we've been able to make it talk to itself through its buffer, and have gotten it to
talk to the computer. [We--includes John Arnold and Dick Whipple, the writers of
Tiny Basic, and their Altair, in which they have 9K of Altari memory, plus my 1K board
on loan.] Our trouble is, that we haven't been able to get it to listen to the computer.
     [At this point, you gave me the name of Nelson Henderson, of Santa Maria, CA,
who has the same equipment and scads of Friden manuals, but still the same problem:
lovely equipment, but how to make it run? You also gave me the name of Ken McGinnis,
who was concentrating on getting up a system to do accounts for a doctor's office
under $2500.]
     The purpose of my call was to find out the address of the party who was adveer
tising the OP-80A Low Cost Optical Paper Tape Reader. You didn't have his name handy,
but promised to write me tomorrow from school and give me not only his name and address,
but also the name of a fellow who was selling optical sensor diodes (?) for $5.00,
where the OP80-A was buying them for $28.00 for use in his rig. Please send both
these names, and their addresses, if you haven't done so already.

     John and Dick will sell cassettes containing their Tiny Basic for the 8080
microprocessor, recorded according to the Suding system, for $5.00 each. Octal
listings of Tiny Basic are also available in Peoples Computer Company's Tiny Basic
Newsletter--a side newsletter, which they are selling for $3.00 for three issues,
and supposed to fold after the three issues are sold out. If interested in the
tape version, write John Arnold, Rt. 4, Box 52-A, Tyler, Texas 75701. Terms: cash
or check with order.

     As soon as I have digested the large amounts of hardware already acquired, and
done a little with it, I will expect to start acquiring Phi-Decks and set up a more
complete operating system that can work for a lawyer's office and both do simple
accounting and form typing.

     I enclose check for $6.00, which should cover the transmission to me of
Vol. I, issues 5-12 of your Newsletter. With thanks for all your assistance,
I am

                                        Yours very truly,

                                        S. A. Cochran, Jr.

...... a great deal of the information
in the Micro & NL and thank you very much for
your efforts for all of us. Because of the
interest you have sparked in me I plan to go
into business administration in the area of
data processing management. I think the
microcomputer will be used more in the future
in the area of small businesses, so I hope to
work in that area.

                    Sincerely,
                    Randall A. Walker

Harold Cronin, 55B Rowe Street,
China Lake, CA 93555 says a com-
puter club is starting at the
Naval Weapons Center with fellows
working on Altairs, TVT's, and
some interested in Intersil 6100
PDP-8/E based systems.

WILLIAM J. SCHENKER, MD
1515 NEWELL AVENUE
WALNUT CREEK, CA 94596
(415) 933-3000

SOME COMMENTS ON THE "AMATEUR" ASPECTS OF THE SMALL SYSTEMS FIELD

FEBRUARY 25, 1976

IT'S BEEN ONLY 2 1/2 YEARS SINCE DON LANCASTER'S TVT ARTICLE
OPENED THE FLOOD GATES OF WHAT WAS TO BECOME KNOWN LOOSELY AS
THE COMPUTER HOBBYIST OR AMATEUR COMPUTER ENTHUSIAST FIELD. IT
HAS BEEN ONE OF THE HIGHLIGHTS OF THE ALREADY FUTURE-SHOCKED
ELECTRONICS INDUSTRY OF THE MID-'70S.

ALL OF US INVOLVED IN THIS MAELSTROM HAVE BEEN MOST THANKFUL
FOR HAL SINGER AND HIS GROUP(ALONG WITH LOCAL SIMILARLY-STYLED
NLS), AND MANY OF US REALIZED THAT THE LIGHTNING CHANGES IN THE
FIELD ARE DIRECTLY RELATED TO THE TIMELY COMMUNICATION CHANNEL,
THE INTERCHANGE UPDATED EVERY FEW MONTHS--MADE POSSIBLE BY THE
MICRO-8 NL. TO SAY THAT WE WITNESSED ONE OF THOSE PERIODS IN
MODERN TECHNOLOGICAL HISTORY THAT WAS GERMINAL IS PROBABLY NO
EXAGGERATION.

NOW THAT OUR FIELD HAS GROWN ENOUGH TO HAVE IT'S OWN COMMERCIAL
PUBLICATION (BYTE) I THINK IT APPROPRIATE TO EXAMINE CERTAIN
ASPECTS OF OUR ACTIVITIES THAT ARE CROPPING UP OFTEN ENOUGH TO
LABEL AS TRENDS.

FOR ONE THING THERE ARE A LOT OF PEOPLE IN THE FIELD WHO ARE
FRANKLY SOFTWARE-ORIENTED WITH A PARTICULAR TWIST. THEY'RE IN-
TERESTED IN COMPUTER "GAMES". THEY ARE ALMOST ALWAYS VERY
BRIGHT, NUMERICALLY/MATHEMATICALLY/RATIONALLY ORIENTED, USUALLY
INTELLECTUAL, USUALLY YOUNG, USUALLY WITHOUT THE FINANCIAL RE-
SOURCES AND HARDWARE KNOWHOW TO HAVE HAD THEIR OWN COMPUTER AT
HOME HERETOFORE, AND USUALLY IN NO WAY INTERESTED IN USING COM-
PUTERS FOR "SERIOUS" PURPOSES. (HERE'S THE CRUCIAL LINES IN
THIS ARTICLE. I DEFINE AS "SERIOUS": WANTINNG TO MAKE SOME SYS-
TEM IN SOCIETY WORK BETTER, SMOOTHER, MORE SAFELY, WITH LESS
WASTE, LOSS , PAIN, FRUSTRATION, ENERGY EXPENDITURE, OR DELAY--
THAN WITHOUT COMPUTER IMPLEMENTATION.)

NOW EVEN THO (OR BECAUSE) THESE SOFTWARE PHREAKS ARE NOT "SERIOUS"
PROVISO, THEY WILL MAKE   MOST EXCITING AND WORTHWHILE CON-
TRIBUTIONS TO SOFTWARE DEVELOPMENT, EXTENDING WAY BEYOND
"GAMES" INTO SYSTEMS ARCHITECTURE WITH COMMERCIAL RAMIFICATIONS.
THE PROVISO IS THAT ANOTHER CATEGORY OF PARTICIPANT IN OUR
FIELD MUST MAKE HIS PRESENCE KNOWN IN AN ACTIVE FASHION, AND
MUST GET SUFFICIENT SUPPORT FROM CIRCUIT DESIGNERS AND VENDORS.
THIS TYPE IS HE (FROM HERE ON READ HE OR SHE) WHO FEELS RE-
SPONSIBLE FOR A SPECIFIC ECONOMIC, SOCIOLOGIC, OR POLITICAL
PROBLEM IN A PERSONAL KIND OF WAY (EITHER BECAUSE HIS INCOME
DEPENDS ON IT, OR BECAUSE HIS NEEDS ARE THERE) THAT HE THINKS
MAY BE RESOLVED BY COMPUTER TECHNOLOGY.

HOW IS THIS GUY DIFFERENT THAN THE TYPICAL DP MAN MAKING HIS
LIVING IN THE INDUSTRY NOW? THE MAJOR DIFFERENCE IS THAT HE'S
A GUY WHO DID NOT GET THE BOSS TO BANKROLL HIS FAVORITE COMPUTER
PROJECT OR IS NOT WORKING FOR INTERNATIONAL BOMBASTIC MACHINE'S
LATEST 64-TRILLION DOLLAR RESEARCH PROJECT. IN OTHER WAYS HE
IS LIKE HIS FORTUNATE COUNTERPART. THAT IS TO SAY, WHAT HIS
BIG-BANKROLLED BRETHREN FIND INDISPENSABLE TO A RELIABLE ELEC-
TRONIC DATA SYSTEM, HE TOO FINDS ABSOLUTELY ESSENTIAL. FOR EX-
AMPLE, HE INSISTS ON AN UNINTERRUPTABLE POWER SUPPLY, REDUNDANT
HARDWARE, LOW MTBF AND DOWNTIME, LOW ERROR RATES, HIGH DATA
TRANSFER RATES, GOOD DATA SECURITY FACTORS, INTERSYSTEM COMPAT-
ABILITY (HARDWARE AND SOFTWARE), AND HIGH QUALITY HUMAN/MACHINE
INTERFACING.

SO WHAT I SEE COMING IS THIS. BRIGHT PEOPLE WILL "PLAY", AND
CREATE LOVELY, ELEGANT, AND EXQUISITE IMPRACTICALITIES.....THEN
THE SLOTHS AMONG US WHO ARE IN TOUCH WITH EVERY DAY PRESSURES
AND CONTINGENCIES WILL FASHION FROM THEM NEW WAYS OF DOING
THINGS AND FOR CHEAP. .

I'VE DEALT ONLY IN GENERALITIES SO FAR. IN CLOSING LET ME DE-
SCRIBE A SPECIFIC AND HOW I THINK THIS DISCUSSION MAY IMPINGE
ON THE FUTURE.

A STANDARD HAS BEEN DEVELOPED RECENTLY FOR CASSETTE MEMORY
HARDWARE AND SOFTWARE. WHAT I NOTICE HAPPENING IS THE SACRI-
FICE OF THE SINGLE MOST IMPORTANT QUALITY IN SUCH A SYSTEM: THE
HIGHEST RELIABLE DATA RATE FOR THE LOWEST DOLLAR. SYSTEMS ARE
BEING TURNED ASIDE WHICH HAVE DOUBLE THE DATA RATE FOR THE SAME
DEGREE OF RELIABILITY FOR ONLY A MODERATE INCREASE IN COST.....
IN ORDER THAT THE SYSTEM MAY USE THE LOWEST-PRICED HOME CAS-
SETTE RECORDERS AVAILABLE. THIS OFTEN MEANS A SAVINGS OF ONLY
$20-50 BETWEEN THE "EL CHEAPOS" AND A RELIABLE DECK. ALSO PART
OF THE DESIGN PHILOSOPHY APPEARS TO BE PROTECTION OF THE ANL
FEATURE. OF THE HOME RECORDER--DESIGNING AROUND THIS FEATURE
(WITH ITS ATTENDANT INCREASE IN COST, COMPLEXITY, AND UNRELIA-
BILITY) IN ORDER NOT TO HAVE TO TAMPER WITH ITS INSIDES. THIS
PRESUMABLY SO THE MACHINE CAN STILL SERVE THE FAMILY TO RECORD
AUDIO PROJECTS WHEN NOT STORING DATA. PUTTING THESE VARIOUS
DESIGN CONSIDERATIONS TOGETHER YOU GET A CASSETTE INTERFACE
THAT VERY SUCCESSFULLY MEETS ITS DESIGN GOAL: A DEVICE MUCH AP-
PRECIATED BY A HIGH SCHOOL STUDENT WITH NO VISIBLE MEANS OF
SUPPORT, WHO CAN THEREFORE AFFORD TO COMPROMISE RELIABLE DATA
RATES.

AND NOW THAT I'VE BROUGHT DOWN ON MY HEAD THE RIGHTEOUS WRATH
OF ALL THE HIGH SCHOOL COMPUTER PHREAKS THROUGHOUT THE LAND LET
ME SAY TWO THINGS: 1) I AM ACTIVE IN PROVIDING LOCAL HIGH
SCHOOL AND COLLEGE STUDENTS WITH WHATEVER HARDWARE KNOW HOW I
HAVE TO HELP THEM IN LOW COST MODS TO SURPLUS DATA EQUIPMENT
(SEE MY LETTER TO MICRO-8 NL ON "PROJECT SCM-TTL UPDATE"); 2)
I THINK THE COMPUTER FIELD SHOULD SPLIT INTO TWO LEVELS, ONE
PROVIDING SUPER LOW COST NON-SOPHISTICATED GEAR TO YOUNG PEO-
PLE, AND ONE OFFERING INDUSTRY QUALITY GEAR AT 1/5TH INDUSTRY
PRICES.* THIS WILL BE A X2 MARKUP INSTEAD OF THE USUAL X10.

*-THIS WOULD BE A KIT PRICE.

William J. Schenker, MD, 2086 Essenay, Walnut Creek, CA 94596
"SCM Equipment -- SASE puts you on roster for buy/sell/swap.
This will be a clearinghouse service, gratis--all I will do
is make up a roster from your responses and distribute it on
a once only basis."

Bruce Brown, WB4YTU/WA9GVK, 4801 Kenmore Ave., #1022, Alexandria, VA
22304 has a friend that just received a Digital Group 8080 machine
after a six week wait and he is having problems with bad 1C's in the
TV display board. In the DC area, they use a homebrew 8008 system
using 2K of PROM, 2K of RAM tied to the WR4AAG TV repeater to pro-
vide a "time share" remote terminal access computer system.

I PREDICT WITH ONE

Page 2

Dear Hal:

Thanks go to Samuel H. Daniel, 402 Juniper St., Vandenberg AFB, CA 93437 for typing up the information in a bunch of hand written letters. Sam has a Digital Group (DG) system that he is very nervously assembling. He has already completely rewritten most of the DG system programs and is now testing the new versions out on the DG 808C system loaned to the Cabrillo Computer Center. His own system should be up and running within a week or so.

Benton H Schaub, Jr., PO Box 28, Gambrills, Md 21054 is currently building a Digital Group 8080 system which he chose because it offered a complete system concept: TVT, expandable memory, Bootstrap EPROM, cassette interface, multiple I/O ports, keyboard, and power supply. Also included is a software operating system on cassette. In general, he has nothing but praise for the Digital Group. They have had delivery problems, but have shipped various parts of the kit as they became available in an attempt to meet their 3-week delivery schedule. He said the workmanship looks great and all components have been first-rate. The instructions assume a certain level of competance so a moderate amount of circuit theory and kitbuilding experience is best.

Randall K Webb, 123 Stratford Ave, Ventura, Ca 93003 has a bare bones Altair and has bought but not received a 3P+S I/O board from Processor Technology. He has a keyboard and plans to add 8K of memory and a TVT. He is an EE & CS major at UCSB and hopes some of his work will earn credit towards graduation.

Teunis Slagboom, 1694 Donnelly Ave, Victoria BC, Canada V8P 1X9, owns an Altair 8800 and subscribed to Vol. 2 of the NL. He says he hopes to contribute to the NL in the future.

Lum Loo, 709 Quintard, Anniston, Ala., 36201 says he has a 64 x 64 x 13 memory stack, and would like some info or ideas on adapting it to the Altair 8800.

Bruce Brown (#B4ITU/#A9GVK), 4801 Kenmore Ave. #1022, Alexandria, Va 22304 said the newsletter is doing an outstanding job providing invaluable info not obtainable through commercial publications, and could save someone lots of money by pointing out reputable dealers. He says James Electronics is the best from his experience. He uses a homebrew 8008 system with 2K RAM, and 2K PROM tied to the #R4AAG TV repeater to provide a "timeshare" remote access terminal computer system.

Bob and Barb Juanillo, 35360 Fircrest, Newark, Ca. 94560 recommends a text-book for the newcomer to computers and digital devices in general. It is the "Practical Digital Electronics - An Introduction" with accompanying workbook ($8.00 each from Hewlett-Packard, 1501 Page Mill Rd, Palo Alto, Ca) The book is item #05035-90002.

D. Mark Allen, 2467 Hemlock Ave, Morro Bay, Ca 93442 has a working TV Type-writer he is trying to interface with his Altair 8800. He is interested in an 8 or 9 bit parallel modem which he is trying to get to work and should give a Baud rate around 2400 if it works.

Vernon T. Kempf, Kempf Associated Enterprises, Inc., 194 Edgemond Lane, Barrington, Ill. 60010 is a new subscriber to the NL.

David Gillespie, 1331 N. Lotta Dr., Los Angeles, Ca. 90063 only recently saw a copy of the Micro-8 NL for the first time. He has a Mil Mod/8 running and requested a copy of the Mil cassette interface.

Peter Wolfe, 42409 Highland Dr., Box 139 Yarrow, BC, Canada V0X 2A0 says he is one of the approximately 8000 Altair owners, but he bought his as a partial kit he is still trying to put together. He said the NL has come a long way from #1 when we said "It is quite possible that we may have Hundreds of participants.

Jack Klincher, 15448 Meyers Rd, Detroit, Mich. 48227 sent in $6.00 for the next volume of the newsletter. He has a Mark 8 and is interested in expanding the memory.

Lee C. Hanson, 2914 Snyder Ave, Cheyenne, Wyo 82001 is currently building a MOD 80. He sold his Mark 8 so he is temporarily without a computer. He plans to get at least 8K of 91L02 (500ns) RAM for the MOD 80 and also the MITS BASIC. He also wants to interface the Suding TVT. He has in his possession the C-MOD-8-9 ROM board and the Monitor 8 ROM from Mini Micro Mart. He would like to sell them both for $75.00

Bart M Berger, 1380 Howard St, San Francisco, Ca 94103 (415)861-4089 - a new phone number- is in the very first stages of building a new TVT that is very fast (more than 15,700 chars/sec parallel, 9600 baud max. rate for serial input) with a 32 x 64 display using interlacing memory. The only problem may be readability. He promises more details if it is ever finished.

Ronald K Angstadt, Rd. 3, Box 281, Kutztown, Pa 19530, hasn't worked on his Mark-8 for a long time, but just received a TVT-III from Micro Mini Mart, after waiting 3½ months. He also has the Suding Calculator interface, and a MOD-8 cassette interface. He wants to get a Monitor for the Mark-8, but doesn't want to wait another 3½ months to get one from MMM.

Robert K Burandt 3429 E 71st St, Inver Grove Hts, Mn 55075, has a Scelbi 8H with 8K RAM and a Digital Group TV-Cassette interface. He has also ordered a Digital Group 8080 10K system, and is considering building the 64 x 64 graphics interface from Byte #2.

Jeb Boswell, MD, 28 Kenilworth St, Newton, Mass 02158 credits the NL for his success in buikding an 8008 type system.

Duane L Gustavus, 2001 Golf Ct, Denton, Tx 76201, says from past experience that the NL is still the best buy in the field for the computer hobbyist. He has the 8K BASIC tape from MITS, but zapped his CPU and had to send it back to MITS for repair. Its enough to turn your hair white, he says.

Larry R Shultis, Box 218, Fontana, Wis 53125 says he received the NL and Byte the same day, and found he couldn't put down the NL until he had read all the fine print, which isn't the case with Byte. He wants to know if anyone has ideas on interfacing a HP-45 to an Altair; also if anyone has had experience with saturation recording or with National Multiplex's Computer Aid digital data recorder.

Martin Haase, Jr, Box 1549, Boulder, Co 80302, expects to have his MOS Technology 6502 system running with 2K of 350ns low-power 2102s, a Digital Group TV and Cassette interface which worked flawlessly the first time it was turned on, and a keyboard hooked to a UART to interface to the 6502. Future plans include A-D and D-A converters, floppy disk, modem, a line printer, X-Y plotter and CRT graphics. His next CPU will probably be an 8080 because of all the great amount of software available for it. He's also looking at the TI-9900 and the PDP LSI-11. He would like opinions on the IMSAI 8080.

The Litton Calculator/Computer Club has just formed at Litton Guidance and Control Systems, Mail Station 78/31, 5500 Canoga Ave, Woodland Hills, Ca 91364, and meets during lunch hours to promote common interests. W V Bennet, is President, and S Lieberman is Secretary.

Timothy H Jackins, 585 Ashton, Palo Alto, Ca 94306 is just now nearing completion of a Mark-8 and needs help in debugging and going even further.

Robert J Jones, MA, 4201 Massachusetts Ave, Washington, DC 20016, reports he has formed the Amateur Computer Society at Catholic University of America.

Gary T. Post, VA 174, Cecil Field, Fl 32215, is in the Navy and says that since he started building a Mark-8 he has been to 6 foreign countries. He has finished construction, but hasn't had time to debug it. Now he will be at the same address for three years and will have more time. He says he'll probably have an 8080 system running before the Mark-8 is working.

John Griffin, 34008 22nd Pl SW, Federal Way, Wa 98003, has a Mark-8 with 10K of RAM, TVT, keyboard, and FSK tape, but just found out about the NL from a friend. He is looking for a good text editor program.

Don Birzei, 1512 E North St, Waukesha, Wi 53186, is building an Altair 8800. Future plans include BASIC, from MITS or someone else. He is looking for a cheap, used ASR 33. He has the Suding calculator interface from Micro Mini Mart, and says the board is inaccurately drilled and the assembly drawings and schematic are unreadable.

Mike Talbutt, 3229 Parkview Ct. S., Columbus, In 47201 (812)376-7738 (a new address) is getting ready to start construction of a system based on the 6800, or more likely the MOS Technology 6502, which he'll probably get from Ohio Scientific Instruments, Box 3/4, Hudson, Oh 44236.

John James, 1597 Monument St, Concord, Mass 01742, has a Mike-2 with 2K RAM, TVT-II, and Suding cassette interface. He reported some problems with the 50 pin connectors, but replaced them with the SkotchFlex versions and has had no more trouble. He modified the Suding Operating System to work on the Mike. He wants to build an assembler and a CW (Morse Code) learning program, which would randomly send letters, check on correct reception through the keyboard, and modify letter probability according to mistakes made by the user.

Baron B Barker, 9748 Pinewood Ave, Tujunga, Ca 91042, has worked out an ASCII to Octal loading program which he uses with his Mark-8 and a TVT-II. His new project is building a MC6800 setup.

Sincerely,

Mary Golberg

Maury Golberg

Box 574
MIDWAY SCHOOL
John Sikorski
NORTHWESTERN UNIVERSITY

MAPLE Microcomputer APL Enthusiasts
is here!

I'd like to know if anyone is interested in furthering the following projects (well, projects-to-be):

APL for uP users: promote APL as a compact, universal code for program notation which can be easily read by any user, and then translated to his uP's code through a APL/uP dictionary. First for the 8080, then....

Software: initially, without vectors (PCC may begin work on this soon)
next, vectors
then, arrays: 2D and color, then 3D?

Hardware: firmware to automatically implement the APL character set on TVT's, and then for those dictionaries!
a matrix printer which will be able to cover the whole page with dots (filling in even the spaces between lines and letters) (and someday even between the dots!) to print the programs in APL text

Essentially, I'd like MAPLE to serve as a focus for the information required to implement the aforesaid projects. If you know of anything that has to do with the above, please tell me about it!

John Sikorski

Mark Spohr, M.D.
1372 Marion St.
Denver, Colorado 80218

Micro 8 Newsletter

At long last I am getting around to writing you! I have learned much from the newsletter and it is time that I contributed. My background is B.S.E.E. and M.D. I hope to get something together in the medical engineering field when I finish my internship but plans are nebulous now.

My system is 8008 based, mostly wirewrap, with Dr. Suding's modifications and VLCCT (handwired). A Digital Group cassette interface is working well with the loader program in two 8223 PROMs in high memory (I built an 8223 programmer which is controlled by the Mark-8 - programs an 8223 in about three minutes - I'll send a schematic and software when I get it in readable form). My system has 6K of 2102 memory, Digital Group TVT and an ASCII keyboard. It has been running well since late Oct.75 (how time flies). The Suding mods make the thing easy to use. Actually, No front panel and a decent monitor program would be better (My next computer ....). Power supply is a homebrew Kludge which is ugly but conservatively designed (10 amp @ 5v.). TV monitor is a 12" Motorola AC/DC with isolation transformer which works well.

After writing several game programs, I decided that hand assembly was not the wave of the future(even with an electric eraser - modified wire wrap gun). On investigating monitors and assemblers, I decided the MIL Monitor 8 was the best way to go (even though it is only a "one pass" assembler). The Monitor 8 was modified so that it could be used with the Digital Group TVT and cassette interface. I also couldn't resist adding a few goodies: such as software scrolling for the TVT, new commands to insert and delete instructions (with automatic adjustment of program JMP and CAL addresses to maintain registration of loops), zero buffer area, and load ASCII text into memory. These new instructions coupled with the original functions of the Monitor 8 (symbolic and octal load and dump, copy and translate functions, breakpoint insertion, program execution, and editing capabilities) make a very handy monitor in 3K of memory. The modified Monitor 8 will be available through the Digital Group.

I would like to put in my vote in favor of the computer conference as suggested in NL #12 by David Christianson. This would be an ideal format for the NL to evolve into now that schematics and kits are available for 103 Modems. This would save a lot of paper, postage and delay . It seems like the logical next step.

Please keep up your effort. We need your open forum, informal format free of advertising bias. Sincerely,

Mark Spohr MD

CACHE

P. O. BOX 36 VERNON HILLS, ILL. 60061

Last November, a company called Great Northern Computers Ltd. had published in the Micro-8 Newsletter a letter, requesting people to help debug their computer kits' documentation. Individuals selected by GNC would be allowed to purchase a GNC kit at a reduced price, and would receive two copies of the construction manuals, one of which was to be returned to GNC when the kit was completed. This second set of instructions was to be modified, corrected, and otherwise annotated, as required. I wrote to them shortly after their letter appeared, and received a letter in reply early in February announcing that I was one they had selected for debugging. Since I had thought of some questions concerning their systems, I attempted to call them by using their return address and going through directory assistance. There was no listing for GNC, nor for two other companies who were listed on the return address of the envelope. It was at that time that I noticed the postmark - Tampa, Florida. I have written them again, with a number of questions about their kits(one 8008-based system for $295, and one 8080-based for $345), a few more questions concerning the mailing discrepencies, and a suggestion that they call me to facilitate my response to their selection. I'll let you know what develops as soon as I know.

The Chicago Area Computer Hobbyist Exchange, CACHE, held its February meeting on the 29th, at Northwestern University. Ed Curry, vice-president of MITS, along with one each of their software and hardware people. The general atmosphere generated by the MITS people appeared to be one of candor and honesty; however, when their responses to people's questions were viewed with more examination, it appears that not a great deal of information was presented. Invariably, the MITS peoples' responses to specific questions were "We've been swamped with work, so bear with our problems," or "We ship all orders within 60 days." This last comment brought a few chuckles, and snickers, from a number of people in the audience. They showed some new hardware, such as a 4K static RAM board, a 16K static RAM board, a vectored interrupt board, and so on, although none of the items seemed to have either a specific cost, or a delivery date. The software presentation, consisting of a presentation of MITS' extended BASIC disk system commands, was a farce. Not only is MITS' DOS nowhere near ready, the presenter was inaudible, and appeared to have taken over software duties at MITS the day before the meeting.

The high point of the meeting came after the MITS presentation, when we had three microcomputers shown. We had an IMSAI 8080, and a PACER working; and a KIM-1, which had been installed in a briefcase. The IMSAT is exquisite; commercial quality throughout, a 30-amp power supply, and lots of room for expansion. The PACER, using the PACE mpu, is a hex-format, self-contained system. I didn't get a close look at the PACER, so I can't go into further details.

Our next meeting will be on March 28; no site has yet been selected. We have tentatively scheduled a demonstration of the IBM 5100 portable computer(too expensive for most of us, but we want to see it anyhow), and a presentation by a Motorola applications engineer.

As editor of the CACHE Newsletter, I can easily sympathize with the problems which you and John Craig have had to face with the Micro-8 Newsletter. The first two CACHE Newsletters were two-men projects, as far as assembly was concerned. The quality, however, seems to have made a quantum leap from the first to the second; hopefully, it will continue to do so.

These comments seem to bring me up to date, except to note that I have a set of MIL Mod-80 boards waiting to populated. Maybe next month. . .

Geoffrey D. Lowe
4439 N. California   Cordially,
Chicago, IL   60625

312/588-7586   *Geoff Lowe*

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20 February 1976

I would hate to do an audit trail on how I happened to run across your address. To make a long story short, I have been trying for the last six months to piece together enough information on the 8008 to assembly the start of a small system. Although I have most of the hardware, including the 8008, I can obtain no specifics on the CPU (clock cycles?/machine state outputs 50, 51, 52, etc.?) My requests for information have been turned down by "Radio Electronics," and ignored by Intel. Last week, I obtained a back copy of "The Computer Hobbyist" which mentioned your group.

Could you please provide me with a copy of the MARK-8 plans (logic/ schematic), if possible, plus an 8008 user's guide. If not, could you lead me in some direction in which I may obtain these items? Please notify me of any costs which may be involved.

I would be forever in your debt,

LANNY L. LARSEN
650 Village Green Parkway
Newport News, Virginia 23602

Page 4

Trivia: In the issue I just received, I noticed that people are now telling what other newsletters and things they subscribe to. I currently subscribe to: Byte, Pop. Electronics, Radio Electronics, Scientific American, TCH, PCC, Electronic Engineering Times, a pair of Audio oriented mags, The Digital Group Clearinghouse, as well as the NL'.

Our SWTPC TVT is still awaiting the loving hand of a Maintainance Person to marry it to our PDP 8e. (When I tried, they just ignored each other.) With all the pain it has been,it IS nearly compattible with a teletype.

Maybe I should not talk about this, but I am finally ready to send off the first of a series of homebrew computer design articles to Carl Helmers of Byte. I do not know what he will say about it yet. If it were to be printed in the NL it would gobble up dozens of issues. I am currently titling it, aptly enough,"Designing a Homebrew Computer".

The following is a list of why, for my first system, I have decided on using the MOS Technology 6502:
1) It is the first and thus prone to errors.

2) I have no experience in devising the necessary clock circuits necessary for nearly every other MPU in existance. It's built into the 6502.

3) MOS Tech. has come out with hardware and software manuals that make most of the work easy.

4) The 6502 treats I/O devs. as memory, an imperitive need with my up and comming modifications.

5) Due to some of the innovative things I plan to add, I WANT to start nearly from scratch.

6) In order to keep costs as low as possible, a prime consideration has been that the 6502 is an 8-bit processor. 16 bits is double the hardware in most cases, and 12-bits is an outright pain in view of all these new 8-bit oriented support chips that are comming out.

7) I do not plan on just designing one system. My NEXT one will almost deffinitely be based on the Intersil 6100 chip. I am a devout PDP 8 freak!!!

8) I have all the 6502 hardware documentation on hand. I don't know how long it my take to get comparable info from Intersil. I do know that it will cost a pile from anybody else.

Together, these reasons spell MOS Tech. 6502. After I have gained experience, and time, I will jump right into an Intersil system. The prime advantage of an 8 bit system,though,lies in the relative inexpensiveness of memory. According to the data I have at this time, I can get 16 K of 91L02 memory for aproximately 240.00. Now,you start

$30.00 for the digital group's 8K memory PC board,
$10.24 for IC sockets (OPTIONAL)
$192.00 for 128 91L02's (Provided Steve Edelman's deal works out)
Using Jim Brick's pig g backing technique, it is possible to make the 8K board accept up to 16 K

Now I have a problem. Currently, I plan my 6502 card cage as ten slots with a 72 line super bus. Maybe it's a simple problem, but I have no current data on bus drivers. (My most recent semiconductor data library is National's 1974!) How do you get around bus expansion if you have EVERITHING reading off of the address lines. I know that there is no problem up to ten slots, but what happens after that. Do I have to pipe all my lines through another set of bus drivers for every ten slots. Also, what is the best way to terminate the data and control bus so as to limit ringing???? If these problems are easily soluable, I will seriously consider going to 20 slot cage. I am hoping that the resulting cage will come off as something like DEC's OMNIBUS. Please, somebody help me with this.

Finally, I am still interested in getting a VERY cheap model 32 printer for my MWM terminal. Also, can someone recommend either a good process (I have access to a high school Chemistry Lab) for the making of two sided PC boards. Or is it cheaper to send my schematics to someone else. If so, WHO???

Yours in Hobbyist Computing,

William Cattey

William Cattey
39 Pequot Road
Wallingford, Ct. 06492

This is a pretty old letter so if you are
interested in anything here, write Jim
and see what the present status is.

Jim Garrett
322 Rollingridge Ln.
Garland, Tx. 75041

Dear Friends,

In contacting MITS about the avalabil. of there Altair 8800 * (trademark?)
P/C boards I have found that they are no longer going to supply the boards
to the hobbiest. After checking around here in Dallas I have come to the
conclusion that if there is enough interest I will make an equivalent improved
set of boards for us at cost. The purpose of this letter is to guage that interest.

I am asking everyone that is interested in Altair 8800(*) -LIKE boards to
drop me a postcard (or letter) stating their needs and demand. These are improved
boards (A DISCLAIMER: I do not offer Altair(*) products or kits, I sell parts and
accessories which can be used in the Altair 8800(*)).

The display board will contain the neccesary mods to pervide an octal display (for
approximatly $15 in components you can can read octal insteed of binary), AC switch
improvements will be instituted, grounding on all boards will be improved, mods
to the CPU board will include reduce switch noise and better and more conventional
connecting between display board, the memory boards will have provisions for a DIP
switch for address selection (no more jumpers) and the power supply board will have
no or few jumpers (this will improve reliability).

The tenitive prices are as follows:

Description of Board	Cost (Estimated)	
CPU	$18.50	ALL BOARDS ARE MADE
4K Memory (Static or Dynamic)	18.00	TO MIL SPECS WITH
Power supply	13.50	GOLD PLATED EDGE
Display and Control	33.00	CONNECTORS OF 1/16
		INCH MATERIAL.
SET I (1 each CPU,P/S,andD/C)	$58.50	
SET II (4 each of either static or dynamic)	65.00	
SET III ***** SETS I + II *****	$115.00	

(This includes postage, insurance and full documentation of all mods.)

I am willing to produce any other boards if there is enough demand. Along the
same lines I may be able to supply the dip switches, connectors (both 100 pin
and IC) and miniture switches if there is enough interest at OEM prices.

Let me repeat that I'm not in this to make a killing, I am interested in producing
a high quality product and making enough to build my system.

If the demand is enough I will send out an order form by the middle of January to
everyone that sends a postcard or letter with delivery to begin the latter part
of Febuary or first of March.

10/21/75

Thanks,
Jim Garrett

Dear People,
    First please enter a change of address from PO Box 5104 to the above box
number, everything else the same.
    Second, Could you please ask in the newsletter if anyone else received
the Sanders 720 terminal that was offered for a while earlier and whether
there is any information (schematics and such) available. I and a friend
of mine in South Carolina have one each and need the info.
    I have sold him a set of MOD-8 boards and ROM that I haven't had time
to get into (moving etc) and am helping a friend here with a 6800 system
for stock market stuff. I am also working on a alpha-numeric CRT terminal
usong a smoke-damaged Ball monitor that used to be available around here,
a Herbach& Rademan keyboard, based on the Ann Arbor terminals circuits,
and using the Univac printer mechanism I got from Mini-Micro-Mart for
hard copy. I want to do a graphics terminal with a 6800 for intelligence
next, but that is some in the future. I am also looking forward to seeing
what Godbout turns up with on his 16-bit sytem.
    FYI and probably worth following up, Steve Wozniak who is in the
Home-Brew Computer Club here has designed a 40x24 TV terminal that probably
can be built for less than 70$ and has included a serial EIA interface and
rolls. It is called the Call-computer terminal and the info may be available
from them. It uses 32 chips and is pretty simple. It would make a great
console for people with bright TV.s. Thats all the info I have on it.
Douglas Faunt   Thanx
PO Box 60116   Doug
Sunnyvale CA 94086

December 15, 1975

Dear Ial,

Roland V. Lupient
Route 3, Box 303
Mosinee, WI 54455

The time between the date a letter is written to you and the date that
the information gets published can make the information a bit misleading.
For example, the November 1 , 1975 newsletter stated that I sent my
Altair 8800 back to MITS on May 22, 1975, and that I did not get it back
yet. Actually I got it back on June 11, 1975. I had SC10 on the CPU
board connected between PSYNC and ground, the directions and drawings
in the construction manual are not the clearest. They relocated it,
checked the voltages, installed a deposit modification on the display/
control board, charged me $11.00 for ½ hour work and $8.00 shipping.

On June 18, 1975 I ordered the IC's to expand the 1K board from the
256 words supplied with the original kit to 1K, changed my order of
February 25, 1975 from the Comter 256 to the Comter II, ordered the
Line Printer and Controller, and four 4K Dynamic RAM boards.

Everything, except the Comter II, arrived on October 14, 1975. Two
of the 4K Ram boards were returned to MITS on December 10, 1975 be-
cause they failed to function properly. A wrong resistor was supplied
for the Serial I/O board for the Comter II (the board was shipped,
but the terminal was not).

On October 20, 1975 my order for Extended Basic software and the
assembler package was acknowledged, but backordered, and scheduled to
be shipped 12/27/75 and 11/19/75 respectively. The latest promise on
shipment of the Comter II is January 16, 1976.

Now that I have learned a little more about the Altair 8800 it seems
that expanding the 1K board was a mistake--it would have been more
economical to scrap the 256 wordsof static memory, but I was under
the mistaken impression that some static memory was necessary for the
successful operation of the computer.

Some other hobbyists I met convinced me that I am not going to be com-
pletely satisfied with the Comter II, because of the limited display
capability that it has, and that the Typewriter II from SWTP might
serve me better. I would like to hear from anyone who might be able
to offer any other solution for this terminal, keyboard/display problem.

Please enter my order for Volume 2, 1 thru 6 of the "Micro-8 Newsletter",
$6.00 check enclosed. My office phone is 715-457-2139, home 715-457-2502.
I hope you can keep us to NL, since there are not enough hobbyists here
to form a club and the NL is a good substitute.

    Yes, of course I'll send you six bucks for Volume 2 - 1 thru 6
(Enclosed is my check for same). I've never enjoyed a publication so
much. Usually only one or two articles in a magazine interest me and
one reading usually does it. I'm interested in every article-letter
Micro-8 prints and I read 'em again and again. I'm going to be very sad
if and when you close up.

    The computer bug hit me in a big way back in Oct 75. Since then I've
been devouring everything about it I can get ahold of. I'm in a rural
area and if there are any other computer enthusiasts near I'm not aware of
them. I live in the eastern panhandle of West Virginia about eighty miles
away from Washington. If there is a club in Hagerstown, Md or Frederick, Md
I'd like to know about it. Your newsletter is my sole present contact with
others.

    I have subscribed to the Computer Hobbiest (six weeks ago - no
response) and Byte (four weeks ago - no response). I want to get the
back issues of ECS and wrote to Carl Helmers as suggested in u-8. Carl
said no sale, no loan of remaining copies. Will you lend me yours?
I will photo copy & return immediately and am willing to send you a
security deposite sizeable enough to insure return. Same dismal respose
to efforts to get Mark-8 plans. Tracked down the back issue of Radio
Electronics thru interlibrary loan, found only the description and sent
off for plans to RE, Naturally I found that offer closed out. I still
want the plans; the modifications written up in u-8 don't do me much good
without the schematics. Will you lend me yours with the understanding
I'll return immediately? If nothing else, could someone in your group
xerox the schematics? Thats all I really have to have. With that in
mind I'm enclosing an S&S and an extra two buck check to cover the xerox
cost. I'm especially interested in the Mark-8 control panel.
    Thru your newsletter I learned of Robert Swartz, sent for and promptly
received Mod 8 and Mod 80 documentation. He provides a good service.
For those who are interested: Space Circuits' number is 519-742-5896
but phone orders with charge card numbers are not accepted. They promise

Page 5

Enclosed is a bulletin from Processor Technology describing a
memory stand-by operation. I have made the modification on
my 4KRA board and presently use a 2V stand-by power supply.
The only problem I've encountered is that all AC power to the
peripheral equipment must be turned off before the computer
is shut down. Turning off everything with a master switch
caused garbage to be loaded in memory.

The SWTP TVT-2 has provisions to load the cursor position
register directly and thereby moving the cursor anywhere on
the screen. This will greatly increase the update rate of the
display when only a small number of characters have to be dis-
played (1 came up with this circuit to speed up the LIFE game).
The character position is determined by 1C35 and 1C27A; the
line position by 1C34. A total of 9 bits are needed for cursor
positioning requiring 2 output ports. This also makes the soft-
ware somewhat messy. In my interface the first output in-
struction latches the first 4 bits in a 7475 and the cursor
is set to the home position (resets 1C27A). Next the remaining
5 bits are sent out along with a strobe pulse to load the
register.

Some comments on suppliers. I have received excellent service from
James and Solid State Music. I'm sending a letter to the FTC
regarding an order I placed with MiniMicroMart in June 75.
Two requests for a refund have been ignored.

Adolph F Stumpf
5639-A Ute
Glendale, AZ 85307

Sincerely yours,
A. Stumpf
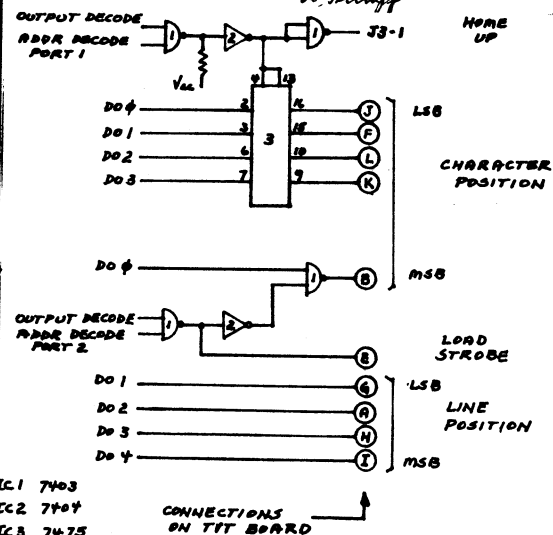
two day shipment out of stock for all Mod8/80 boards. The basic set of
7 boards for either Mod8 or 80 is currently (Jan 30) $86.70. Extra boards
are still $13.00 except for prom programmer backplane at $24.75. The
$10 postage & handling and 8 % duty still hold. I intend to install this
unit in a Mini Micro Mart RM terminal and have been promised by Maury over
the phone to get shipment immediately after receipt of order. After the
warnings in your newsletter I am very fearful, but he is the only one I know
with a Rix for sale. I'll let you know how it all turns out.

    I'm an ex-heavy ground radar tec, now highschool chemistry and physics
teacher who does a little land surveying on the side. I have a HP 9100a,
cira 1969, with no peripherals. I would like to interface it with an intellegent
typewriter so that I didn't have to hand copy everything the Hp9100 does.
Thus the interest in the RM terminal. I expect it will take at least a
year to get my system up. I certainly hope you're still publishing at
that time.

31 Jan 76   Sincerely

Teriff C. Young, Box 826
Shepherdstown, WV 25443

2309 Hazel Ave.
Dayton, OH 45420

March 5, 1976

Enclosed you will find a paper entitled "One Evaluation of a SPHERE System" for publication in Micro-8 NL. I have also sent a copy to Peoples Computer Co. to get as much hobbist coverage as possible (I realize some duplication will occur).

In the past I have a request to make. I would like to know of any independent circuits that I can buy or build that will be compatible with my Sphere system (as is or by modification). I have a copy of the Intel circuit and it is quite complicated and heavily discrete. There has to be a better way. I could design my own but why re-invent the wheel.

Speaking of re-inventing the wheel, I grew tired of waiting for Sphere to deliver my cassette interface so I designed my own. It uses Manchester (Aiken F/2F) coding, has no one-shots, will tolerate +2% to -31.2% speed and/or frequency variations, records at 1500 bps and 800 bpi, and uses 16 ICs. Why go against the KC Std. you asked. Well for trading software I will have a KC Std. via Sphere, but my own design is more efficient at packing data and record and playback times. However, if you wish to use the KC Std. changing one timing circuit will get you there. If you are interested let me know and I will do a short article on it. I guess that is it for now.

Yours truly,

Chuck

One Evaluation of a Sphere System

Charles E. Burton, Ph.D.

Which Processor?

In the early 1970's Intel developed some Macroelectronic circuits that would revolutionize the electronics industry and would intrigue hobbiests. Although the Intel 4004 was developed first, the Intel 8008 has probably been used by more hobbiests than the 4004 because of the design of the Mark 8 and of the Microsystems International MOD-8. The major drawbacks of the 8008 are the large quantity of overhead circuitry required and the slower speed, when compared with the second generation devices; however, the price made it attractive. Then MITS introduced the Altair 8800, using the Intel 8080 and the hobbyist market exploded. Now kits are available which use the National IMP-16 and PACE, the Motorola 6800, the Fairchild F-8, the MOS Technology 6502, the Intersil IM6100, and others. After surveying all the available microprocessor data, I decided: to go with an M6800 system; although for software support the IM6100 might have been a better choice since it emulates the PDP-8/E, thus opening up a vast library of DEC software. The M6800 has an architecture similar to the PDP-11, treating I/O and memory addressing the same. The chip family approach and single power supply are also desirable features of the Motorola device.

Placing the Order

Sphere was probably the first company to introduce a system using the Motorola microprocessor. They started their design in early 1975 and I believe their first advertisement appeared in Radio-Electronics in July, 1975. Their introductory offer was very enticing and subsequent telephone conversations convinced me to take a chance on this new system. I ordered the System 2 kit containing a CPU board with 4K bytes of dynamic RAM, a CRT board (similar to the TVT video generator), a keyboard, a Communication/Cassette board, a power supply, and a terminal. Their introductory offer included a 180 day guarantee and a 5% rebate for late delivery (in excess of 60 days).

Delivery

The kit was not delivered within the 60 day period and Sphere lived up to their rebate offer. The kit did arrive about a month later and it came in five or so installments. However, as of the first of the year, the Communication/Cassette board has not been delivered. This late delivery is due in part to a redesign required to make the cassette interface compatible with the BYTE conference audio standard. This late delivery has been promised for March, 1976. The Operator and Reference Manual and the System Software were not delivered until about 1½ months after the parts were received.

Assembly

1. The CPU Board

The instructions consisted of 1½ pages of assembly procedure, a parts list, a part layout sheet, and schematics. I spent about five hours assembling this board. The 1702A's containing the monitor were not included with the parts and were not received. The assembly procedure is questionable. At the outset, four checked out bad, i.e. open or short. There were some PC board layout errors on the schematics. One resistor was mislabelled and on the layout sheet, there were no instructions on using the real time clock; a few of the parts were crowded making part insertion difficult at times and there were a few errors on the schematics.

2. The Keyboard

The instructions consisted of 1½ pages of assembly procedure, a parts list, a part layout sheet, and schematics. I spent about five hours assembling this board. The assembly procedure for the space bar was absent from the instructions, causing some head scratching. The key-switches are similar to those used in the SWTP TVT and their reliability is questionable. At the outset, four checked out bad, i.e. open or short. After assembly, three turned out to have extremely bouncy characteristics and two went bad (shorted) during a three week period of no use. Sphere indicated that the manufacturer has tightened their QA and if the owner wants to return the old switches for exchange, along with $5 for handling, Sphere will replace the keys. The major problem is that after the keys are soldered in place, unsoldering may destroy the keys (because the lines are very thin) and the plated-through holes.

There were a few PC board layout errors which had been corrected by Sphere by cutting the etch and running wire. One of the original bad keyswitches was one that Sphere had soldered into the board as a PC board correction.

3. The CRT Board

The instructions consisted of 2 pages of assembly procedure, a parts list, a part layout sheet, and schematics. I spent about four hours assembling this board. Numerous resistor positions on the layout sheet were absent or wrong; part count and components delivered were wrong in a couple instances; instructions to complete the RF section were not included and one PC board layout error which Sphere had corrected was evident. An RF transmitter can be made to this board since the PC board has the etched area available. The circuit for the transmitter is identical to the TVT circuit published by Radio-Electronics. There are also pads available for affixing a Gaussian shield. I made my shield from copper screen, cut to form a five sided box. All edges were soldered and silicon rubber glue was applied to the base of the shield to insulate the shield, thus preventing component shorting. Wires were soldered to the screen, then soldered to the shield grounding pads.

4. The Power Supply Module

The instructions consisted of no assembly procedure, a parts list, and schematics. I spent about four hours assembling this module. The major problems came from missing hardware (nuts and bolts) and a couple of misdrilled holes. The lack of enclosed assembly procedure caused some frustration.

5. The Terminal Module

The assembly instructions consisted of no assembly procedure, a parts list, and no part layout sheet. I spent about one hour assembling this module. Again, missing hardware and some tolerance errors caused problems. Also, the lack of assembly procedure and part layout caused frustration.

6. General

The boards are good quality and the plated-through holes saved untold problems. The only thing that I am apprehensive about is the narrow etch widths. Because they are narrow, soldering and unsoldering components can cause the etch to lift away from the boards; also, ohmic drops and noise problems can occur. There are more than enough decoupling capacitors on all of the boards.

Any missing parts and hardware were promptly sent. The new assembly procedures (included in the Operator and Reference Manual) have been up dated to include some of the procedures that were missing from the original instructions. However, I must say that a major deficiency of this kit is the documentation. I believe that the assembly procedures are not nearly sufficient for the general hobbiest. Sphere would do well to survey HeathKit, SWTP, and MITS kit assembly instructions for use as guidelines to improvement. After reading the Operator and Reference Manual, it was found that the manual could stand a vast amount of improvement. I estimate that there are at least two typographical, grammatical, and/or technical errors per page.

Debugging

After the components were soldered to the boards, the flux was removed by using a toothbrush and alcohol. I found that backlighting the boards with a high intensity light allowed me to easily find most solder bridges. However, because some of the component solder pads were so close to etch lines, a couple of bridges appeared as though they were proper solder connections. In particular, one of the clock circuits had such a solder bridge and it took me about two hours to find it.

Much has been written about "the front panel vs. the software monitor." During the debugging of the system, a front panel can be invaluable. If clock circuits, memory address or data busses, etc. are defective, a system monitor is of no use! I started debugging the system with a VOM and a logic probe, progressed to an oscilloscope, and ended with a logic state analyzer. In all I spent about seven hours running down the various "bugs."

I had and still have some power supply problems. The zener diodes and the series resistors of the -5 volt and -12 volt supplies run extremely hot. Increasing the series resistor to reduce the zener current would probably alleviate the problem. The +5 volt and +12 volt supplies are low, but within the regulator specifications. However, ohmic drops in the cable from the power supply to the terminal (about ten feet of 22 AWG wire) and in the interconnecting and distribution ribbon cable (about four feet of 30AWG wire) drop these voltages to near or below the lower limit of the IC supply voltage specifications. I believe that it would have been much better to distribute the unregulated voltages to the boards and to put regulator circuits on each board. The system cost would have increased somewhat, but the problems with ohmic drops would have been overcome.

The power-on-restart circuit only works occasionally. However, a "fix" has been suggested in Sphere's Global News.

Another documentation deficiency that is also evident is the lack of information on debugging any hardware problems. If the kit builder does not have a good understanding of digital circuits and the other circuits which make up the kit, he will have a rough time during this phase of the kit construction. Also schematic errors can make things even worse!

Hardware

The CPU board contains the M6800 CPU, four 1702A PROM's (1K bytes) containing the Sphere Program Development System(PDS) software, eight 2107 dynamic RAM'S (4K bytes), an optional PIA, a two phase system clock, a refresh clock, a real time clock, and control logic. The system clock phases (#1 and #2) are derived from two monostable multi-vibrators configured into an astable arrangement. The #1 is about 820 nsec. for all cases except during a write RAM cycle where it is 1000 nsec. for all cases except during a write RAM cycle where it is 1000 nsec. This cycle time is 32% longer than the fastest CPU clock rate. The dynamic RAM refresh is not done on a cycle steal basis but shuts down the CPU by pulling the HALT line low for 64 system clock cycles out of about every 2 msec. The refresh clock is also derived using two monostables. The real time clock is derived from the refresh clock using a binary counter to produce 512, 256, 128, or 64 interrupts per second (tied to IRQ). The action of pulling the HALT line low during refresh causes two major problems. First, software timing loops, a major programming tool, are impossible to use reliably. Second, the real time clock suffers from a similar problem since all interrupts are ignored while the CPU is halted. There is another problem with the real time clock. It has the lowest priority in the interrupt structure since there is no way to directly detect that the real time clock was the interrupting device. All other I/O devices whose interrupts are enabled must be polled before the real time clock can be assumed to have caused the interrupt, i.e. assumed by default.

The keyboard module has and is still giving me 90% of my headaches. The major cause seems to be the keyswitches. The keypress codes are derived using the system clocks, two binary counters and a one of sixteen decoder, i.e. a multiplexing scheme. The keyboard I/O is done through ½ of a PIA, leaving the other ½ of the PIA for a user defined function. The CRT board contains a video generator (similar to the SWTP TVT), etched area for an RF oscillator/twin lead antenna hook-up (parts and connection instructions not supplied), 512 bytes of static RAM, and video clocking circuit. The video clock is also derived from two mono-stables. This clocking method does produce some waviness in the display. The RAM not only provides storage for the CRT characters (32 characters per line by 16 lines) but is also memory for the CPU, i.e. directly addressable. The nifty part of this circuitry is that it has a DMA controller, whereby the video circuit can access the memory as long as the CPU is not addressing this memory segment, i.e. the CPU takes precedence. All connections between boards (address buss, data buss, control buss, and power supply voltages) are made by ribbon cable and DIP connectors. I have experienced a couple of problems with the DIP connectors. First, the connector/socket interconnection is not real tight so that the connectors tend to work themselves loose. Second, the pins on the connectors are somewhat frail and I have had two pins break off during insertion. Third, care must be taken when inserting the connectors in the correct orientation. Luckily the boards are protected against connecting positive voltages to the negative supply lines and vice versa and I only burned out one diode.

Software

It is evident that Sphere has some good software writers. Within the 1K bytes of the PDS PROM's is an Editor, a Mini-Assembler, a Debugging Aid, and some Utility Programs. The Editor has full cursor control and scrolling capabilities. The scrolling can store and retrieve text through-out the entire extent of the memory. The Assembler allows for 63 one character labels and origin and equate pseudo-operations. The opcodes are presented in hex and the operands are defined as data by one "shift left." The operands are defined as data by (two byte), or relative and take the form of two hex digits or a label. The Debug routine allows for addressing any memory location, viewing the contents, and changing the contents; the stack can be retrieved and modified breakpoints (using Software Interrupt) can be set and reset; the Assembler symbol table can be accessed; and a program can be executed, all under keyboard control. The Utility routines include multiply, divide, ASCII-to-Base and Base-to-ASCII conversions, CRT I/O, and more.

Comments

Sphere has what I consider some major hardware deficiencies (especially the keyboard) and some very good software. Be that as it may, Sphere is one of the few companies that sells a complete system for a reasonable price. However, in its kit form, the present state of the documentation probably makes construction extremely difficult for the inexperienced hobbiest. To date, Sphere has lived up to most of their promises, has paid their rebate for late delivery, has promptly responded to supply missing parts, has freely answered question, and has been appreciative of feedback. On the other hand, the delivery times are not as good as had been first anticipated and promised.

In general, depending on the intent of the user, the Sphere system is a pretty good system for the money. After all is said and done, you have a system for the $860, or so, that you have spent and not just a box with front panel switches. Each individual will have to weigh the benefits against the deficiencies and make his own decision as to whether the system will meet his needs. My intnet has been to indicate problem areas and good points, so that the potential buyer can go into his purchase with his eyes wide open. I should note here that my system was one of the first delivered and problems can be expected under such circumstances. I do not intend to scrap the system; on the contrary, I intend to use the system to the full extent of its capabilities to solve the problems that interest me.

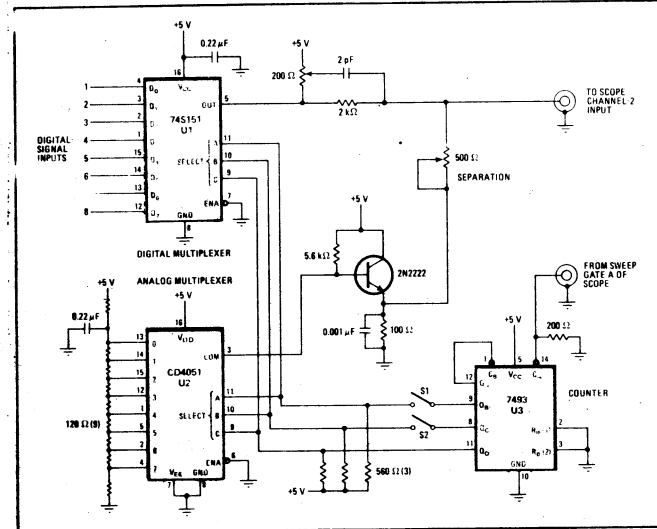# Scope display of eight signals helps debug sequential logic

by Matthew L. Fichtenbaum
General Radic Co. Concord, Mass

When debugging sequential logic, an engineer may have to observe several signals simultaneously. Logical states and the times that they change are of primary importance in the visual display; the exact values of voltage levels and the duration of rise times and fall times are of lesser importance.

Two, four, or eight digital signals can be displayed on one of the two channels of a Tektronix 454 or similar

dual-trace oscilloscope, as demonstrated in the photographs on the next page. The other channel may then be used for triggering or for observation of a ninth signal. The eight signals are treated as logic levels and are gated by a digital multiplexer. Although this procedure does not preserve voltage levels and wave shapes, it does achieve maximum speed with simple circuitry.

The circuit for displaying the signals on the scope is illustrated in Fig. 1. The 7493 divide-by-16 counter (U3) is incremented after each scope sweep. The counter steps through the eight inputs sequentially, and the extra stage compensates for the use of every other sweep in the "alternate" display mode. The counter's highest three bits select an input signal via digital multiplexer U1, which is a 74S151 TTL Schottky type. At the same time, the CD4051 C-MOS analog multiplexer U2 picks a dc voltage off a resistor chain. This voltage is summed

2. **Signal tracing.** Channel 2 of dual-trace scope is multiplexed to display eight different logic wave forms in (a) and four wave forms in (b). The channel-1 trace, used for triggering, appears at top in both photos; it is brighter than the channel-2 traces because of its higher duty ratio. This simultaneous display of several signals is convenient for logic-circuit debugging. High and low states, and the timing of their changes, are indicated accurately even though the multiplexing does not preserve voltage levels and wave shapes. The multi-trace adapter circuit is shown in Fig. 1 on the preceding page.

with the digital signal, providing a different reference level for each trace and thus separating the traces vertically from each other on the screen, as shown in Fig. 1.

The 500-ohm variable resistor adjusts the magnitude of the dc offset, varying the trace separation. The scope's variable vertical-sensitivity control may be used to adjust the over-all display amplitude. The 200-ohm potentiomet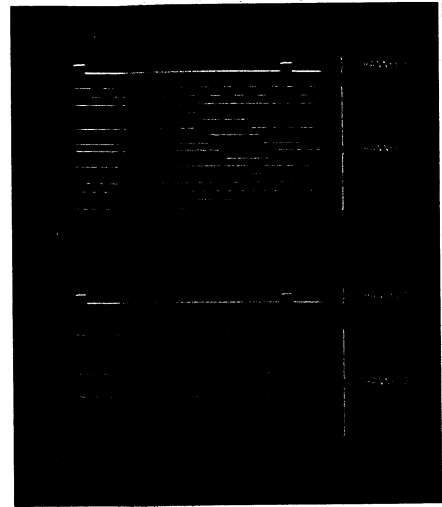er is adjusted for best transient response. Both the 500-ohm and 200-ohm pots should be cermet or other noninductive types. The three 560-ohm resistors pull up the levels of the inputs to the multiplexers.

The resistor chain could be replaced by eight potentiometers in parallel, with their wipers connected to the input terminals of the CD4051, for separate adjustments of the vertical positions of the individual traces.

If switch S_1 is open, the scope displays only four traces (digital inputs 1, 3, 5, 7). If both S_1 and S_2 are open, only two inputs (3 and 7) are displayed.

This time-division-multiplexing of channel 2 on the dual-trace scope of course makes the signal wave forms less bright than the channel-1 trace. In Fig. 2(a), the top trace is scanned eight times as often as each of the lower eight traces, and in Fig. 2(b), channel 1 is scanned four times as often as any one of the four offset wave forms that share channel 2.

The circuit may be built in a small box, with appropriate connectors to the scope and inputs. It should be used near the logic circuit under test to minimize signal-lead length and circuit-loading. Only 5 volts of dc power are required. □

1. **Multi-trace adapter.** Two, four, or eight digital input signals time-share the channel-2 trace of a dual-trace oscilloscope by means of this circuit. The digital multiplexer selects individual digital inputs in cyclic succession, and the analog multiplexer separates their wave forms vertically. Sweep counter drives multiplexers. Switches S_1 and S_2 permit display of only two or four digital wave forms instead of eight.

Dear Gentle People,

Please send Vol. 2 NL's 1 thru 6 if it has gone. I realize that I'm a little late with this but being the eternal optimist I thought I would try anyway.

I have been living in London for the last 4 years but am now going home. Home is 1202 West Koch, Bozeman MT 59715. Please consider that as an official change of address notice.

I have an Altair 8800 with 1K memory, TVT 11. cassette interface from IMS Associates (if it ever reaches me) and an ASR-33 with a 115v 50 Hz motor in it. Would sincerely appreciate any information as to where I could beg, borrow, trade, etc a 115v 60 Hz motor for the ASR.

Now for the software. I don't have any. Am interested in MITS Extended Basic but I am not very impressed with dynamic memory and I can't afford static memory. One note of interest is that Mini Software, P.O. Box 7438, Alexandria, VA 22307 is offering FORTRAN AND BASIC software packages for the 8080.

Here's hoping that you are alive, well and still publishing.

Terry [...]

January, 1976
Ravcommunit, Box 4/1
[...] NY, NY 00510

I have recently gone to my first meeting of the South Fla. Computer Users Group. I wish that everyone in the Miami - Ft. Lauderdale area knew about it. The group is just in it's early stages, but it seems to be a GREAT idea.

I have available from me for sale :

1) The total package of TTL ics and the 8008 for the Mark-8.

All of the pieces are unused and are on sale for $ 53.00 + post.

For an additional $3.50 I will supply all of the resistors except those for the memory board. Or 8008 alone for $24.95.

2) I also have the hand-made positive foil- pattern artwork for the ALL SIX BOARDS Mark-8. All of the boards are complete except for the memory which has been adapted to 2102 chips which is probably 95% done. The $30.00

bus system has been adapted to .156 plug-in fingers (double 60) 11½ conn.
6 conn. - NC
The approx. size of the finished boards would be about 7 X 10.

3) For the above, I have obtained 28- 15 cond. double sided PC board connectors. They are .156, have soldertail term. and are extreemly easy to splice together to obtain the necessary double 60 conn.
each· 30¢ + post.

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WILLIAM T. PRECHT & ASSOCIATES
Data Processing Consultants
1102 S. EDSON
LOMBARD, IL. 60148
620-1671

Dec. 4, 1975

Dear Hal,

I just received the Nov. issue of your newsletter, and am enclosing a check for $6 to receive the next 6 issues. Although I am sure that it represents considerable personal sacrifice to you to put out the newsletter, I certainly hope that you will continue to do so. For most of us in the heartland, yours is the only up-to-date and unbaised source to represent users from coast to coast, and provide comprehensive news from suppliers on the west coast.

My personal Altair "toy" continues to grow, mostly with enhancements from Processor Technology, whose attitude and product quality is unexcelled. I have their 2K ROM board, 4K RAM, 3P+S I/O board, Mother Board, and the Video Display module on order. My only previous quibble had been about price, but now with group purchases, that is being erased, too. If their ROM-based Operating System with dual cassettes (think of them as slow floppy disks) is as good as their Software Package #1, I am sure I will go that route with them as well. (No, I don't own any of their stock).

Our Chicago users group is growing rapidly. We now have almost 200 on our mailing list, and meeting attendance has gone from 30 to 70 in 3 months. Our new name, by the way, is CACHE, (Chicago Area Computer Hobbyists' Exchange), and we are now setting up memberships, regular meeting sites, and breaking into committees. Full information can be obtained by writing to:

CACHE
P.O. Box 36
Vernon Hills, IL 60061

We would like to form an association of user groups, both for information exchange and to increase our group purchasing power. Maybe someday we can build it up to a national conference (everyone needs a few of these to attend).

Supplier notes: When the new FTC rule goes into effect, Maury Goldberg of MiniMicroMart may as well throw in the towel and keep the loot he has acquired for his junk by misleading advertising and Big Talk on the telephone. As PCC said recently,"in view of his apparent reputation, we will not waste space printing his address."

The MITS mobile was here last week, and put on a pretty good show. Mike Hunter ("the van man") does a good job, and the 8800 does its thing with a very nifty BASIC. I don't know why anyone would pay $12 a month ahead of time to see it, though.

Keep up the good work (please).

Sincerely,

Bill Precht

Dear Sir:

Please send me information on starting a subscription to Micro 8 News.

I have a MOS 6502 system in operation and would like to possibly submit a construction hints article to your paper.

Very truly yours,

Gerald D. Severson
30 Irving Terrace
Depew, New York 14043

I would like to know if anyone has tried to interface a high speed commercial computer tape transport to an Altair 8800 for mass storage. If so, I would very much like to hear from them.

Thank You,

Kenneth Albin

December 15, 1975
1820 SW 85th Court
Miami, FL

305 Jackson Avenue
Crookston
Minnesota 56716

P.O. Box 1664
Boulder, Colorado 80302
February 23, 1976

Dear Hal,

Pardon this rather belated reply. Enclosed is my check for Volume Two of the news letter. I feel that it serves a very worth-while purpose, and would like to see it continued, but think that there must be a better way than having it all fall on the backs of just two people.

I have not written sooner as I have been rather busy getting the hardware going. My Martin MIKE is working well, and I certainly recommend the product. Enclosed is a short memory test program for the MIKE, which I wrote just before receiving the Martin instruction book. This program is somewhat different from most in the literature in that it only tests one page at a time, but takes each location on the page, writes a zero and reads it back, checks, then writes a one, checks, and keeps doing this for all numbers through 377 (octal) at the one address. When that address is fully checked, it moves to the next, and cycles through the same procedure. This seemed to me to be a little better test than simply writing one number, or of galloping a pattern through the memory.

The other hardware going, I think, is my MOD-8. It seemed to run MONITOR 8, properly, but teletype bugs at test time leave me some doubt. Both systems, Martin and MOD, are intended as development tools, for two dedicated applications: a data logger, and a minimally smart teletype terminal for autostart operation.

Again, I appreciate the news letter greatly, and wish it (and you two) the best.

Sincerely,
Don Lund

ASSEMBLY LANGUAGE PROGRAM: MIKE MEMORY TEST

LABEL	MNEMONIC	OPERAND	COMMENTS
	XRA		
	LBA		
	LLI	377	/start from page top, work down
	LHI	PPP	/sets page address
LOOP	LMA		
	LBM		
	CMP B		
	LCL		
	LDH		
	JFZ	FAIL	
	ACI	001	
	JTC	NEW	/next address
	JMP	LOOP	/still checking address
NEW	DCL		
	JTM	PASS	/all addresses on page OK
	XRA		
	JMP	LOOP	
FAIL	LLC		
	LHD		
	CAL	DISPLAY	/7SEG display of fail address
	HLT		
PASS	LLI	321	
	LHI	123	
	CAL	DISPLAY	/7SEG display of pass message
	HLT		

MACHINE LANGUAGE PROGRAM

```
000   250 310 066 377 056 PPP 370 317
010   271 326 335 110 036 010 014 001
020   140 026 010 104 006 010 061 160
030   044 010 250 104 006 010 362 353
040   106 322 000 000 066 321 056 123
050   106 322 000 000
```

NOTES

This program checks one page (256 bytes) of memory at a pass. The page being checked is specified as PPP in the program. Each byte is written, then read, with each octal number from 0 to 377. If the number read is not the same as the number written, the program halts with the address displayed on the MIKE seven segment display register. If all addresses on the page pass the test, the program halts with "123321" latched in the display register.

1975XII21
D. Lund

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26 February 1976

Dear Hal,

Enclosed is a photocopy of an article that you might find interesting. For those people who are interested in computer conferencing I would like to mention a few things. 1) Computer conferencing is in use in industry and government. If you have access to a timeshare net-work see if it has a conferencing ability and if it does set up a conference for minicomputer hobbyists. If it doesn't have a conferencing ability write to United States Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22161; and request the EMISAR1 program which has the accession number AD767069/CPG (specify the track, density, and parity you require). The cost is $480.00. 2) If you want more information on conferencing read the article by Murray Turoff titled Human Communication via Data Net-works which was published in the January 1973 issue of Computer Decisions. Also good is publication R-32 (titled Group Communication Through Computers) which is available from the Institute for the Future, 2740 Sand Hill Road, Menlo Park, California 94025 for $10.00. This publication gives examples, explanations, and sign on procedures for the FORUM conferencing system. 3) The first step towards use by hobbyist of computer conferencing is to get some experience with computer communication via telephone. I would suggest that those people who feel they have the ability write into the Micro-8 NL giving their name, address, telephone number and time available. This would allow people to set up schedules for simple computer communication experiments. These experiments would provide infor-mation, build interest, and establish a core of people that could set up a computer conference. Maybe we can come up with a second generation Micro-8 Newsletter.

Sincerely yours,
David Christianson

John Ford
558 Esplanade
Santa Maria, Calif. 93454

Feb. 28, 1976

As I promised in my last correspondence, this letter concerns the building and performance of the Computer Hobbyist's (TCH) tape cassette interface board.

First of all, the price is right. The board can be bought and stuffed for less than $50.00, depending on the size of your junk box. After overcoming some confusion as to the polarity of several of the jumpers and tracing one bad 3900, the unit came up like a champ! The LED on the board provides the user with a straight-forward means of checking operation. I was a little confused as to which motor was actually zero and which was one, but otherwise no problems.

From a performance standpoint, it is beautiful. I've been using it for several months now and can find no fault in its operation. I suspect that most of us will be gradually moving toward the Kansas City Standard for tape recorder I/O but as a backup or in-house recorder interface, the TCH is very hard to beat. It is easy to hook up, flexible in operation, and superb in performance.

I was a little surprised to discover that I could only read in 376 words instead of 377 (a full page), but this limitation can easily be overcome by block oriented software.

electronics

I strongly recommend this unit. As a rank amateur "builder, I can say it was easy to put together. As an experienced software builder, I can say that it fills my requirements very well.

ALGONQUIN
COLLÈGE

ALGONQUIN COLLEGE OF APPLIED ARTS AND TECHNOLOGY
COLLÈGE DES ARTS APPLIQUÉS ET DE TECHNOLOGIE

SCHOOL OF TECHNOLOGY
FACULTÉ DE TECHNOLOGIE

200 LEES AVENUE, OTTAWA 1, ONTARIO
200, AVENUE LEES, OTTAWA 1, ONTARIO

Dear Hal:

It was good to see you again in L.A. Thanks for the gems of information. They are worth much more than you may realize.

I talked with John Kiss re his PDP - 8 Assembler Language Programming. He has added a section on OS - 8, but he personally still works mainly with the Algonquin Assembler. He has a lot of ideas, but is not interested in publishing beyond what he has already done. The cost of the book is $3.48 + $1.50 handling from the Algonquin College Bookstore, 1385 Woodroffe Ave., Ottawa.

Re our conversation about your newsletter, I enclose $9.50. I tried to get an address/phone number for John Burgeon, but no luck. Can you help? In particular, we need 400 2102 RAM's, soon! The price you mentioned is 1/2 of that which we can get here.

Sincerely,
H.K. Mehta

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User's Guide to a computer conferencing system

Guide to Emisari user-choice sequences

Human communication via data networks

Computer conferencing adds new properties to organizational communication and already is cost effective for even fairly small groups

by Murray Turoff
Office of Emergency Preparedness*
Executive Office of the President

There are two major reasons why you should learn something about computer conferencing, Delphi[†] techniques, and other data network communication modes.

One is that the capacity for group interaction, and one's own efficiency in communicating with others, can be significantly enhanced with a well-conceived conferencing system. We have learned this through direct experience in communication regarding the wage and price freeze[1,2] and in system design work.

The second reason, to be developed later in some detail, regards cost. Economics already favors computerized conferencing, even for fairly small groups, within organizations that have computers and terminals. As mini-system and terminal costs decline, and digital data networks come into wide use, we should by the late seventies find this communication mode to be quite commonplace.

Verbal versus computer communication

Some people communicate best in the face-to-face verbal mode. But difficulties can arise in group communication, particularly where participants are at different levels in the corporate hierarchy. There is no opportunity for sub-group discussion, or perhaps negotiation, away from the main streams of the discussion. One generally doesn't whisper or pass notes to a neighbor. If a vote is taken, political reasons may lead one to vote as a superior votes. Serious doubts or possible difficulties with a plan under discussion may not be mentioned, or alternatively may be presented so forcefully as to kill an otherwise good idea.

The verbal mode of communication has certain rules and procedures that also inhibit free discussion. Only one person may speak at a time if the conversation is not to become confusing to the group as a whole. If you have something to say pertaining to the current speaker's remarks, you must normally wait until he is finished, and even then you may not have the opportunity to interject your comments if someone else gains the floor ahead of you. In fact, the psychology of verbal communication is such that when you have

Human communication . . .
(continued)

threads by utilizing unique identifiers, such as the sequence numbers or key words used in the discussion itself, to define a particular topic.

One observes that the individuals communicating through such a system tend to develop a feeling of equality with the other group members. The resulting group atmosphere is very different from a committee meeting where some one individual usually takes control (even if only tacitly) for the purpose of sequencing the discussion. The group itself does, however, wield impact on the individual. If someone is not making sensible or pertinent comments, or if his remarks are verbose and drawn out, he quickly discovers no one is commenting back on what he has said. In fact, he quickly begins to wonder if anyone is bothering to read his contributions.

In computerized conferencing, any individual may write a private message to any other individual unbeknownst to the rest of the conference members. These messages may be "carboned" to any subgroup. Therefore, two individuals may arrive privately at a joint view on some issue, or on the remarks of another individual. This universal whispering capability is available for any use an individual in the conference desires to make of it. This ability to carry out timely subgroup negotiations could lead to more rapid resolution of some particular issue. Private messages are eliminated from the conference file after delivery.

Computerized conferencing can involve 30 or more people, geographically dispersed, and participating whenever they get a chance rather than according to a forced time schedule. A conference telephone call, by contrast, begins to get difficult if more than five are involved, and all must be on the line at once. Following is a brief description of the mechanics of using our present system.

How to get your two cents in

When a participant calls up for a particular session, he will usually request first a list of the current status of the members to determine when each of them was last on and how many messages each received out of the message list. If anyone else is currently interacting when he gets on, or should someone get on while he is on, he will automatically be informed of who it is. He will then respond to computer requests for his name and security code, which logs him in, after which the computer will begin to list for him all the messages that came into the conference since he was last on. At the completion of that list he will be asked for any message he wishes to add.

When he finishes typing a message he uses a special symbol (in our case the "+" sign) to have the message added on to the conference file. Before doing so, however, he has available a number of editing capabilities which allow him to skip around the text of his message to correct errors or make changes. After he sends his message the computer will list any messages which came in while he was writing his own, and it then returns him to the writing mode for the entry of a new public message. This mode provides commands for special situations: writing a private message; edit-

obtained the opportunity to speak, the topic may have shifted to the extent that your planned remarks are out of place or too late.

Verbal exchange, therefore, represents a synchronous form of communication. Individual participation is sequential and under the control of the group along with any explicit or implicit rules of order that apply. In this atmosphere, one may either listen or talk when allowed to.

Computer-based group communication, by contrast, allows participants to be "talking" (by typing remarks) or "listening" (by reading the remarks of others) as they choose. Since the computer stores remarks until each individual indicates he is ready to receive more of the conversation, he can now control the rate of participation. If he chooses to listen, he can vary the rate of the presentation on a crt screen for the purpose of skimming, pondering, reflecting, or even ignoring what is being said. If he talks, his remarks will be added at the end of the conversation list, and will be received by others when they have reached that point. This is "asynchronous" communication. The group could be all talking or all listening at the same time, and all could be at different points in the conversation. This is "self-activating communication," because the individual controls the communication rate and time.

In practice in computer-based discussion, a number of separate conversation threads becoming interleaved. There is not the same pressure to restrict the discussion to a sequential flow with respect to the specific topic of the moment. Therefore, individuals who wish to think about what they say on a particular matter may wait for a time before making their remarks. The fact that some of the others in the conversation may have moved on to another topic does not detract from the ultimate impact of the comments. Furthermore, since the computer assigns a unique sequence number to each message (in the order of occurrence) and labels it with author, date and time, a later message referring to an earlier one need only begin with "Ref. mes. #101."

This is in sharp contrast to a verbal discussion where a typical comment referring back usually begins: "In regard to what John was saying awhile back about such and such . . . . . ."

While there is a learning curve for effective use of this communication mode, a group communicating in this manner becomes accustomed to this oscillating form of communication after a few hours of practice.

Furthermore, the sorting capability of the computer can be used to regroup the discussion into its separate

ing an earlier message; retrieving messages edited in a certain time frame; and so on. All these options are described in the User's Guide (page 27).

When the user finishes, he signs off. The computer will keep a record of his location in the discussion.

The casual user or the new user need only learn how to get on and off, write a message, and send it into the central file. Retrieving comes automatically. The average user learns how to do this in about ten minutes on a good interactive terminal. Computer neophytes usually achieve quite adequate facility in a half-hour to an hour. For a group to get used to communicating proficiently about an involved issue via this method requires a few additional hours of practice.

Various degrees of anonymity may be exercised in a computerized conferencing system. Normally, when starting a new conference everyone supplies his name, which the computer then uses to "sign" each message automatically. However, everyone could use a fake or code name. In fact, if each participant selected his own code name, then no one individual including the monitor would know from whom a particular message came. This free form discussion minimizes the fear of losing one's anonymity because it is known to some monitor. Even the usual mode of operation, without any anonymity on what is said or proposed for voting, still has the feature that votes (on such things as a proposal or plan) are presented as distributions, so no one knows who voted which way except by implication from the discussion. In addition, a member of the conference may change his vote at any time.

These group discussion involving voting methods are forms of Delphi procedures. An additional aspect of Delphi-like modes are small group interaction concepts from such fields as gaming, psychodrama, organizational development, and sensitivity or role-playing techniques. Almost any of the "organizational development" techniques now used to sensitize small groups to the problems of communication and cooperation within an organization[3,4] can readily be adapted for computerized conferencing.

Why will computer conferencing take off?

There are several very concrete reasons to expect a rapid growth in the use of computer-based Delphi-like conferencing systems by medium to large organizations in the next five years:

• Most now have computers or computer services available.

• Interactive terminals are being made available in sufficient numbers to allow convenient access for most management and professional people.

• Costs for postage and correspondence preparation are rising, while digital data network development should bring data communication costs down.

• There is increasing awareness that complex problems require more communications among larger professional and management groups.

In addition, by the mid-to-late seventies interactive computer terminals may be expected to retail at costs about like that of a color TV set today, thus leading to a substantial home market for these systems.

An idea of what this may mean to society is suggested by a list of specific applications that would be possible. In several the logic and calculational abilities

of the computer are utilized also. For example, the computer may aid people in finding discussion groups that would interest them. Or it may provide models, games, simulations and other calculational aids or structures to aid the group in focusing on their central concerns or interests.

Here are a few examples:

• A group of salesmen involved in marketing a line of computer peripherals maintains a continuous conference for the purpose of comparing responses to customer questions and analyzing competitive products.

• Division heads in a company which is spread out geographically discuss and agree on their respective responsibilities for a company proposal involving their separate operations.

• Technical librarians in a group of non-competitive companies set up a document exchange program and jointly plan complementary acquisitions.

• A committee that meets only once a month uses computerized conferencing to maintain continuous contact and to arrive at the agenda for its face-to-face sessions.

• Members of legislatures caucus at will with a computerized conference.

• A housewife joins a local conference discussing current affairs.

• Students conduct an anonymous conference with their teachers to discuss problems and subjects in a course.

Conferencing effectiveness vs other modes

How can the cost effectiveness and efficiency of computer-based conferencing be measured against other modes of communication? A simple model we have used is based on three parameters: average typing speed of the individuals in a conference; average reading rate or print speed of the terminal (whichever is lower); and the average talking rate of the same group if it were engaged in verbal exchange.

Using this information, and the number of people in the group, one may calculate how much information a group of proficient conferees at terminals could exchange in a given time period and compare it to a verbal conference. Some of these figures have been plotted for various typing and talking speeds. Relative effectiveness may be interpreted as the ratio of the number of words a group can exchange via the computer mode versus the verbal mode, given a fixed time period for discussion. Another way of viewing it, given a fixed number of words to exchange among a group, is as the ratio of the time needed to do it verbally versus the computer approach.

This analysis can be extended to costs by considering average hourly salary. Given a specific computer system and its cost for conferencing, that added cost can be traded off against the time the people in the meeting save by using the computer, where a dollar value can be assigned to their time. It is quite straightforward to calculate how many people of what average value in dollars per hour are needed to make computerized conferencing cheaper than other modes of communication. The results for a Univac 1108,

which costs out at about $7/hour per user for conferencing, are shown in the following table:

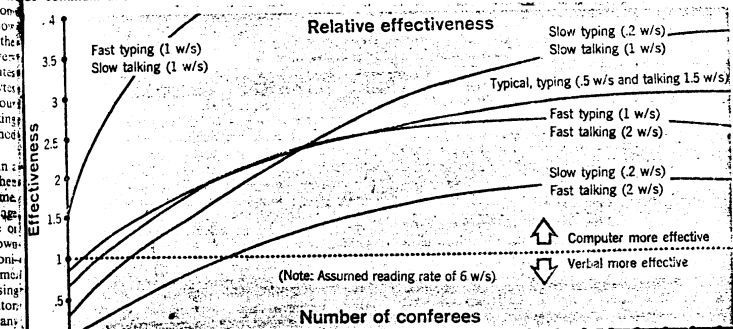| Alternative communication mode	Person's value ($/hour)	
	$10	$20
Committee meeting where travel time equals discussion time—no travel costs	4	3
Telephone conference call	7	5
Committee meeting, no travel time—all in the same building	9	7

Measurement of communications effectiveness is more difficult. Some psychologists hope that the computer can become a useful tool in expanding the experimental basis in the area of human communications.[5] Certainly the concept of computerized conferencing lends itself to the introduction of measuring systems directly in the communication process, potentially alleviating greatly the time and effort now needed to evaluate in any experimental sense the process of human communication.

A sophisticated approach has been taken by Gordon B. Thompson of Bell-Northern Research.[6] He proposes three dimensions for the relative evaluation of any communication process.

First is degree of "ease of access to stored human experience." Along this dimension books are printed,

Trade-off curves for conference mode
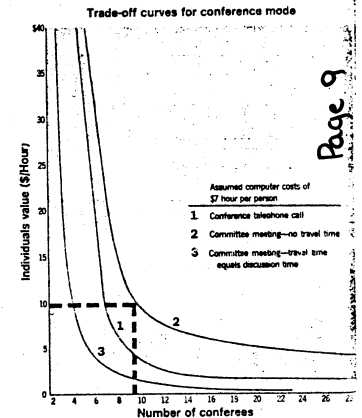
These curves enable cost trade-offs when costs have been established for the computer system and for participant salaries. Note that points in the region above curve 2 favor the computer over a committee meeting with no travel time. For points below this the meeting is more cost-effective. Derivations and plots for other computer costs, are presented in Ref. 2. The curves move out from the axes as computer costs increase. Here, at $10/hour, the computer is favored for 10 or more conferees (dashed lines).

Relative effectiveness

Effectiveness of communications is defined as the ratio of times necessary to transfer a certain number of words by alternate modes. Derivation of equations

used to plot these curves is given in Ref. 2. Note that the crossover is at 6 conferees for slow typing vs slow talking, and at other points for other ratios.

text rate high, the telephone intermediate, and television low. The telephone, in particular, allows a human to call on an informed person rather than search a library.

Text-searching capabilities inherent in the electronic form of the printed word provide a new alternative which can ultimately rate higher in this dimension than books, or perhaps even than the combined use of books and telephones. Computerized conferencing improves the way people index information, because the user is essentially free to tailor his own index using such things as keyword, author, and/or time-of-occurrence searches.

Thompson's second dimension concerns the "amount of shared information the communicating group possesses and the interaction they experience." When talking a group shares the acoustic space, since they may listen simultaneously. It has been suggested that the Picturephone is a failure in part because it adds no additional shared information space in comparison with the telephone. One party cannot view what another party is pointing to on his screen. In this dimension the telephone rates much higher than TV, which is slightly higher than books. Computerized conferencing creates something which would rate higher than the telephone because it allows full simultaneous asynchronous operation by all participants with respect to a common writing space.

The third measure of Thompson is the "ease with which new ideas can be propagated through the group," or the degree to which "shared feelings could be discovered and developed in the host society." Here television rates high on a society-wide basis, but for small groups the various opportunities for anonymous participation and the resulting free flow of ideas provided by computerized conferencing potentially offers a greater degree of impact than the telephone or the face-to-face verbal exchange.

It is the ability of these systems to handle large

groups, provide hard copy, preserve anonymity, and allow participants to control their time and rate of interaction which makes the concept attractive for many applications which would be difficult, ineffective, or inefficient with conventional alternatives. □

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1. Kupperman and Wilcox, Emisari—An On-Line Management System in a Dynamic Environment, May, 1972, OEP Report ISP-108, AD No. 744-348, $3.
2. Turoff, 'Party-Line' and 'Discussion' — Computerized Conference Systems April, 1972, OEP Report ISP-109, AD No. 744-349, $3.
[Both preceding reports are available at $3 each from the National Technical Information Service in Springfield, VA.]
3. Pfeiffer and Jones, A Handbook of Structured Experiences for Human Relations Training, Iowa City, Iowa, University Associates Press, 1969.
4. Nylen, Mitchell, and Stout, Handbook of Staff Development and Human Relations Training, National Education Association, Washington, D. C. 1967.
5. Chapanis, Prelude to 2001: Exploration in Human Communication, American Psychologist, Vol. 26, No. 11, November 1971.
6. Thompson, Three Characteristics of the Communications Revolutions, Proceedings of the International Conference on Computer Communications, October 1972. Also Moloch or Aquarius, "The," Issue 4 (Feb. 1970), published by Bell-Northern Research, Ottawa.
[The Proceedings of ICCC can be obtained from IEEE, 345 East 47th Street, New York, N.Y. 10017, for $12.50 (IEEE members) or $15.00 (non-members). Refs. 1 and 2 are also included in this Proceedings.]

Dr. Murray Turoff is a senior operations research analyst in the Office of Emergency Preparedness. He has worked for the Institute of Defense Analyses and IBM. He is most interested in Delphi design, modeling, simulation, gaming, technological forecasting and information systems. He teaches technological forecasting at American University.

Here's my six bucks for volume 2. Of all the computer hobbist publications I
have encountered, the Micro-8 newsletter is unique, and would be greatly missed
if if were discontinued. Keep up the good work.

For those of you who may have wondered what has become of Phil Mork, I'm
alive and well and living in Cleveland, Ohio finishing up my education in
engineering at Case Western Reserve University. My Mark-8 now has two whole K
of 1101, the Digital Group TVT & cassette, a two channel analog output, and
a SWTP keyboard & TVT I(retired). I've got the MIL MONITOR-8 modified for
the Digital Group TVT up and running and on cassette (Digital Group, 375 baud).
If anyone out there is interested, I'd be glad to send a copy to anyone who
sends me a blank cassette and a SASE for return of same.(Better yet, how about
putting some 8008 software on the cassette!) If you use the 8008, you need
Monitor-8. My version omits load and dump BNPF format and adds cassette
load, dump, and verify routines, as well as load and dump ASCII. It fits in
2K of RAM with about.300₈ bytes left over.

I'm toying with the PCC's TINY BASIC, and maybe will have that running on
my 8008 soon (if I only had more time....).

Got myself a PAIA Gnome micro (music) synthesizer. It's not very playable using
the supplied ribbon controller, but it works well connected to my Mark-8 via my
analog output. So far I've written a program that lets me define keys on my
ASCII keyboard as notes, allowing me to play tunes by "typing". Later, I'll
write programs to store tunes for later playback, and maybe control multiple
synthesizers.

Managed to get a hold of an X-Y plotter, but havn't done much with it yet. I'm
interested in computer graphics and games, and am kind of thinking about a video
graphics display.

Guess I'll get myself a fancier computer some day,but I think I'll satisfy
myself with the Mark-8 for a while. It seems that about every month a new micro
comes out that's better and cheaper than the others. I'm keeping an eye on
Ohio Scientific Instruments' MOS Technology 6502 system. They say they'll have
a BASIC ROM board, and a PDP-8E simulator board.

If anyone wants further information or has any suggestions on what I'm doing,
feel free to contact me at my Cleveland address.

Best of luck on volume 2!

Phil Mork   Feb. 18,1976
610 Michelson
11896 Carlton Rd.
Cleveland, OH 44106
(216) 795-0850

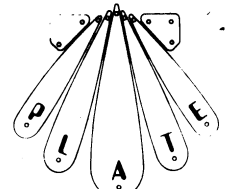ps. Some of the guys in the Cleveland group are planning a "computerfest" for June

S. Trim
2991 E. 43rd. Ave.
Vancouver 16, B.C.
V5R 2Z4

Secondaly I think that your proposal summarise
articles from other newsletters is important.
There is no one clearing house for information in
existance with the result that it is difficult to
know where to look for any one piece of information.
A person is almost certain to miss something of intrest
to him unless he subscribes to all newsletters, a condition
which is both difficult and expensive. deally there should
be an index of all past and present articles which could
be consulted for information on a perticular subject.
Although this is not vital it might tend to increase
the enjoyment of this hobby by cotting down on time
wasted looking and if your not in a hobby for
enjoyment what are you after. also it might slightly
decrease the cost since you need only buy the
perticular issue you want, a goal most hobbiests
share. Thank You. Sincerly Yours

S. Trim

DIGITAL to ANALOG CONVERTER
with SAMPLE and HOLD *

Output is approximately 1-3 volts.
"Sampled" output tracks "direct"
output while sample is low.

By outputting a value (call it Y)

and momentarily bringing sample
low, then outputting a second value
(X), and keeping the relative time
short during which the first value
(Y) is present on the data inputs,
two "simultaneous" outputs are
available for driving a plotter
or 'scope.
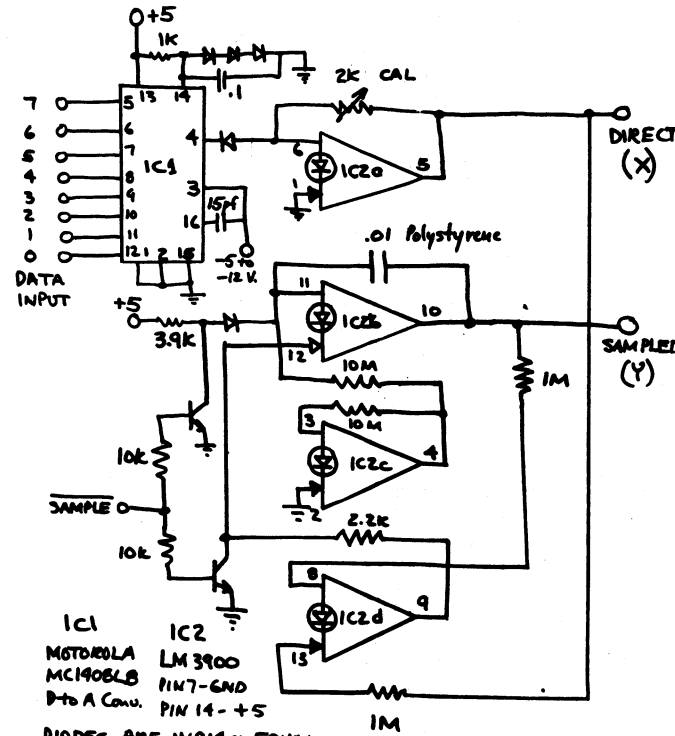
IC1
MOTOROLA
MC1408L8
D-to A Conv.

IC2
LM 3900
PIN7-GND
PIN 14-+5

DIODES ARE IN914 or EQUAL
TRANSISTORS ARE NPN, SILICON
SMALL SIGNAL UNITS (2N4123)

1/76 PHIL MORK

Suprise, suprise! It seems I managed to list my phone
number incorrectly in my last correspondence. The correct
listing is 272-2339. Sorry.

Update on the RAM purchase. Worst case price is $2.00
for the 91L02A (500 ns.). The more we buy, the bigger
the discount, and if we top 5k, everybody will get a
refund of up to .25 per chip.

Please, if you order send a self addressed stamped post-
card so I can confirm receipt of your order and notify
you when to expect delivery.

We are also buying 5000 16 pin solder tail lo-profile
sockets for the memory, and other uses. The cost is
16¢ each which is a real deal. The firm is giving us the
100,000 unit price since this is educational work. Del-
ivery is from their stock and should be pretty fast.

Cornell is buying a couple of the Fly paper tape readers
and I would really like to see us order 5 or so at once
and get a discount. Anybody game?

Other projects nearing completion are my 8080 run ROM
programmer, and a unique TV typewriter another Senior
is working on. More on the former when its all up and
debugged.

I must note in closing that the hobby is truly world-
wide. I have received letters from Europe, Asia, and a
telephone call from New Zealand. Inquires are coming
in daily, most people interesting in a 100 or more chips.
If I can be of any help to people, feel free to call
write etc.

One additional note. Mini-Micro-Mart is really almost
in my back yard and I'm wondering if I can be of help
to those stranded minus $ and merchandise. Perhaps if
people send in all relevant info., ie. copies of checks,
orders and letters, I can talk to the States Attorney.
Being in the area if half the battle. The only way I
buy from them is to pick it up in person. The Post
Office can be very helpful with dealing of this sort. A
Postmaster can simple refuse to deliver mail to a business
that doesn't live up to its promises. I would really
like to see them forced to clean up their act, its so
much better for business. Ah well.....

I have a note from someone who wants to sell a surplus
300 LPM line printer for $700. As soon as I find the
letter again I'll send along the name + address to any-
body interested.

Sincerely,

Steven Edelman 204 Dryden Rd. Ithaca, N.Y. 14850

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PLATE SOLID-STATE ELECTRONICS

Balboa Building, Suite 301 □ 735 State Street □ Santa Barbara, CA 93101
(805) 962-1990

Business Hours:
MW 9-12, 1-4:30   TThS 9-12,
F 9-12, 1-3:30   by appointment   18 February 1976

Laurence L. Plate, Jr.

I am now open for mini/microcomputer systems consulting and design business.

My digital electronics service business will open sometime in early March when all my servicing equipment is delivered and set-up.

The sales aspect of my business is being held in abeyance, pending to market surveys under progress. Since the market is being flooded with relatively untested and untried microcomputer systems, it will be very difficult to carry them for a given time period as well as to service them this year. However, I will try my best to select worthwhile computers for my business to offer to the public.

I am stressing on consulting and servicing aspects of my business with emphasis to give you the best system tailored to your actual needs with mind in your future growth. It is well known that the computer is an universal tool which is highly flexible to meet any given need, but it reguires the know-how to be ulitized properly. Thus, I am offering my 16 years of experience to give this know-how to the client in need.

Laurence L. Plate, Jr.

MRS   2-21-76
P.O. BOX 1220
HAWTHORNE, CA. 90250

We have developed a high quality product which allows owners of an Altair 8800 to develop systems with Motorola's MC6800 MPU.

This product is a must for anyone who wants:

1. To compare the Intel 8080 with the Motorola MC6800.

2. Has an Altair 8800 and plans to use the MC6800 MPU for a new design.

3. Wants to have the fexeblity of both.

The AM6800 card in an Altair 8800 also allows one to take advantage of all the best features of each processor in software through alternating processors in the same program.

It is a one board pin compatible card for an Altair 8800. No modifications are required and it will not interfere with normal execution of 8080 programs. The MC6800 gains control via software command, one instruction. You can return control by either the front panel stop switch or through software, one instruction. It will operate with either fast or slow, static or dynamic memories. MC6800 MPU status signals are brought out on unused bus lines (jumper option), ie Ø1 & Ø2 clocks, VMA, R/W lines for system development. The 8080 processor cared remains in the computer to handle all front panel controls.

The MC6800 MPU has the following software advantages: Increased interrupt structure, Two accumulators, More addressing modes, better memory instructions, and a 16 bit index register.

AM6800 Pricing AM6800 Complete Kit $148.75 Plus Tax
AM6800 Complete Kit Except MC6800 $97.75 Plus Tax
Checks received by the first of the month will receive their kit at the next meeting
Make checks payable to M.N.Kalashian

Computer Speaks Up At Wright-Pat Lab

AFIT, WRIGHT-PATTERSON AFB, Ohio — GGUDD MISSOURBRINGING POWELLLX KUBBM TTOO TECHIBAMOUD DABSIANSIMIMEAANNDD RRAIKONNEIMIT SSOTOYII SHURRN...

The rest of the message at the Aerospace Medical Research Laboratory goes on to say that you are listening to a voice generated by a mini-computer, and that computers are ready to speak.

The PDP 11 digital computer, known to its friends as Fred, is programmed to speak by Capt. Dan Warmuth, a student at the Air Force Institute of Technology. School of Engineering. He's working with Dr. J. Roland Mundie.

chief of the neurophysiology branch of the Biodynamics and Bionics division.

"Computers have talked before," says Warmuth, "but those that have been given words to store in their banks and draw on those words when programmed to do so. Instead of talking, they are stringing words together."

With the International Phonetic Alphabet, Fred has been programmed as a part of the lab's speech recognition project. "The input—we give the computer is typed on a teletype, using a phonetic alphabet," says Warmuth. The beginning of this story is one such manner.

"By using the phonetic system, the computer actually has to formulate its speech, much the same as a human brain would do," he says.

According to Warmuth, one of the practical uses of a talking computer would be to tell students inflight simulators what they are doing wrong while they are doing it.

Lest computers start monopolizing conversations, Warmuth and his colleagues also are working on a system to teach them to listen too.

SRI-F8	Microprocessor Board	$ 325
SRI-RAM-2	2K (Words) Static Memory Board	$ 100
SRI-PR	PROM Board	$ 50
SRI-SER-C	Serial Interface - Control Board	$ 45
SRI-PWR	Power Supply	$ 55
SRI-MB	Main Board	$ 45
SRI-ENC	Enclosure Assembly — Complete	$ 100
SRI-DR	Digital Data Recorder	$ 150
SRI-VI-A	Video Interface	$ 150
SRI-VI-B	Video Interface	$ 275
SRI-KBD	Keyboard Assembly	$ 100
SRI-12V	Monitor	$ 125
SRI-TR	Tape Reader	$ 375
SRI-FD	Floppy Disc System	$ 1250
	Extra Diskettes for above	$ 10
SRI-LP	Line Printer	$ 1575

NOTES: Specify Paper Tape or Cassette Programs.
$5 per 1K words duplicating charge (no charge for the Assembler or Editor software).
An additional SRI-ENC may be used for expansion.
All prices subject to change without notice.
Allow 30 days minimum shipping time from date of order.
All items shipped prepaid in continental U. S.

Systems Research, Inc.

P.O. Box 15128 0 · Salt Lake City, Utah 84115 · (801) 942-1093

NOTE: Our Basic Program should be done soon!!! (About March). It requires 8K of memory.

The Native Assembler also requires 8K of memory. The Native Editor requires somewhat less.

We now offer the following ......

SRI-RAM-4	4K (Words) Static Memory Board (Assembled)	$ 200
SRI-VT	Video Terminal RS-232 In-Out	$ 375

If you want the Instruction Set for the F-8, drop us a line, and we will send it to you at no charge.

By the way, we will also offer about 25 Basic Routines along with the Main Basic. These will include Accounting, Educational, Business, Hobbyist, and many more.

Ladies and Gentlemen: **∞ INFINITE**
                                          INFINITE INCORPORATED ®

   Yes, there actually is a microcomputer coming on the market that uses a processor other than the 8080 or 6800.

   The UT1800 general purpose microcomputer will use the RCA Cosmac single chip CPU, a very powerful little package indeed.

   We can't officially release any details on price until the end of March but we thought you would like to know now that your choices are widening. The hardware will be ready in June.

   The UT1800 design concept will allow you to start with the simplest low cost hardware and proceed to the very sophisticated without the usual cost duplications.

   Whats more, you'll have a standard bus to work with so you can plan and build for a long time to come.

   There'll be no objection to mixing and matching with the other guy's hardware. We have a long range plan.

   If our stuff sounds interesting to you, drop us a post card and we'll put you on our mailing list.

INFINITE INCORPORATED   Yours truly,
POB 906
151 Center Street
Cape Canaveral, Florida 32920
                                W. J. Haberhern
                                President

PCM

Complete PCM-12 kit: $799.00
  1ea – 12010 CPU module, with IM6100C microprocessor device
        and 3.33 MHz crystal. Built-in crystal-controlled
        Baud-rate generator.
  1ea – 12020 4K-word (x12-bit) static memory board, with 1K
        words of memory semiconductors.
  1ea – 12030 Front-panel board and electronics, complete with
        control PROM's, and bootstrap loader.
  1ea – 12050 Back-plane bus structure. Accomodates up to 15
        plug-in printed-circuit modules.
  1ea – 12900 Heavy-duty OEM power supply. Adequate for
        considerable system expansion. Voltage-regulated,
        fold-back current-limited, over-voltage protected.
        5 volts @ 12 amps, + 12 volts @ 1.7 amps. (Assembled,
        just connect to system backplane.)
  1ea – 12800 Attractive aluminum cabinet with card-cage built-in.
        Accomodates up to 15 plug-in printed-circuit modules -
        plenty of room for system expansion.
 1ea – Set of assembly, operating and trouble-shooting manuals.

        For assembled and tested PCM-12, add   425.00

Accessories:
12010-EX	Kit of required parts to convert CPU to 4.00 MHz operation. With IM6100I device. ($118.00 if ordered separately.)	32.00
12020-EX	Kit of required parts to expand original 12020 memory module to full 4K words.	139.00
12020	Additional 4K-word static memory module for expanding memory beyond original 4K words. (kit)	245.00
12040	Memory extender module. Necessary to expand memory beyond 4K words, up to 32K words. (kit)	135.00
12060	DEC-software-compatible TTY/CRT interface module. 20 ma or RS-232 I/O levels, selectable. 110-9600 Baud operation. Uses DEC device numbers 03 and 04. (kit)	97.00
12070	High-speed paper-tape reader/punch interface. Fully DEC-software-compatible. Uses DEC device numbers 01 and 02. (kit)	97.00
12080	Audio cassette interface. Inexpensive replacement for high-speed paper-tape reader/punch. Uses BYTE-standard modulation format at 300 Baud and same format at 1200 Baud, selectable. (kit)	117.00
12090	Prototyping card. For user-designed expansion logic and peripheral interfaces. Holds up to 55 DIP wire-wrap or solder-type IC sockets. (With edge-card connector, w/o IC sockets).	53.00

Available very soon – 8K dynamic memory module; DECtape interface; LINCtape system/interface; floppy disk system/interface; PROM programmer; EPROM module; and more DEC-compatible interface modules - please inquire about your needs.

## END YOUR MONITORING PROBLEMS WITH A "PIXE-VERTER"
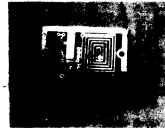
A transistorized modulated oscillator which instantly converts a TV receiver into a top notch video monitor.

ABSOLUTELY NO WIRING MODIFICATIONS REQUIRED ON THE TV RECEIVER!!

PXV-2A
$8.50 kit form

Ideally suited for "video only" type TV cameras and video tape recorders.

*   Operates on any blank channel from 2 to 6.
*   Works on all cameras (vidicons, I.O.'s, iconoscopes, flying spots, etc.) as well as VTR's having a video output between .25 and 5 V.
*   No direct camera-to-receiver connection required on AC/DC sets thus reducing possibility of shock hazard.
*   Miniature size (approx. 1.25" x 2.1") allows it to be mounted inside most cameras and VTR's or on back of TV receiver near antenna terminals.
*   Requires less than 3 ma at 6 volts.
*   Printed circuit construction (including oscillator coil) permits quick and easy assembly. Total time averages about 30 minutes.
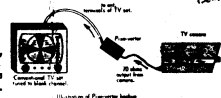
NOTE: This unit is not required when using cameras with RF output capabilities such as the ATV Research Model XT-1A.

First Class Mail   ONE NATION INVISIBLE

Page 12

I did get this NL out in three weeks! Don't expect the next one as quickly. It's time to worry about other projects for a while.

You'll notice a motley assortment of stuff in this issue. This is partly because the input of material has gone down to virtually nothing. Guys cry that they want software but no software comes in. (With the exception of Mike 2 stuff. A Mike-2 mini-Monitor-8 with Suding TVT output was sent in and Bob Pearce has sent in a whole bunch of stuff. I'm trying to figure out how to reprint them now. Write if your interested.) I'm cleaning out the files, so the next issue may include some old stuff that got neglected.

The Computer Hobbyist - Box 295 - Cary, NC 27511

I had heard that the TCH group had published a Jan and Feb issue but subscribers in this area have heard nothing from them for months. I just received issue No. 9 and a jewel it is! They claim 2200 subscribers which is nowhere as high as it should be. No. 9 contains the first of several articles on an ultra low cost floppy disk unit, the 2nd installment on their IMP-16 construction article, and another installment on ALTRAIR 8800 interfacing. Backissues (USA) cost 65 cents and are must reading. A subscription is $6 per 12 issues (an absolute steal). If these guys had 20,000 plus subscribers like BYTE has, they could produce material that would keep you in the shop 20 hours a day. If you aren't a subscriber, subscribe now! and get on the telephone and round up at least five more guys. If a lot of people do this, it will ensure that the TCH group will have ample money to hire clerical help so that they can concentrate on writing articles. If you haven't received no. 7, 8, or 9, drop them a note with a copy of your cancelled check. I'm sure they just misplaced a part of the mailing list.

IMSAI Problem

Max L. Wymore whose letter to IMS is printed on page 2 reports that he has received a full and complete refund as of 3/23/76.

SCCS Award

The SCCS surprised me with the presentation of a trophy at the last meeting inscribed:

Southern California Computer Society
Special Award
To The
Editors And Publishers Of The
Micro-8 Newsletter
In Recognition Of Pioneering Service To
Computer Arts And Sciences
March 1976

I'd like to express my greatest appreciation to the SCCS for this award. I would also like to point out that the participants of the Micro-8 User Group that have contributed material for inclusion in the newsletter are the true recipients of this award. The Micro-8 NL would not have existed were it not for you. I'll try to get a picture of the trophy, the students, and the computer center in the next NL. Thanks again to the SCCS for this honor.

SUBSCRIPTION FORM
(Copy if you don't want to mess up NL)

☐ ....Volume 1 back issues 1 thru 4 $3.50
                (56 mice-type pages)
☐ ....Volume 1 back issues 5 thru 12, $6.00
                (186 mice-type pages)
☐ ....Volume 1 combination 1 thru 12 $8.00
                (the principal is on my back because we have
                too many boxes cluttering up the computer center)
☐ ....Volume 2 issues 1 thru at least 9 $6.00

Name_____

Address_____

_____

Zip _____

Telephone No. _____
        (may be published -- leave blank if you prefer)
Please also include a little note describing your equipment, plans for the future, experience, etc.   Thank you.

Micro-8 Newsletter Phase Out

After a lot of careful thinking, it is time to announce that the Micro-8 Newsletter will phase out after volume 2. It appears that there is ample money to send out 9 issues and if back issues continue to be ordered, we may be able to extend it to twelve.

Many factors have contributed to this decision. I would like to think that we participated in "digging our own grave" by fostering the organization of some of the many computer clubs that have sprung up thruout the country.

In the beginning, communication with others of similar interest was essential and a national newsletter was the quickest most efficient way to accomplish this. Now there are national magazines and at least twenty local club newsletters. Guys are meeting together monthly and in some cases, weekly. This was the goal we set and we have achieved it.

Another factor is the time required. As club newsletter editors will testify, these things eat up an enormous amount of time. I have enjoyed every minute of time spent on the Micro-8 NL. I'm sure the students in my classes have gained immensly by becoming aware of what is happening in a movement that is destined to permanently change our world. One of the students learned that the stamp does not go over the return address. At the same time, the students may have been neglected to a certain extent by me devoting so much time to the preparation of the NL. If subscriber response had been in the thousands, money would have been available to hire student clerical help to reduce some of the time involved.

There are some lessons here if you expect your club newsletter to prosper: 1) Be ready to volunteer your labor. Make sure you are ready to go to the place where the editor prepares the NL. Just saying "have you got anything to do that I can take home with me" won't help since its more trouble to get something together for you than it is to do it himself. 2) Be ready to support it with cash. Printing and postage are not cheap. Printing costs for small quantities can be super expensive per copy.

What about the guy in the unpopulated area of Kansas (maybe that should have been underpopulated) that can't take advantage of local clubs? I would like to persuade the SCCS to undertake a NL reprinting service. All local clubs would continue to publish their monthly newsletters and would send to SCCS a camera ready copy. SCCS would then contract with a large volume printing house to print a monthly newsprint copy of all the club newsletters that could be sent out to all subscribers of the reprinting service. The information might be a month or two old by the time you got it but you would know what every club is doing all over the U. S.

This club information combined with the technical articles provided by BYTE, INTERFACE, MICROTREK, "73", and TCH (and PE and RE when they get around to it) will keep everyone well informed on the latest happenings in hobby computing.

MICROTREK?

Speaking of national magazines, does anybody know anything about the editor or publisher of Microtrek other than the info contained in their PE ad?

Sincerely,
Hal Singer - Editor

Bill Gates' Micro-Soft Letter

It has been interesting to follow what has happened in the aftermath of what is now called the "software flap". The most logical action was to tear up the letter and forget about it. Perhaps that would have been too easy. Maybe it needs to be treated as a learning experience for all of us in this infant field of hobby computing, both manufacturers and hobbyists alike.

The logic behind my comments smacks of the pot calling the kettle black but I think the point is still valid. It is the responsibility of the advertiser to honestly explain what the product can be expected to do and when it can be delivered and if he misleads the buyer, to adequately compensate him with corrective action.

A letter by Dr. Michael Hayes was reprinted in the Bay area Homebrew NL. He attacks Mr. Gates' marketing strategy and says nobody stole BASIC, you gave it away. "If you want monetary reward for software creations, you had better stop writing code for a minute and think a little harder about your market and how you are going to sell to it. And by the way, calling all of your potential future customers thieves is perhaps "uncool" marketing strategy!"

If you are interested in reprints of letters to and from regarding the software flap, let me know by postcard. Otherwise we'll drop it.

AN OPEN LETTER TO:

MR. ED ROBERTS, PRESIDENT
MITS INCORPORATED
PO BOX 8636
ALBUQUERQUE, NM 87108

DEAR MR. ROBERTS:

ALL OF THE HOBBY COMPUTER PUBLICATIONS RECENTLY RECEIVED A SPECIAL DELIVERY LETTER WITH A MITS RETURN ADDRESS FROM BILL GATES OF MICRO-SOFT. I CERTAINLY HOPE THAT THIS LETTER WAS SENT OUT WITHOUT THE APPROVAL OF MITS MANAGEMENT. IN THIS LETTER, BILL BRINGS UP SOME DIFFICULT QUESTIONS THAT THE HOBBY COMPUTER COMMUNITY IS CURRENTLY WRESTLING WITH AND WHICH HAVE BEEN AROUND SINCE THE PRODUCTION OF THE FIRST COMPUTER.

A COMPUTER DOES NOTHING WITHOUT PERIPHERALS AND SOFTWARE. THIS IS AN OBVIOUS FACT TO ANYONE FAMILIAR WITH COMPUTERS. UNFORTUNATELY, MANY OF YOUR BUYERS ARE NOT FAMILIAR WITH COMPUTERS AND ARE AWARE OF ONLY WHAT THEY CAN READ FROM YOUR ADVERTISEMENTS. IF YOU WILL GO BACK AND RE-READ THE ORIGINAL POPULAR ELECTRONICS ARTICLES AND YOUR ADVERTISEMENTS AND ATTEMPT TO VIEW THEM THRU THE EYES OF THIS INEXPERIENCED BUYER. I'M SURE YOU'LL COME TO THE CONCLUSION THAT THIS FELLOW THOUGHT HE WAS GOING TO GET A COMPUTER FOR $395 (ORIGINAL INTRODUCTORY PRICE) THAT WOULD DO SOMETHING. ONLY AFTER HE RECEIVED THIS THING DID HE FIND OUT THAT HE WAS GOING TO NEED APPROXIMATELY $1000 TO $2000 WORTH OF ADDITIONAL HARDWARE AND SOFTWARE TO GET IT GOING. ABOUT $500 TO $700 CAN USUALLY BE ROBBED FROM THE FAMILY BUDGET BUT MORE THAN THAT AND THE HOBBYIST IS ACCUSED OF TAKING FOOD OUT OF THE KID'S MOUTHS AND CLOTHES OFF THEIR BACKS.

I'M SURE YOUR COMPANY HAD NO INTENTIONS OF MISLEADING THE COMPUTER HOBBYIST. HOWEVER, WHEN BILL GATES ACCUSES THE HOBBYIST OF STEALING, IT MAKES ONE WONDER IF IT WOULD BE REASONABLE TO COME BACK WITH A CLASS ACTION SUIT OR PETITION THE FEDERAL TRADE COMMISSION FOR MISLEADING ADVERTISING AND FAILURE TO DELIVER MAILORDER PRODUCTS AS ADVERTISED IN A REASONABLE TIME.

IT IS SAD THAT RUMORS HAVE BEEN CIRCULATING THRU THE HOBBY COMPUTER COMMUNITY THAT IMPLY THAT DEVELOPEMENT OF THE BASIC REFERRED TO IN BILL GATES' LETTER WAS DONE ON A HARVARD UNIVERSITY COMPUTER PROVIDED AT LEAST IN PART WITH GOVERNMENT FUNDS AND THAT THERE WAS SOME QUESTION AS TO THE PROPRIETY IF NOT THE LEGALITY OF SELLING THE RESULTS. THIS MAY BE A VICIOUS AND FALSE RUMOR BUT IT EXISTS. IT WOULD SEEM THAT MITS SHOULD RESPOND BY PUBLISHING INFORMATION AS TO HOW THE BASIC REFERRED TO WAS DEVELOPED, WHO PAID FOR THE MACHINE TIME FOR THESE ORIGINAL DEVELOPEMENTS, AND SUFFICIENT DETAILS ABOUT ITS ACQUISITION SO THAT THE PURCHASER OF BASIC DOES NOT FEEL THAT HE IS PURCHASING AN ILLEGITIMATE PRODUCT ALREADY PAID FOR BY THE TAXPAYER.

WE CERTAINLY DO HAVE TO RECKON WITH THE PROBLEM OF ADEQUATELY COMPENSATING AUTHORS FOR THEIR TIME IN SOFTWARE DEVELOPMENT. THE XEROX MACHINE IS FORCING THE LAW-MAKERS TO RETHINK THE COPYRIGHT LAWS. EASE OF COPYING COMPUTER SOFTWARE IS FORCING THE SAME TYPE OF RETHINKING IN THE COMPUTER FIELD.

I HOPE YOU AS THE HEAD OF MITS WILL PUBLISH A PUBLIC APOLOGY TO COMPUTER HOBBYISTS FOR THE NAME CALLING WHETHER MR. GATES' LETTER WAS SENT WITH MANAGEMENT APPROVAL OR NOT.

SINCERELY,

HAROLD L. SINGER - EDITOR

MICRO-8 COMPUTER GROUP NEWSLETTER

L.U.M.P.
% Andy Ehalt
115 Edgemont Drive
New Albany, IN 47150

Gentlemen:
Please find enclosed a brief resume of Louisville Area Users of Micro-Processors (L.U.M.P.). We would appreciate your placing it in your publication. We are interested in obtaining additional members and other groups with which to exchange ideas or software.
Any support you may give us with this matter would be greatly appreciated. Thanking you in advance for your assistance.

Sincerely,

Andy Ehalt, L.U.M.P.

The L.U.M.P. (Louisville Area Users Of Micro-Processors) Computer club located in Louisville, Kentucky is asking anyone interested in micro-processors to join them at their bi-weekly meetings. Present membership is approximately 30 members. We are also very interested in working with other groups or clubs for the exchange of designs or software.

We presently work with the 6800, 6502, 8080, and 8008, including one 8080 and 8008 multi-processor, with future plans including a P.A.C.E. or LSI 11; all but a few are of our own design. Our club system, being designed and built by club members, is a 6502 based system.

For information write: Steve Roberts   or   Andy Ehalt
                       Cybertronics   115 Edgemont Drive
                       PO Box 18065   New Albany, IN
                       Louisville, KY   47150
                       40218

SCOTT BERTILSON, RR2, SPICER, MN 56288   I WOULD REALLY LIKE TO GET MAY HANDS ON A COMPUTER BUT MONEY IS ONE OF MY BIGGER PROBLEMS -- AND I DON'T REALLY KNOW WHAT PROCESSOR TO GO WITH ALTHOUGH I LIKE THE 6800 (LSI-11 IS TOPS) BETTER THAN ANYTHING ELSE. I WOULD KIND OF LIKE TO GO WITH LARGER WORD SIZE AND HIGHER SPEED THAN MOST MICROS CAN GIVE. ONE IDEA THAT HAS INTRIGUED ME FOR A LONG TIME WOULD BE A TTL (SHOTTKY?) MICROPROGRAMMED PROCESSOR - YOU COULD SIMULATE (EMULATE) ALMOST ANYTHING AND TAKE ADVANTAGE OF EVERYBODY'S SOFTWARE. IT SEEMED LIKE A PIPE-DREAM UNTIL I CALLED JACK ABBOT ABOUT HIS PDP-11 COMPATIBLE MACHINE. IT TURNS OUT THAT HE IS WORKING ON A TTL MICRO-PROGRAMMABLE MACHINE WHICH WILL MICRO-CYCLE AT ABOUT 200 NS. (FAST, HUH -- JUST IMAGINE HOW IT WOULD BE USING SCHOTTKY TTL). JACK FIGURES IT WOULD EXECUTE PDP-11 INSTRUCTIONS IN ABOUT 1 MICROSEC, BUT IT COULD ALSO EMULATE JUST ABOUT ANYTHING ELSE IN THE LESS THAN 16 BIT CLASS AT COMPARABLE SPEEDS. HE HAS SOME PRETTY NEAT IDEAS LIKE TIME-SHARING THE PROCESSOR BETWEEN THE USER AND THE PERIPHERALS. THE PROCESSOR WOULD HANDLE THE USER AND TRANSPARENTLY ACT AS A PERIPHERAL CONTROLLER. (IT WOULD BE THE INTERFACE FOR ANY OR ALL OF YOUR PERIPHERALS). SLICK, HUH? I THOUGHT SO ANYWAY. HE IS STILL IN THE DESIGN STAGES ALTHOUGH HE HAS ORDERED ALL THE PARTS AND IS FAIRLY DEEP INTO CONSTRUCTION. HE IS RE-CONFIGURING IT TO A 4-BIT SLICE CONCEPT INSTEAD OF A STRAIGHT 16 BITS AS IT WAS ORIGINALLY, BUT USING THE SAME PARTS AND GENERAL DESIGN. HE FIGURES HIS PRESENT COST AT ABOUT $1000 WHICH SOUNDS PRETTY GOOD TO ME. HE IS SENDING ME SOME PRELIMINARY INFO AS SOON AS HE FINISHES HIS PAPER FOR HIS DEGREE.   AT THE MOMENT, THOUGH, I AM WAITING FOR JOHN LIND TO RECEIVE HIS ALTAIR 680 FROM THE ALWAYS SLOW MITS.   I PERSONALLY THINK THE SWTPC 6800 IS A MUCH BETTER MACHINE BUT THERE IS THE MATTER OF AN ADDITIONAL $100 WHICH HE DIDN'T HAPPEN TO HAVE AT THE TIME. HE HAS ALSO BEEN PUT-OFF BECAUSE OF A DESIGNCHANGE (THAT WAS TO HIS ADVANTAGE OF COURSE). HIS 680 IS TO BE MAILED OUT IN APRIL WHEN HESENT HIS ORDER LATE LAST YEAR.   ONE CONSOLATION IS THAT MITS HAS APPARENTLY GOTTEN ENOUGH RESPONSE SO THAT THEY ARE GOING TO WRITE A BASIC FOR IT.   I DOUBT THAT SWTPC WOULD TAKE ON A PROJECT LIKE THAT.   WE ARE KIND OF INTERESTED IN PUTTING UP A PASCAL ON THE 6800. I CAN GET A COPY OF THE PASCAL COMPILER WHICH GENERATES CODE FOR THE "IDEAL" PASCAL MACHINE, A SO-CALLED P-MACHINE. ALL A PERSON HAS TO DO IS WRITE A P INTERPRETER AND RUN THE P-CODED COMPILER THRU IT. ANOTHER APPROACH IS TO RECODE THE CODE GENERATION ROUTINES IN THE COMPILER WITH ROUTINES THAT GENERATE 6800 CODE. THE COMPILER IS WRITTEN IN PASCAL OF COURSE.
                                                              SCOTT

Max L. Wymore, P.C.
1200 United Bank Center
1700 Broadway
Denver, Colorado 80202

IMS Associates, Inc.   March 10, 1976
1922 Republic Avenue
San Leandro, California 94577

Gentlemen:

On approximately February 18, 1976, I placed an order with you by telephone for an IMSAI 8080 microcomputer kit to be charged to my BankAmericard account. On approximately February 20, 1976, I was advised by a telephone call from someone in your company that there was an insufficient credit balance in my BankAmericard account to cover the entire purchase whereupon I advised your representative that it was my decision to cancel the order for the microcomputer kit and requested that my BankAmericard account be credited for any amount debited.

On March 9, 1976, I received a telephone call from a woman at IMS Associates advising that my kit was ready to be shipped and how did I intend to pay for same advising that my BAC account had been debited $170.00 and whether I would send a check for the balance, pay for same with a credit card or authorize shipment COD. I indicated that I had cancelled the order by a prior phone call. She advised that I could not cancel my order and suggested I talk to a Mr. Arnie Karush who told me that I was not permitted to cancel my order, that his company had made a commitment to deliver a microcomputer kit to me and that I had made a commitment to pay for same. It was the position of Mr. Karush that he was going to hold my $170.00 and the kit in my name until such time as I paid the balance owing, authorized charge thereof to my credit card, or authorized a COD shipment of the kit.

I advised Mr. Karush that I had cancelled my order on approximately February 20, 1976, and that I expected full restitution of all charges debited to my BankAmericard account in the amount of $170.00.

If you are not, you should be aware of the consumer protection laws which provide for the rescinding of any contract to purchase with full restitution of all monies paid. See 15 U.S.C. 1635 as extended by Judicial decree in Gardner and North Roofing and Siding Corporation v. Board of Governors of the Federal Reserve System et al, 464 F.2d 838 (1972) and others. Title 15, 1635(b) of the U.S. Code provides that "When an obligor exercises his right to rescind under subsection (a) of this section, he is not liable for any finance or other charge, and any security interest given by the obligor, including any such interest arising by operation of law, becomes void upon such a rescission. Within ten days after receipt of a notice of rescission, the creditor shall return to the obligor any money or property given as earnest money, down payment, or otherwise, and shall take any action necessary or appropriate to reflect the termination of any security interest created under the transaction."

Mr. Karush's insistence that mine was a special order is completely without foundation since my order was for the standard kit and no assembly was involved. Unless I receive full credit against my BankAmericard account within ten days as provided for in the Commerce and Trade section of the U.S. Code, 15 U.S.C.A. 1635(b), I will be forced to take legal action as necessary for the recovery of illegally held funds.

                                        Very truly yours,

MLW:sr
CERTIFIED MAIL
RETURN RECEIPT REQUESTED
                                        Max L. Wymore

M.D. RIVERS, 28 LEYFRED TERRACE, SPRINGFIELD, MA 01108 HAS SOME COMPUTER GRADE POWER SUPPLIES AVAILABLE THAT WERE OBTAINED IN AN INSURANCE SALVAGE DEAL. TWENTY UNITS ARE AVAILABLE, ALL NEW AND UNUSED. EACH SUPPLY HAS THREE OUTPUTS: 5 VDC @12 A, 15 VDC @2.8A, 15 VDC @ 2.8A, FILTERED, REGULATED, AND VARIABLE. PRICE IS $100 PLUS 10% FOR POSTAGE AND HANDLING WITH 25% OF IF ORDERED BEFORE MAY 1ST.   THEY ARE SUPPLIED WITH A MONEY BACK GUARANTEE IF RETURNED IN GOOD CONDITION.

CARL E. HEIMERDINGER, WB4BIG, 1325 GLADDEN DRIVE, LOUISVILLE, KY 40218 IS BUILDING AN 8008 SYSTEM WHICH HE HOPES TO FINISH SOON. IT WILL HAVE 4K OF MEMORY, CLARE-PENDAR KEYBOARD AND A TELETYPE FOR OUTPUT. HE IS GOING TO USE THE SYSTEM IN CONNECTION WITH AMATEUR RADIO TTY AND HOPEFULLY SOME SATELITE TRACKING IN THE NEAR FUTURE.

Dear Makers:

Delighted to receive a sample of your NL. Enclosed are bucks for a subscription. I'm a programmer on a 370/145 installation here in Baghdad-by-the-Bay, just getting interested in micros. I plan to buy a kit in a coupla months, but I need some good advice on what kind would be best for extensive real-time control appls.: answering the phone, running my tape deck and TV, forwarding phone calls, handling a modem or two, mixing drinks etc. Is there a user language handy for such stuff? Also, I'd like to try writing interpreters for APL and LISP; I find BASIC too inelegant and low-level.
I'd love to look at the rigs of any mikers in San Fran, if they exist. If anyone will lend me their first 4 issues of Byte to copy, I'll make them copies for free: I have unlimited free access to an IBM copier.
If you did not exist, you would have to be invented!

Regards,

Shadrack Black
1800 Market St., #123
San Francisco CA 94102

R. B. LEGGE   PO Box No 0.069 e
                                                   CAIXA POSTAL 7879
END. TELG. { LEGGE   CONSULTOR COMERCIAL E INDUSTRIAL   AV. ALVARO RAMOS, 1142
            { LEXMETAL -   01.000 SÃO PAULO - BRASIL
TEL. ADD.   { S. PAULO   BUSINESS AND INDUSTRIAL CONSULTANT

I am specially interested in converting an IBM Selectric, if possible the Model 72 which can be had in good condition, used, down here at a relatively inexpensive price - for use as I-O device with the Altair 8800. I'd be grateful to hear from anyone who can help me on this - giving me data on the IBM Selectric "Code" - how to convert the code to ASCII (I have in mind using a Re-prgrammable PROM circuitboard, together with a UART) so that all data bits to and from the Altair 8800 would go back and forthbx to the Selectric in ASCII form, being converted to the IBM code prior to entering the machine terminal-strips and vice-versa. I already have a Southwest Technical Products ASCII Keyboard and ASCII encoder which I plan to use in this hookup.

I'd like to know where I can purchase the IBM 72 Service Manual, and generally speaking have any criticisms or help anyone can give me.

Thanks in advance for any help you can give me.   Sincerely,

address for reply: PO Box No 30.069 / Avenida Alvaro Ramos No 1142 /
                   01.000 São Paulo, Brasil.   South America.

(By Air Mail, please!)

Dear Hal and Group,
Thank you for the sample issue of your NL. I'm convinced that its my kind of NL and enclose $6 for the next six issues. Although I do not yet own a computer I am keenly interested in the subject and am currently in the information gathering stage. I am trying to learn as much about the subject as I can so that when the time comes to buy a computer I can make an intelligent choice and know enough to enjoy and use it. I think that I will take advantage of the drop in prices to accumulate knowledge, and try to convince my wife of the worth of a computer (anyone have any convincing arguments?) I have only built one kit and do not have much knowledge of electronics. I have programmed in BASIC, Fortran, and PL/I. I occasionally have use of our DEC PDP 11/35 and in Fortran for the IBM 1130. I am interested in computer games and computer graphics and would like as long range goal to have a working space war system.

Sincerely,
Edwin P. Kawasaki II
292 Collamer Road
Hilton, New York 14468

                                                        March 8, 1976

Victor A. G. Murrell, 11229 Wright Rd., Lynwood, CA NE 1-1846 WB6HWN wants to know if anyone has a Hal keyboard for sending Morse code. He is teaching a class in advanced code for Amateur Radio and would like to speak to someone that owns one or has used one, or has one for sale, because he needs to know whether it would do the sort of thing he needs to make special instruction tapes.

Page 2

MIKE'S T.V. REPAIR

MICHAEL G. SCOTT

BOX 105 • KIRON, IOWA 51448

(712) 675-4255

Dear Hal: 10 MAR 1976

Enclosed is my contribution to the Micro-8 N.L. Also I want to say that you are doing a great job, keep it up.

Please note, before I go any farther, this is an untested circuit, fresh off the drawing board, and may have a few bugs in it. I've checqued it several times but we never know until power is applied.

A BRIEF DESCRIPTION

Until now all Scrolling circuits have operated in basicly the same maner, all lines move up one position and the poor top line is wiped out. What good is that, unless you don't want the top line all this does is give you a once only reading of your copy.

My version on the other hand stores the top line, which may be recalled at any time for re-reading.

Made to plug into the MEMORY board socket of the TVT-II, it operates as follows:

If the cursor is on the top line and receives a "SCROLL" command or cursor UP command all lines shift down one position (see drawing) now line 0 is line 31 line 1 is line 0, etc.

If the cursor is on the bottom line and receives a "MOVE DOWN" command the lines all pop up one position causing line 0 to be stored.

The first step is to re-define the memory as shown in figure 1.
Instead of having two pages of 16 lines of 32 characters we now have one page of 32 lines of 32 characters.

These lines are arranged kind of like a continuous loop belt, with a window (CRT SCREEN) in the middle. This "window" can only show 16 lines but the belt can move so that any 16 consecutive lines can be displayed.

The added components (8 ICs and some resistors & Caps) can mount on a small board which plugs in between the memory board and the main board. There are a few connections, however, which cannot be picked up off of the memory socket and wire jumpers must be used.

The only trace breaking to be done is to pins 4 & 5 of IC34.

Just a couple of final notes:

After you design a P.C. Board for this you can decide which pins to use. Also note that any of the A or B inputs can be used as long as the groups are kept seperate (ie As tied together or Bs tied together and the other connected to IC34, don't mix 'em)

If you haven't built your TVT yet, you can mount the Memories on the Scroller board and make it one board.

Let me know how this works if you build it.

Sincerely,

Michael G. Scott

Fig. 1 Memory

lines viewed on screen

↑ SCROLL DOWN

↓ SCROLL UP

Fig. 2 Schematic
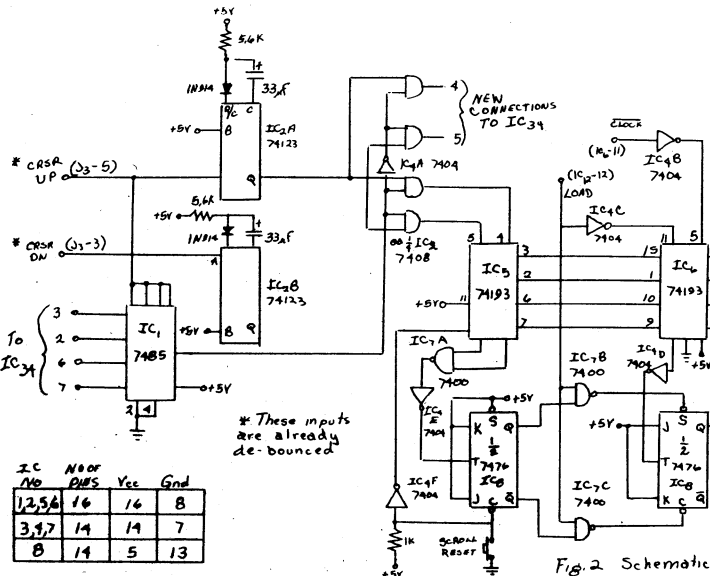
P.S. I AM ALSO WORKING ON A PORTABLE CRT MONITOR FOR TVT USING A 5" O'Scope Tube. Let you know how it works out

IC NO	N of PINS	Vcc	Gnd
1,2,5,6	16	16	8
3,4,7	14	14	7
8	14	5	13
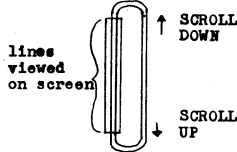
Mr. R. Pfotenhauer, Dunn Road, Rochedle 4123, Brisbane, Australia has recently purchased a SWTPC 6800 computer.

Ryoichi Mori, Electrotechnical Laboratory, Logical Systems Section, 2-6-1 Nagata-cho, Chiyoda-ku, Tokyo 100,Japan is chairman of the micro computer committee and wants to receive the newsletter.

Robert Leonard, 3003 Driscoll Dr, San Diego, Ca 92117 (714)274-9502 has a Mk-8 with 8K of 2102s, Suding TVT and Cassette, an SWTPC Keyboard, and a hardware stack.

Anthony G. McGookin, 402 Jones Dr, Bartlett, Il 60103 received his BSEE 25 years ago, and since then has worked in all phases of the computer industry, field engineering, marketing, production and R&D. He is now working for Univac, and with retirement not too far off, wants to design a state-of-the-art system to keep himself occupies with. He is really impressed with the IMP-16 (big brother to the PACE), and thinks its been overlooked by kitbuilders. He is also looking at the IMSAI 8080 and the Digital Group's kit, also the Intersil 6100 chip. He wants schematics for a good TV monitor to design a self-contained TVT similar to the SWTPC, but with a 64 or 80 character line. He has promised more info later.

Glendon C. Smith, 5822 Daffodil Cr, Dayton, Oh 45449 has a Altair with 12K of memory, Suding cassette and calculator interfaces, Clare-Pendar keyboard, and a homebrew TVT and graphics interface in the works. His TVT will provide an 88x88 grid, or blinking alphanumerics or graphics characters. He will send more info when the TVT is completed. He's afraid that new uPs will overshadow the 8008 and 8080 and that 8080 users will be ignored, even though thousands of people are still using 8080s. He also wants to see much more software in the NL. He will send a penny matching game and some TVT routines soon.

Page 3

Mark Goldstein, Advanced Tools for the Arts, Box 825, Tempe, Az 85281 owns a small company producing electronic music equipment, industrial control systems, etc, and is interested in computer graphics. He's building X-Y displays using analog computer controls. He intends to add a uP, TVT and cassette storage. He would like to correspond with anyone having ideas on converting X-Y deflection voltages into standard video signals with sync in real time, simulating an oscilloscope display on video monitors.

John Bottoms, P.N.P. Services Co, 423 Knoblech Ave, Jeffersonville, In 47130 reports that he's sold quite a few TVT-II boards, and has had requests for other boards. His new goal is to be able to supply etched and drilled boards from any R.E. or P.E. article, or any other board if the artwork is supplied. He is also working on a 6502 kit which will use the TIM monitor ROM from MOS Technology. the board will have 1K pre-programmed ROM and 1K RAM. Another memory board will also be available. The goal is to supply a system for under $150 (plus power supply and TTY).

Dean Dillabough, 913 Hamlet Rd, Ottawa, Ont, Canada K1G-1R3 bought an 8008 and 1K of 2102 from Godbout Electronics, and is designing his own system. He has to finish designing the display/control board, and then can start on the PC board layouts. After that he wants to work with the 8080A or the 6502. He says the mail is now going through after the big strike.

Allen T. Swann, 5503 Dolores Ave, Halethorpe, Md 21227 heard about the NL from Creative Computing and wants to join. He's been in computers for about 10 yrs and is now a staff consultant of Equitable Trust Bank in Baltimore. He's often talked to people about having a Computer in the basement, and now uPs have made it a possibility.

Gary E. Johney, PSC Box 264, APO San Francisco, Ca 96264 says his Mk-8 is having growing pains and will send more info later. He also reports that Mini Micro Mart is starting to deliver after 6 months. He would like to see more software in the future.

Pete Halstead, 23 St. Helen's Cres., Burton Joyce, Notts., England would like some info on availibility of the Mk-8 in England, and on construction.

Dear Hal,   March 24, 1976

A letter from Glendon C. Smith (excerpted somewhere else in this NL) expressed a wish for a newsletter that would be what the Micro-8 NL started to be, i.e., exclusively for the 8008 and 8080 users, and which would stay that way for 8-10 years rather than following all the new systems which are springing up. Mr. Smith told about a similar happening involving a piece of HP gear, which was later superseded, and therefore, ignored, in all of HP's publications. He expressed the fear that MITS' Computer Notes and BYTE would do the same.

Could it happen to the Micro-8 NL? Of course it could, except for one thing. The Micro-8 NL is composed almost exclusively of the contributions of its readers. If its readers send anything about the 8008 and 8080, it goes in the NL. By the same token, if you send something about a new product, it also goes in. The 8008 and 8080 can never be ignored if you write in and tell us what you're doing; hardware or software, it's all important.

Software is another touchy subject. Every month there are several letters complaining that they don't see enough software in the NL. If each letter had contained a software listing, there'd be plenty of software in the NL every month. Face it, fellow computer freaks, it won't happen if you don't make it happen, because there isn't anyone on the NL who does nothing but write software. If you want to read about software, send in some software to read about. Set a good example for everyone else to follow.

To show I sometimes practice what I preach, here are subroutines for decimal addition and subtraction of two 12 digit numbers. It should handle most people's tax returns. How you call it, and how you read out the results are your business. Two decimal digits per byte, right justified.

Addition				Subtraction			
1	LXI D,	1stNUM		1	LXI D,	1stNUM	
2	LXI H,	2ndNUM		2	LXI H,	2ndNUM	
3	MVI C,	006		3	MVI C,	006	
4	XRA A			4	STC		
5 LP:	LDAX D			5 LP:	MVI A,	231	
6	ADC M			6	ACI 000		
7	DAA			7	SUB M		
8	STAX D			8	XCHG		
9	INX H			9	ADD M		
10	INX D			10	DAA		
11	DCR C			11	MOV M, A		
12	JNZ LP			12	XCHG		
13	RET			13	INX D		
				14	INX H		
				15	DCR C		
				16	JNZ LP		
				17	RET		

Samuel H Daniel
402 Juniper
Vandenberg AFB, Ca 93437

Dan Erickson, 400 S. Catalina Ave, Pasadena, Ca 91106 sent a note announcing the formation of the San Gabriel Valley Chapter of the SCCS. The chapter will be open to all current and potential members of the SCCS. Interested people should contact Dan, but send a SASE if you want a reply, since the chapter has no budget.

John Griffin, 34008 22nd Pl SW, Federal Way, Wa 98003 says his latest project is a 256x256 point plotter on a 12in P-7 CRT. He has the 1K Digital Group operating system for his Mk-8, and says he sure could use something better.

Frederick L. Kahl, 704 Courtland Circle, Western Springs, Il 60558 has an Altair with 25K of memory, 8K BASIC, SWTPC CT-1024 TVT, a paper tape reader and punch. He also has the Intel monitor in PROM, and the Assembler and Text Editor, with Extended BASIC maybe on the way. He expects to do some work in Industrial control Systems (Numerical Control & Process control). He is rather disgusted with MITS in terms of delivery, product design & performance, and general "don't give a damn" attitude. He has a mod for the CT-1024 which gives Auto erase of next line on line feed or foldover which he offers to anyone interested.

R J Riley, Box 4310, Flint, Mi 48504 has 5 sets of 4 TI SBP0400 4bit-slice CPUs (ie, makes a 16bit CPU with 512 instructions from each set) They cost him $360 a set, and he is selling them for $250 a set. He also has 10 Phi-deck units which cost him $100 each and he will sell them for $75 apiece.

Cuba Hardin, Jr, 700 W Second St, Owensboro, Ky 42301 says hes interested in word processing, TVTs, and producing outputs suitable for phototypesetting.

Rick Brennan, 601 S Knight, Park Ridge, Il 60068 finally gave up wiring his 4K of 2102s on a Vectorboard, and bought a Solid State Music board for $20. He says its nice, and he wishes he had read about it sooner. He says the NL deserves much credit for bringing the uP into many hobbyist's homes.

Dear Micro-8,   March 22, 1976

I have seen your newsletter only occasionally, a situation which I hope to improve by sending you a check for $6. Other than that, I have a specific question, and a bit following for inclusion in the newsletter.

The question is: can you get in touch with Keith Britton or otherwise get more information to me about whatever he had in mind with the comments about Vocal Output. According to your report of the CompCon session, a vocal output (speech synthesizer) would be possible with only a ROM and "4 to 5 chips". Could you please tell me more?? Even an outline of what he had in mind and I can probably take it from there. As far as I understand the problem, you need 4 or 5 tunable resonator circuits, + a driving pulse generator, not to mention additional control circuits. Is there some proprietary secret behind a significant reduction of the system, or has the control circuitry been merely "minimized" away? If a copy of the paper is available, I would very much appreciate it, along with any other related comments. I am enclosing an SASE for that purpose.

D. Lloyd Rice
821 Pacific Street, #4
Santa Monica, CA 90405

6502 User's Association taking shape
           March 20, 1976

Several MOS Tech 6502 builders and users have been in communication recently and are forming a more organised way of keeping in touch. Currently, this is in the form of a mailing list and could easily expand to a newsletter. Most are more interested in getting software out of the group than hardware ideas simply because most have either bought systems or have their own ideas about what they want. Personally, I have been involved with mini software for the last ten years or so, and look forward to writing editors, assemblers, etc. I have ideas for a simple BASIC-like language centered around a scientific calculator chip set interfaced to the 6502. I plan to have a modem up as well as KC std. cassette.

John Campbell, 6278 Lake Lucerne San Diego CA 92119, has offered to copy and send out all materials in your SASE. Send him a description of your system, what code you're running and what you would like.

UNITED STATES DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

My name is Dick Hayes and I am employed by the National Bureau of Standards at Gaithersburg, Maryland. Our group is responsible for the instrumentation associated with the nuclear reactor facility.

Recently we purchased the hardware for building the Mark 8 computer using the Intel 8008 microprocessor. Since assembly, I have found jumpers missing and not called out on the Data MPX Board (IC3-14 and +5), and on the Address Latch Board (IC1-5 and IC2-1). It is quite obvious that there are other major problems.

Your name was given to me by Radio Electronics Magazine as a possible source of further information on updating literature newsletters, and troubleshooting literature. Any information you could forward me in regard to the Mark 8 Computer would be gratefully appreciated. If you should have any questions, please call me at 301-921-2303.

Sincerely yours,

                                  March 16, 1976

Richard P. Hayes
Reactor Radiation Division
National Bureau of Standards
Washington, DC 20234

Editor, COMPUTING NEWSLETTER
Professor of Computer and Management Science
J. Daniel Couger
Sincerely,
Thank you.

UNIVERSITY OF COLORADO
CRAGMOR ROAD
COLORADO SPRINGS, COLORADO 80907
March 15, 1976

Dear People:

Please add my name to your distribution list for MICRO-8 NEWSLETTER. You may send it to me at the above address.

Dear Micro-8,

I have seen your newsletter...

that's it, keep up the work.

David

John James, 1597 Monument St, Concord, Ma 01742, sends the following Pseudo-Random Generator Program. It uses a 16bit seed in the D&E registers and returns a new E in the A register. It repeats every 65,535 calls.

Statement #	Rnd:				#		
1		LAD	O2O		11	EVEN:	XRA
2		NDI			12		LAD
3		LBA			13	ODD:	RAR
4		LAE			14		LDA
5		NDI	O13		15		LAE
6		XRB			16		RAR
7		JTP	EVEN		17		LAI
8		LAI	OO1		18		RET
9		RAR					
10		JMP	ODD				

Richard F Schultz, 611 N Dexter Dr, Lansing, Mi 48910 says that he and Bill Servies of the Mid Michigan Users Group have gotten the MIL Monitor 8 running on Bill's homebrew 8008 with TVL-1. The Monitor is one supplied by Mini Micro Mart on their Mod C-8-2 board. The TVL-1 uses the RE UART board, modified to separate the UART into 2 independent units with only a common clock. More Info to the interested. (send a SASE).

Martin J Boyle, 1030 Milton Way, Rahway, NJ 07065 and his 15 year old son have a TVL-1 with scrolling breadboarded and functioning but not finalized. They also have a Model 19 TTY with a Model 14 reperforator which they use to copy RTTY on 2meter ham radio. Using Baudot to ASCII and ASCII to Baudot converters they hope to tie in a microcomputer for hobby and misc. purposes. They haven't decided on which uP yet, but probably will in a few months.

David Higgins
PO Box 113
Pettigould, AR 72450
phone # (501) 239-8588

Note, the po box is different from the last one, which was 1106.
The latest project, and the only one in months (school) is the MC6800 evaluation kit. Will let you know the $$$ cost after all the little goodies are added in. Like power supply, small TTL, chips not supplied, resistors, and so on.

Hey, have you ever seen the layout of the (IBM) 360's micro-code instructions? Those things are 128 bits long, at least. It's crazy. Thank whoever you don't have to mess with them.

I've got an applications type booklet on a broadcast automation (canned music) system that uses a 8008 for a brain. It's got about 6.6k of ROM, RAM according to your needs, and judging by what it does, they are working that poor little 8008 to death.

January 18, 1976

It was delightful for Jim Brick (NL #12) to introduce himself as a "Senior Systems Analyst (whatever this is)." In precisely the same sense I am a Computer Scientist...that is what my card says but someone else selected the title. For the last few years my work has been in minicomputer systems programming, mainly with peripherals (I/O drivers, interrupt processors, and so forth.) Prior to this I had many years of scientific applications programming with the "big fellows" and this will be the subject of my letter.

Sooner or later many of the microcomputer users will become interested in numerical methods through BASIC or otherwise. Permit me to list some books which may be of value to them:

1. A.I. Forsythe, Computer Science: A first course, John Wiley, 1969
2. F. Gruenberger, Problems for Computer Solution, John Wiley, 1965

These books were written with the particular problems of the beginner in mind and are intended to be thought provoking. The first is language independent (flow charts are used), it was written for intelligent high school students. The second book is at the college level and expects some computer exposure but not very much. The second book makes many references to FORTRAN but it does not hurt, merely think BASIC and continue. For both books there were additional authors but I did not have room for "et. al."

Gruenberger speaks of a classic work by Hastings. A more recent work is

3. John F. Hart, Computer Approximations, John Wiley, 1968

which costs entirely too much but is very good for those of you who get hung up on approximations to various functions. This book will probably not be an easy book to read but is of greatest value for its scads of coefficients for approximating polynomials.

Just as Jim Brick, I am more or less "homegrown" with minimal exposure to those ivy covered walls but I found that I could read

4. J.B. Scarborough, Numerical Mathematical Analysis, The Johns Hopkins Press, 1962 (fifth edition, maybe there is a later one)

You can perhaps find an earlier edition than the fifth in a used book store but these are not satisfactory because they did not address the particular problems of the computer.
A genuine treasure trove, a big, hard bound book at a reasonable price from the Government Printing Office is

5. M. Abramowitz, Handbook of Mathematical Functions, AMS 55, NBS

At one stage of my life I fell in love with the Hewlett-Packard HP-65 and in the normal course of things I joined the HP-65 users group. The owner of a -65 can join this users group for free but a non-owner can join for a small fee. The HP-65 users group has an enormous collection of programs available for a reproduction charge. For a microcomputer user to use these programs he must simulate, in effect, the functions of the HP-65, which is to say that he must provide such as the sine function, square root function, logarithmic function, and so forth. The HP-65 programs are guaranteed to be fairly short so thus usuable on even a small memory microcomputer. A similar resource to be available soon is the users group for the Texas Instruments SR-52 programmable.

Those of you who are interested primarily in mathematics and scientific algorithms rather that in "doing things themselves" should give some consideration to the purchase of the SR-52 for $400. The HP-65 at $800. suddenly seems expensive.

If you find programmable pocket calculators attractive, there are a few things of importance to keep in mind. An imperative to my mind is that a calculator must have tests that permit conditional branching and/or conditional stopping. It seems stupid but many programmable calculators do not have conditional tests. Most such calculators do not permit subroutines. The HP-65 allows subroutines to one level while the SR-52 allows them to two levels.

The T.I. SR-52 has some kind of interface because an optional printer is to be supplied for it. Surely the engineers who designed the beast would not make a stridly one way interface...why out themselves off at the pass and eliminate the future possibilities of data collection, etc. The SR-52 is unique in allowing both indirect and indexed addressing. (It is not truly indexed but the effect can be obtained.)

Sincerely,

Webb Simmons

P.S. Send volume 2, NL's 1 thru 6 of the Micro-8 Newsletter for $6.00 if it goes. My check will be returned in the SASE enclosed if it doesn't.

Webb SIMMONS
1559 Alcala Place
San Diego, Calif. 92111

Adam Trent
Ascension Island
Box A NASA STDN
Patrick AFB, Fla. 32925

5 Mar 76

It's been some time since you've heard from me. None-the-less, I've been reading your Newsletter with avid interest. Here's $6 for a renewal.
My Mark8 had been in pieces for many months while I put it, an MNH modem, a TVT2 and keyboard all in one nice terminal type box. I now have it all back together and running again. I'd like to pass along how I implemented software control of my TVT2.
I used the outport functioned by the 131 instruction (octal). The bit assignments are:

B7	Clear EOF	B3	Cursor Left
B6	Clear EOL	B2	Cursor Right
B5	Cursor Up	B1	Cursor Home
B4	Cursor Down	B0	Change Page

None of the above actions will function properly if held at a latched high or low level by the standard outport latch bit. This is because the latched level will fight the pulsed levels that should normally occur during the input of characters to the TVT2. For instance, the TVT2 creates for itself an advance right pulse for each input character keypress. This proper operation is inhibited if the Cursor Right control line (j3pin2) is held at a high logic level. For similar reasons none of the other controls will function properly if held either low or high.
After building the TVT2, I decided to attempt screen control by using software and an outport. In order to do this, I had to make the action of a bounceless SPST switch which momentarily grounds the control line and then goes to a high impedance state. I used two 74125 tristate buffers, a 7473 and some software:
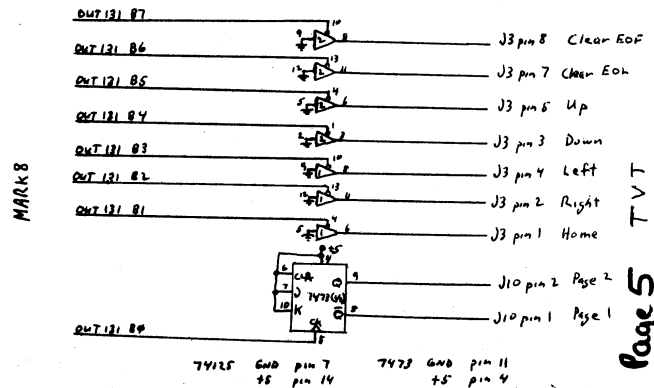
With this set-up you should execute a short initializing routine after powering up. I include the following 3 byte sequence as an early part of my cassette bootstrap program: LAI, 376, OUT131. This places a quiescent high impedance on all the necessary control lines. Then, in order to function any of the controls later, you must output a temporary low on its respective bit and then return it to its normal high (a high on the 74125 control line takes the buffer to its high impedance state). I call the following short subroutine for any of the controls:

Screen Function	301	LAB
	131	OUT131
	006	LAI
*	376	(normal levels)
	131	OUT131
	007	RET

After loading the code for the desired function in B Register, I call the above subroutine. For example, Change Page:

	016	LBI
*	377	(Bit 0 high)
	106	CAL

	---	Screen Function

Unlike the others, the Page control out bit is held normally low and taken high momentarily to toggle the 7473 flipflop.
Given my selection of OUT131 bit assignments, the octal control code for each function is:
Change Page:377, Home:375, Right:373, Left:367, Up:337, Down:357, Clear EOL:277, Clear EOF:177
This software control of the cursor allows a limited but fun 32X16 computer graphics field using the TVT2.
Well, despite the fact that we're thousands of miles out in the middle of an oceanic nowhere, there are now about five Computer Hobbiests here on Ascension (two Altairs running, a Sphere on order, an IMSAI on order and, of-course, my Mark8/TVT2 system). If we had a formal organization it might be called the "South Atlantic Computer Society" and we could boast a territorial region of vast proportions. However, we have no formal organization and probably don't need one since the Island is so small (34 sq mi, pop about 1300).
Thanks again for the fine MICRO-8 Newsletter.

Sincerely,

Adam Trent

37-68 64 St.
Woodside NY 11377

January 18, 1976

I haven't decided on hardware yet, which MPU, 8080, 6800, 6502, or some other, which vendor's kit or whether to build my own from scratch. So I'm eager to hear your comments and the comments of others expressed in the pages of Micro-8 newsletter. I hope you'll be able to keep it up for a while longer.

As far as peripherals are concerned, I like the thinking of Jim Loy, of Motorola, who suggests a hexidecimal (or octal) keypad and display (rather than binary switches and LED's) for a first-step I/O device. Hexidecimal is easier to read and easier to key than the usual front-panel switches and lights. In his Motorola demonstration microcomputer it is connected to the MPU by dedicated ROM. When one outgrows the keypad, one can go to a teletype-writer or video monitor and keyboard, later adding cassette tape storage and

eventually floppy disk.

We are forming a computer club in the New York City area. We had our first meeting in November, thanks to your name and address list coming out when it did. We still haven't formally agreed on a name and officers. Information on monthly meetings can be obtained, however, from myself or from:

Bob Schwartz
1E, 375 Riverside Drive
New York NY 10025
(212) 663-5549

Sincerely,

Wayne H. Foote
(212) 335-9496

MRS

P.O. BOX 1220
HAWTHORNE, CA. 90250

March 20, 1976

AM6800

We have developed a high quality product which allows owners of an Altair 8800 to develop systems with Motorola's MC6800 MPU.

This product is a must for anyone who wants: 1. To compare the Intel 8080 with the Motorola MC6800. 2. Has an Altair 8800 and plans to use the MC6800 MPU for a new design. 3. Wants to have the flexebility of both.

The AM6800 card in an Altair 8800 also allows one to take advantage of all the best features of each processor in software through alternating processors in the same program.

It is a one board pin compatible card for an Altair 8800. No modifications are required and it will not interfere with normal execution of 8080 programs. The MC6800 gains control via software command, one instruction. You can return control by either the front panel stop switch or through software, one instruction. It will operate with either fast or slow, static or dynamic memories. MC6800 MPU status signals are brought out on unused bus lines (jumper option), ie. Ø1 & Ø2 clocks, VMA, and R/W lines for system development. The 8080 processor card remains in the computer to handle all front panel controls. All data and address lines are three state buffered.

The AM6800 card is a fully TTL-Buffered Microcomputer using Motorola's MC6800 microprocessor, and can stand alone with the addition of only an external clock and power supply.

Our price is $147.75 plus tax for the complete kit and $97.75 plus tax for the complete kit except the MC6800 MPU. Delivery is 2 to 4 weeks. Postage is not included. Make all checks payible to M.N.Kalashian.

JACKIE W. PIERCE   460-84-4884
178th. SIG. CO.   17, MAR. 76
APO N.Y. 09102
LOOKS LIKE "BYTE" IS DOING A GOOD JOB. THE TAPE STANDARD THEY WERE INSTERMINTAL IN SETTING SHOULD SOLVE ONE BIG PROBLEM THAT HAS PLAGUED THE COMP. HOBBYIST. MY SUBSCRIPTIONS TO"THE COMPUTER HOBBYIST" HAS NOT BEEN ARRIVING. I WROTE THEM A LETTER 3 WEEKS AGO, AND AM EXPECTING TO HEAR FROM THEM SOON (HOPE). I HAD ORDERED THE MITS 680, BACK IN DEC. 75. AFTER TWO MONTHS I RECEIVED A NOTICE THAT THE SHIPMENTS WOULD BE DELAYED DUE TO MODIFICATIONS OF THE CPU BOARD. AT THAT TIME I CANCELED MY ORDER, AND ORDERED A "JOLT" CPU CARD FROM JAMES ELECT., FOR $156. IT ARRIVED FAST AS USUAL, AND I PUT IT TOGETHER IN ABOUT 3 TO 4 HOURS. YOU CAN POWER UP AND RUN THE MONITER PROGRAM THAT IS STORED IN ITS 1K ROM. THE MONITER IS DESIGNED TO BE ENTERED FROM A TTY (ASCII), AND WILL READ MEMORY, MODIFY MEMORY AND INIATE PROGRAMS. THE TTY INPUT AND OUTPUT ARE SERRIAL. THERE ARE THREE 8 BIT IN AND OUTPUT PORTS BESIDES THE TTY. SINCE I DONT HAVE A TTY, I PROGRAMED MY "MARK8" TO SIMULATE THE TTY.THIS IS WHERE THE STORY TURNS BAD,.. THE THING DID NOT WORK. I OF COURSE CHECKED ALL CONNECTIONS, AND SOLDER RUNS, BUT ALL SEEMED OK. THE RESET FUNCTION SEEMS TO BE THE TROUBLE. THE KIT HAD BETTER THAN FAIR DOCUMENTATION, WHICH HAD A TROUBLE SHOOTHIG CHART. AFTER GOING THROUGH ALL THE CHECKS, WITHOUT CORRECTING THE TROUBLE, DIRECTIONS SAID TO CONTACK THE SERVICE DEPARTMENT FOR FURTHER INSTRUCTIONS. THIS WAS DONE ONE WEEK AGO, AND I AM WAITING TO HEAR FROM THEM. THE JOLT SYSTEM USES THE 6502 CPU, FROM "MOS TECH." I HAVE ORDERED THE "KIM-1" MICROCOMPUTER SYSTEM FROM "MOS TECH". THIS IS A COMPLETE MICROCOMPUTER ON ONE CKT. BOARD(EXCEPT FOR THE POWER SUPPLY). IT USES THE 6502 CPU, TWO 6530s, HAS 2K OF ROM WITH MONITER, 30 IN/OUT PINS, OVER 1.1K OF RAM,ON BOARD HEX KEYBOARD WITH 8 FUNCTION KEYS, SEVEN SEGMENT DISPLAYS THAT DISPLAY ADDRESS, AND DATA, AND IT ALSO HAS A CASSETTE, AND TTY INTERPHASE. THIS SYSTEM SEEMS TO BE THE MOST USEABLE FOR THE PRICE, SYSTEM I HAVE SEEN YET.(FOR FURTHER INFO, WRITE TO " MOS TECH. INC., 950 RITTENHOUSE RD.,NORRISTOWN PA. 19401) I AM STILL TRYING TO FIND SOME A/D CONVERTERS THAT RUN AT ABOUT 400K CYCLE TIME, FOR LESS THAT 100 DOLLARS. WELL ILL CLOSE HERE, KEEP YOUR BITS IN ORDER, AND DONT POWER DOWN.
SINCERELY,
Jackie W. Pierce
JACKIE W. PIERCE

AM6800 OPTIONS

The AM6800 board has provisions for several jumper options which must be implemented.

OPTION 1

The first option depends on how you wish to restart the MC6800 MPU. You are offered the choice between using the "reset" switch or the "external clear" switch. If you are using dynamic memories you should use the "external clear".

Connect a one thousand ohm resistor between points A and B for the "external clear" option. Connect the resistor between B and C for the reset swich option.

OPTION 2

The second option is concerned with MC6800 input output device control. It is normally recommended that you use the 8080 for I/O since the MC6800 uses memory locations for I/O. Connecting a jumper wire between J and L will allow using all address for memory. Puting a jumper wire between J and H will reserve the top 256 bytes of memory for I/O less the very top 8, which are interrupt vectors for the MC6800 MPU.

OPTION 3

We provide the user of our board with the option of bringing out some of the MC6800 signals on unused pins on the bus. The following signals are brought out to the bus with this option:

MC6800 Ø1 clock   Pin #14
MC6800 Ø2 clock   Pin #15
MC6800 R/W   Pin #16
MC6800 VMA   Pin #17

If you wish these signals brought out on your bus you must connect a jumper wire between F and G.

OPTION 4

The last option offered is concerned with the signal called PDBIN on pin #78 of your bus. Normally, a jumper should be soldered from P to N. This will allow the data lights on the front panel to be active while the MC6800 MPU is running. If Option 2 was selected for I/O operation then this jumper should be connected from N to M. This will sync PBIN to the MC6800 Ø2 clock.

AM6800 PROCESSOR BOARD

* MC6800 Microprocessor Based
* Altair 8800 Pin Compatible
* Two Micro Second MPU Cycle Time   (2 Cycles/Instruction - Min.)
* Static and Dynamic Memory Compatible
* Alternate Processing Between 8080 and 6800 During One Program
* Transfer of Processor Control is Via Software
* Transfer Time Does Not Exceed One MPU Cycle Time
* 6800 Processor Restart Accomplished Via "Reset" or "External Clear" (Jumper Option)
* NMI and IRQ Brought Out to Altair Bus
* Current Drain Less Than One Ampere
* LED On AM6800 Board Indicates 6800 Selected
* MC6800 MPU Status Brought Out To Altair Bus   (Jumper Option)
* 8080 Device Code Instruction to Select AM6800 is 323,367 - Octal
* MC6800 Instruction to Select 8080 is F7,FFF7 - Hex

Page 6

(vertical text in left margin of this column):
All it should take to get a MC6 TECH 6501 out now. Or better yet, get two boards, make a few changes and your ALTAIR compatible machine is three work is plugging it in. MOS is checking this out different processors simultaneously. Anyone ready to design an F8 board or ???????? Makes a few to compete with ALTAIR bus machine look better and better. Hal Singer

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Micro-Eight Readers...

After the recent write-up in Byte magazine about the Micro-Eight Newsletter I felt it would be appropriate to drop you a line and straighten out a few things...and share a few thoughts with you.

First, as I'm sure you've noticed by the letterhead, I'm no longer associated with the newsletter. I'm now working for Wayne Green as editor of the "I/O" (computer and digital electronics) section of 73.

Secondly, it should be pointed out that the Micro-Eight Newsletter is, and always has been, Hal Singer's baby. It was his intiative and effort which started it...has sustained it...and of course, has made it as great as it is. I probably never really contributed enough to be called a co-editor, and I suspect Hal did that more because we're friends than anything else. (By the way, last Saturday the Southern California Computer Society presented Hal with a trophy in appreciation of the contributions he's made to our hobby. Stop and think for a minute where this hobby would be now if it hadn't been for Hal Singer's efforts. Almost every club which has been formed around the country used the newsletter to get started.)

I would also like to take this opportunity to say that I'm looking for articles for "I/O". The "I/O" section of 73 is about 40 pages in length (about the size of a small magazine, really) and contains articles dealing with computer applications, fundamentals (hardware & software), interfacing, construction projects, games, music and just about anything else you can think of. If you have any ideas for an article for 73 I sure would like to hear from you (so how's about dropping me a line and we'll discuss them?).

Writing for 73 can certainly be profitable. If you're like most computer hobbyists, you're always looking for those extra bucks to buy this or that peripheral. This is one way of doing it. And, of course, it always looks good on a resume to have published professionally.

It's thru magazines such as 73 that we'll attract more hobbyists to computers (rather than thru computer magazines). And, the publisher of this magazine is a man with a strong desire to get as many people as possible turned on to these toys. (He's also a man with vision stretching many, many years into the future.)

Looking forward to hearing from you.

Sincerely,
John Craig
John Craig
I/O Editor - - 73

MARCH 21, 1976

FROM: THE COMPUTER HOBBYIST GROUP OF NORTH TEXAS(TCHGNT)
      % L. G. WALKER, PRESIDENT
      RT. 1 BOX 272
      ALEDO, TX. 76008

WE WOULD APPRECIATE IT VERY MUCH IF YOU WOULD PRINT THE FOLLOWING AD IN YOUR PUBLICATION:

THE BETA TERMINAL OWNERS GROUP OF THE COMPUTER HOBBYIST GROUP OF NORTH TEXAS IS INTERESTED IN ESTABLISHING COMMUNICATIONS WITH OWNERS OF TERMINALS THAT USE THE UNIVAC 0769 SERIES PRINT MECHANISM. WE ARE LOOKING FOR BETA KEYBOARDS (MICROSWITCH # 53SW1-2). ONE OF OUR MEMBERS HAS SOME SPARE PARTS FOR BETA TERMINALS FOR SALE. CONTACT L. G. WALKER, RT. 1 BOX 272, ALEDO , TEXAS 76008. (817) 244-1013.   SINCERELY,

THANK YOU VERY MUCH.

L. G. WALKER

I presently have an IMSAI 8080 with 8K of Processor Technology up and running. It is a beautiful machine!!! I bought the machine on February 2. Before that time, I had never even soldered or put together an electronics kit. I don't have the time now, but I hope shortly to write down my experience and send it to you for possible publication.

Kenneth Young
3311 West 3rd Street
Apartment 1-319
Los Angeles, California 90020
March 20, 1976

Sincerely,
Kenneth Young

I believe that one of the most important functions of your very fine newsletter is to make the hobbyist aware of unscrupulous mail order suppliers. We are all aware that we are taking a risk any time we put a check in the mail to a supplier.

In hopes that my experience with Mini Micro Mart will save some other hobbyist a lot of grief, I am sending this account of my experience.

I ordered a Mark-8 kit from Mini Micro Mart in June, 1975. I received nothing from them until mid-August when I received a partial shipment of integrated circuits (minus the 8008, and 8263/8267 multiplexors) and a request for additional money to cover the cost of a "better" memory board (2102's) as they were not going to supply the standard Mark-8 board. I sent an additional $15.00, bringing the total I have sent them to $187.45.

In November, I received the "better" memory board and 2102's - it is their C-MOD8-5 board. The documentation is trash and the board is not compatible with the standard Mark-8 boards. I also received the circuit boards for most of the rest of the kit (minus the LED Register Display board).

After waiting seven months, I still do not have (1) the 8008 CPU chip, (2) the two 8263 and two 8267 multiplexor chips, (3) the LED Register Display board, and (4) any resistors or capacitors. Three letter and two phone calls have been totally ignored.

In speaking to Mr. Maury Goldberg by phone on January 2, 1976, I was told that they do not now have the LED board, have not started to produce it, and may try to buy it from some other supplier to fill their orders. Mr. Goldberg did not seem to feel that a seven month delay in delivery was unreasonable as they "had had problems".

I certainly will never buy anything from Mini Micro Mart again. Other hobbyists will, of course, take their own chances, but if anyone would care to give me a call (401-728-2869) or drop me a line, I'll certainly tell them what I think of Mini Micro Mart. My experience is completely documented with copies of letters, checks, invoices, and telephone notes.

Please keep the Micro-8 newsletter going. Unfortunately, it appears we hobbyists are still in a jungle when dealing with suppliers and the newsletter is invaluable in showing the way.

44 Circledale Drive
Cumberland
Rhode Island 02864
January 19, 1976

Yours truly,
James Tucker

Bob Wallace, designer

New World
Computer
Services, Inc.

PO Box 5415, Seattle, Wa. 98105

Feb 23, 1976

Micro-8 Newsletter
Lompoc, California

Dear Hal,

"The Retail Computer Store" is opening in Seattle, and I'll be handling publications for them. We'd like to carry the newsletter; accordingly, enclosed is a purchace order for 5 subscriptions and some back issues. Keep up the good work !

Sincerely,
Bob Wallace

Just got a data sheet for the Texas Instruments TMS 9900 microcomputer. Looks like an excellent chip (I think; haven't really analized it yet). 64 pins (!), separate 16 bit address and data buses, good instructions for both bytes and words. Could be a reasonable hobbyist minicomputer chip (I don't consider either the PACE or the General Instrument micro's to be particularly powerful).

Sincerely,
Bob Wallace

I found out about your group from Arthur Kleiman, associate editor of Radio-Electronics magazine. I'm interested in building a minicomputer but I don't have any idea which features are more important than others. I have two years of electrical engineering (1½ at Steven's Institute of Technology in Hoboken, N.J. and ½ at New York Institute of Technology in N.Y.). I'm familiar with BASIC and FORTRAN IV. I would like to build a system similar in operation to either the XEROX 800 ETS or the IBM MTST. Input would be from a keyboard preferably with ASCII code. Output would be either hardcopy from the typewriter or visual on a television screen. A memory library would be kept on cassette. Sample use would be an inventory of post-war LIONEL trains which could be updated periodically by entering new aquisitions via keyboard and verifying proper numerical entry via television screen, with availability of hardcopy for away from home reference,(i.e.when at collector's meets).

I would like to communicate with someone who could guide me towards the equipment which could meet my needs. I would appreciate any help or suggestions where I could get help that you can supply. Thank you very much for your time and efforts.

Sincerely,
Richard R. Rutkowski
January 4, 1976
166 Caswell Avenue
Staten Island, N.Y. 10314.

RICHARD N. RUBINSTEIN, M.D.
7711 ELBA ROAD
ALEXANDRIA, VIRGINIA, 22306

January 6, 1976

Gentlemen;

Enclosed is $6.00. Please enter my subscription for Volume 2.

I've got a 21K Byte Altair 8800 with ASR-33, ACR, EXTENDED BASIC (Fantastic!), and Assembly Language up and running.

I'm very satisfied with the system and hope to get a floppy disc system this year. The system is used primarily to store confidential patient records (in a secret code for extra protection), but it doubles as a bookkeeping and billing system and is also used for statistical work, games and household accounting. Other than that it's useless!

I recently attended the first meeting of the Washington-Baltimore Computer Hobbyist Club. About 90 people packed into a small meeting room rented at the Colony 7 Motel. The club elected temporary officers, arranged a meeting schedule, provided technical lectures and system demonstrations. The elusive Joe Cimmino was even there. We should have a newsletter going soon. We're meeting on the second Wednesday of every month.

Sincerely,

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1331 North Lotta Drive
Los Angeles, California
90063
March 6, 1976

Is there a source for the TV Typewriter data package advertised in the September 1973 issue of Radio-Electronics? According to Radio-Electronics, the supply is now exhausted. Possibly a reader has a copy and can xerox it for me. I will pay his expense if he will write me and let me know how much it will cost.

I am also looking for a copy of the Intellec 8 (8008) assembler to run on my MOD-8 system. Any one with a readout can contact me. I have the MIL Monitor 8 up and running. I encoded it by hand into octal and did debug on the machine. All the bugs are out and it is running perfectly. I am enclosing an octal readout for those readers that do not have an assembler yet. Documentation and programmed units can be obtained from Bob Schwartz in Chicago. This readout can be bootstraped by a SIM-8, or Intellec 8.

Monitor 8 commands:

```
LOC  set location pointer... used in one pass assembler
DLP  display current location pointer
DPS  dump symbolic.......... yes, a real dis-assembler
LDO  load octal............. MIL octal(like readout)
DPO  dump octal
LBF  load BNPF format....... what a drag
DBF  dump BNPF format
EDT  enter edit mode........ anyone got an Intellec Editor -
XQT  initiate program execution        (not very powerful)
CPY  copy routine
TRN  translate routine...... THIS ONE IS DYNAMITE
SBP  set break-point........ breaks and lists reg. A, B, C, H, L,
CBP  clear break-point                                         M.
PRG  program PROM
```

I enjoy your newsletter and congratulate you on a fine job.

Sincerely,
Dave Gillespie

I have a couple ideas that I have been toying with.

1) would it be feasible to design a graphies card for a TV using its raster scan with Intel's CCD chips(charge coupled devices). These chips are 64 recirculating shift registers of 256 bits apiece. They have maximum transfer rate of 2megabits/sec. It seems to me that because of their high density (16k bits/chip) and their architecture(64 independant registers) that they would be ideal for such an application.

2) How about a Micro based on Intel's 3000 series bipolar chips. These 2-bit slices(CPE) and controller chips(PMU) are extremely fast and capable of executing microcode at a clock rate of 10megaherzt(1 instruction/100 nanosec). I have gotten this idea from a data catalog that I received from them. They already have a developement package around it and I have sent for more information from them but have not received it yet. Another example of their fastness is register add time which is about 300nsecs for 16-20bit registers.

Thank You,
Dale Luck
Wayland Academy
Beaver Dam, Wis. 53916

Dale Luck
P.O. Box 372
Beaver Dam, Wisconsin 53916

please use this address if possible

TELESENSORY SYSTEMS, INC.

NEWSLETTER 9 - OCT., 1975

1889 Page Mill Road
Palo Alto / California 94304

Telephone 415/493-2626
Telex 348352

SPEECH PLUS* CALCULATOR ANNOUNCEMENT

TSI is now accepting orders for the SPEECH PLUS talking calculator. The price is

$395

with first shipments scheduled for February 1976. This low price, together with its powerful capabilities and high quality, means that a very convenient, hand held, completely portable calculator is now available to the blind.

Over a year of research and development has gone into designing the SPEECH PLUS from the ground up as a talking calculator for the blind. Advanced speech synthesis and integrated circuit technology have resulted in a unit which measures only 7" x 4½" x 1½" (18cm by 11.5cm by 3.8cm) and weighs about a pound (455 grams). The lack of moving parts (except for the keyboard and speaker) in SPEECH PLUS makes it a highly reliable unit.

The algebraic logic we have used is an easy, natural way for people to do arithmetic. For example, to add 3 and 4, one presses (and hears) "three plus four equals". To obtain the result, press a special "speak" key and you will hear "seven point oh oh". (The extra two digits are added to make monetary calculations easier). "Speak" can be pressed as many times as necessary to hear whatever is in the display. A volume control allows variable sound levels to suit needs at the time (classroom, library, etc.). For completely private listening, an earphone is included.

With its 24-word vocabulary, SPEECH PLUS has the capability of announcing every key pressed, so the wrong key cannot be pressed without your knowing it. A complete record of calculations can also be made with any tape recorder. Keys can be pressed as rapidly as desired; if SPEECH PLUS can't talk fast enough it will simply "clip off" the last part of one word and start saying the next (there is a switch for turning off the spoken keyboard verification so speech is only produced when the "speak" key is pressed).

Besides addition, subtraction, multiplication, and division, SPEECH PLUS does square root and percent. There is a memory register and an automatic constant feature which allows repeated or chain calculations with a minimum of keystrokes. SPEECH PLUS has eight-digit floating point decimal capacity. If a calculation results in a number that is more than eight digits, it says "overflow" and stores the most significant digits (the correct number can be obtained by separately multiplying the contents of the display by 10^8).

*SPEECH PLUS is a trademark of Telesensory Systems, Inc.

SPOKEN WORD OUTPUT FROM YOUR OPTACON???

Would you like to have an accessory unit plugged into your Optacon which would speak the words as you scanned them with the Optacon camera? This question has concerned the Optacon engineering group since the 1960's when the Optacon was being developed at Stanford Research Institute and Stanford University. A feasibility study sponsored by the National Eye Institute was conducted by this group at SRI from 1968 to 1970 which considered and tested many alternative approaches toward meeting the unfilled reading needs of the blind. The results of this study (which were widely circulated in a final report in 1970, several published papers, and several public presentations) led to the conclusions that:

- The Optacon should be widely disseminated as a portable reading aid to provide for many reading needs of the blind as a stand alone device.

- It appears technically feasible to develop an accessory to the Optacon which would provide spoken word output. This accessory would be plugged into the Optacon I/O connector and would perform the optical character recognition (OCR), orthographic-to-phonemic conversion, and speech synthesis functions (either in an accessory electronic unit at the user's location or remotely via telephone lines).

- With this accessory, reading rates up to 200 words per minute could possibly be achieved on a restricted but very useful set of type styles and documents. These could be achieved by a blind user hand tracking with an Optacon camera (automatic scanning could also be provided for by an Automatic Page Scanner (APS) if desired).

Several features result from our human factors study. The number keys are arranged in a "touch-tone" telephone format. This makes it easier and more accurate to learn and to switch between calculating and telephoning. The function keys are arranged for easy learning and convenient operation. There is a sturdy built-in metal eyelet which can be used as an attachment point for a carrying strap or tie-down security cable. SPEECH PLUS comes with a durable attractive naugahyde case with a strap for easy carrying on wrist or belt. There is a self-contained rechargeable NiCad battery and separate battery charger.

With its visual LED display, we think anyone, blind or sighted, who needs to make arithmetic calculations will find SPEECH PLUS the most convenient calculator they have used. Lists of numbers can be entered quickly without looking at the display, teachers can use it to demonstrate arithmetic to their classes, salesmen can compute orders while the customer follows by listening, etc.

First production prototypes of SPEECH PLUS will be ready this month. Full production units will be ready in February 1976. Since orders will exceed our production capacity for the first few months, it would be wise to get your reservation in now. As an extra incentive, we will include free with the first 200 calculators purchased on the attached order form a booklet on Games and Applications (to be published by Dymex Publications) being especially prepared for SPEECH PLUS by Drs. Silvasalem Thiagerajan and Harold Stolovitch of the Center for Innovation in Teaching the Handicapped, Indiana University, and by Loren Schoof of TSI.

Fill out the attached SPEECH PLUS order form now for earliest possible delivery to you in 1976.

TSI's NEW FIELD REPRESENTATIVES IN THE UNITED STATES

Bill Kuhn, who will be working out of Houston, Texas, joined TSI in August and will be responsible for TSI representation in Texas, Nebraska, Kansas, Missouri, Oklahoma, Louisiana, and Arkansas. His address is P.O. Box 2564, Houston 77001 and his telephone is 713/526-6065.

Bill, who has a Master's Degree in Political Science from Rutgers University, was formerly Field Representative for Wadsworth Publishing Company of Belmont, California and covered Texas, Louisiana, and Mississippi while in this position. His interests include real estate restoration ventures, stamp collecting, trains, bridge, sports, gourmet cooking, and a little stock car racing on the side.

Jack Gilson will be working out of Atlanta, Georgia and will be responsible for Tennessee, South Carolina, Georgia, Mississippi, Alabama, and Florida. Jack received his MA in Government from Ohio University, has taught Junior High School U.S. History and Civics in Augusta, Georgia. His address is 417 Valley Hill Road, K-6, Riverdale, Georgia 30274. His telephone number will appear in the next Newsletter.

Diane Jackson will be covering the New York City area, beginning in October. She has a M.Ed. in Orientation and Mobility from Boston College and has been coordinator of the O & M program at the New York Institute for the Education of the Blind for the past three years. Diane and her husband are just getting settled into their new home, which is at 118 Braunsdorf Road, Pearl River, New York 10965, telephone 914/735-9223.

The conclusions from the 1970 study directly affected the Optacon design in that provision was made, through the Optacon I/O connector, for the later addition of this spoken word accessory if it could be developed. Thus purchasers of the Optacon would be able to make use of this accessory when and if developed, but in the meantime they would have all the capabilities the Optacon provides. Since this study in 1970, no possibilities for funding the development have been identified. Now, five years later, progress in OCR, speech synthesis, and integrated circuit technologies, together with the success and wide dissemination of the Optacon, make the possibility of such an Optacon-based spoken word system even more likely.

We at TSI would like to hear from our Newsletter readers regarding this subject. Your comments can have an important influence on decisions resulting from such questions as:

- Would an Optacon accessory which provided spoken word output and reading rates in the 100 to 200 word per minute range on a restricted set of materials be useful to you? Could you list the applications you envision as being most important?

- Would you prefer to interact directly with the text by hand tracking or to have the extra equipment complexity and expense of automatic tracking?

- Would you view such an accessory as a system to be personally owned or as a system to be in libraries, agencies, schools, and industry for the use of Optacon owners?

Please write to us at your earliest convenience and let us know how you would react to the availability of this type of system.

Page 8

Hi:

My name is Bruce. I used to follow your group closely when I was living in Southern California. When I moved to Berkeley I no longer had friends that received the newsletter so I hove been out of touch for half-a-year.

Please enter my name on your subscription list and send the next six issues.

Now for some questions-

1) I've got a box of parts to build the mark 8 but haven't had the time. It looks like spring break will be my next chance. I seem to remember from the 1st issues that there were some errore in the construction article. Do you have a comprehensive errate sheet you could send to me? I'd like to make corrections on the project as I go; not after its done.

2) I also think if I'm remembering right, that Motorola nad available a monitor-debugger for the 8008 in 2k of prom. Is this true? And does anyone have a listing of the machine code for it or an enuivalent? What is available as software on the line of a monitor, editor,or debugger?

3) Will you please send me the name of an 8008 enthusiast in berkeley, or very mear by that gets your magazine. Perhaps this person would let me look at some past issues and help orient me properly.

I would greatly appreciate it if you could take a few minutes to send a note back to me in answer to my questions. I'm sure things have changed a great deal since I last read a newsletter.
Thank you for your time. I'll be looking forward to hearing from you.

Sincerely yours,

Bruce Harris

Bruce Harris

22 Feb 76

Dear Hal,

Re the FCC letter in the latest Newsletter...I'm very sorry to see that published...and I suspect the FCC will be sorry that it was published too. Not that you had any way to know...I really should have written you about this.

The fact is that the FCC was given very little information to go on by Charnock and, lacking that, they assumed some things which are not so. As soon as I got a copy of the FCC letter to Charnock I called the FCC and talked with them...and explained about the importance of being able to experiment with computers via amateur radio. The FCC had not realized that computers would be an actual part of an amateur radio station...they assumed from the Charnock letter that radio would just be used to tie two computers together and that would be that...not that computers might be an active part of the communications link. When I had explained this to them they asked that I put it in writing for them and file it with them...this has been done.

I have been given to understand that the FCC actually has no objections to any amateur radio type of experimenting, and this certainly includes computers via amateur radio. Where Charnock went badly wrong was when he tried to get permission to do something which was already permitted...or at least not prohibited. I am given to understand that amateurs interested in computer experiments have but to write to the FCC requesting Special Temporary Authority (STA), giving the rational and parameters (to develop computer assisted amateur communications...and needing ASCII permission) and the FCC will give permission. Such experimenting can then be done and a report made to the Commission.

When I approached the Commission for ASCII on the low bands just before Christmas they explained that they had no serious objection, but that since there were no petitions on file or requests for such permission from amateurs, they really had better things to do. So much for any claims that amateurs have been clammoring for ASCII...not one formal request!

Keep up the good work with your Newsletter...always enjoyable! 73---Wayne

---

Thanks for the copy of the Mark-8 article. I am sorry to say it was pretty horrible. I was unable to duplicate it. I will hold on to it unless you say otherwise.

I am still trying to make a decision on the micro for me, meanwhile I am working on the I/O devices. Maybe you could offer a suggestion on a unit -- I want to be able to run in BASIC since I am able to use it now and am down to: MITS ALTAIR 8800 or a SWTP 6800 with lots of additional memory on either one.

Hope you can shed some light on this or I will have to flip a coin. Maybe you can suggest a better unit than either (I would like to keep it under $1 K for openers).
Thanks
Dave Metal, 28 Splitrail Road
Commack, NJ

I desperately need direct contact with RGS-008A system owners who have their system up and working and know program entry techniques, including: cassette, keyboard, tty interfaces (at least). Would like info on TVT-1 program for interface as well. All related expense would be gladly reimbursed. The system is basically sound. I've seen much of it working at RGS, but I couldn't get what I needed there before I moved.
Gerald McKee, Box 992, Okmulgee, OK 74447
(918) 756-2978

Gerald also mentions, "I'm going to school to be brought up to date in electronics (taking machine language this semester) and when I finish I hope to find employment back in California. I'm a TV broadcast engineer and am hoping to qualify for experimental/developmental field, also a ham "W6ZQT".

Hi,

While setting-up the Mike-2, I found a need for a memory test routine. low-priced 2102's aren't too reliable! Borrowing heavily from the NL's, digital group, and Mike 2 monitor, I came up with a test routine that checks every bit combination between any two designated addresses. This routine writes writes a bit-pattern, checks for correctness, and if correct advances to the next memory location. . ., etc. If the compare is false, then the location is displayed, the test pattern, and the contents of the location, the display repeats until interrupted or aborted. If the "continue" key is used, the routine continues with the next address, of course if "reset" then we are back in the monitor routine.

Of course I made liberal use of the Mike-2 Monitors display routines, Time-Wait routines, and input keyboard.
Essentially, the routine-
Start   Load "B" with zero's
           Load "A" from "B"
           Write "A" into memory
           Read memory into "A"
           Compare "A" "B"
           False - Go to error routine (M2N display routines)
           INcrement "L" and/or "H" (as needed)
           Go to start

After all locations are tested, "B" is incremented, routine repeated, ... until 3778.

This routine is by no means a very efficient routine. It does test all bits between the designated addresses, and displays the problem and location. If you're interested, I'll supply a source listing.

And thanks loads for the effort you people out west are putting out.

P. S. In answer to your comment on "CACHE" - our steering committee has tall goals and lots of amition. But we really have you to blame, for without the Newsletter, there wouldn't be any local groups!
2951 S. King Dr.
Tate   Chicago, IL 60616

Dear Hal & John,
You've GOT to keep going! How else am I going to be able to decide which system to start into when I finally get the bread together???
Right now I'm thinking to hold off for a 16 such as PACE, IMP-16, or LSI-11. Looks like with CPU's prices dropping you might as well get the most flexible and powerful CPU you can find 'cause the peripherals are going to be most of the cost anyway. But then maybe I ought to leap in with a small system to play around with first. On the other hand...... See what I mean?

Jan R. Wilson
3132 Eugene St
Baton Rouge, LA 70808

Page 9

The following letter was received from Sphere Corporation. Part of the seperation involved rights to the Micro-Sphere. If you ordered a Micro-Sphere, it may be in your best interests to contact Sphere immediately and find out where your order status stands. Please let us know what you find out.

SPHERE CORPORATION

March 13, 1976

TO WHOM IT MAY CONCERN

Sphere Corporation, manufacturer and distributor of fine Micro Computer Systems announces the resignation of Michael D. Wise as President, and as a member of the Board of Directors.

We are very proud and pleased to announce Monroe C. Tyler as acting President of Sphere Corporation. He was one of the original incorporators. Mr. Tyler has an appropriate background receiving his Masters Degree in Computer Design from University of Southern California in 1968. He was privileged to attend USC under a Hughes scholarship. Monroe has been responsible for the design and development of the Sphere System 1,2,3 & 4.

Sphere Corporations product direction will be to continue refinement of the System 310 thru 340 (the former System 1-4).

With Mr. Tyler at the helm, Sphere Corporation is beginning the acquisition and development of Business applications with which the new System 500 series (a larger version of the System 4 with a 80x25 character display) will be marketed into the Small Business Environment.

Filling the position of Senior Vice President, Douglas S. Hancey will provide valuable management support to Mr. Tyler. Doug has been responsible for Sphere Marketing and will be assisted by Randall L. Waters, recently named to the newly created position of Marketing Manager.

Under this amiable team, Sphere Corporation plans to aggressively market their products to the Non-Professional User market and the Small Business Environment.

Douglas S. Hancey
Chairman Board of Directors

940 North 400 East · North Salt Lake, Utah 84054
(801) 292-8466

FEATURES:
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1 ea – 8T31 Bidirectional I/O Port
2 ea – 8T26A Quad Bus Transceiver
1 ea – Introductory Manual

Signetics
811 EAST ARQUES AVENUE
SUNNYVALE, CALIFORNIA 94086
TELEPHONE: (408) 739-7700

COMPATIBLE PRODUCTS

82S100, 82S101 FPLA
- Field programmable (Ni-Cr Link)
- Input variables – 16
- Output functions – 8
- Product terms - 48
- Address access time - 50 ns
- Tri-state (82S100) or open collector (82S101) outputs
- 28 pin ceramic dip

82S115/123/129 PROMs
- Schottky TTL technology
- Single +5V power supply
- 32 x 8 organization (82S123)
- 256 x 8 organization (82S129)
- 512 x 8 organization (82S115)
- Field programmable (Nichrome)
- On-chip storage latches (82S115 only)
- Low current pnp inputs
- Tri-state outputs
- 35 ns typical access time
- Standard 24 pin DIP (82S115)
- Standard 16 pin DIP (82S123, 82S129)

82S25/82S116/82S11 RAMs
- Schottky TTL technology
- 16 x 4 organization (82S25)

DEVELOPMENT KIT | 3000

BIPOLAR MICROPROCESSOR
- 256 x 1 organization (82S116)
- 1024 x 1 organization (82S11)
- On-chip address decoding
- 16 pin ceramic dip

8T26A/8T28 Quad Transceiver
- Schottky TTL technology
- Four pairs of bus drivers/receivers
- Separate drive and receive enable lines
- Tri-state outputs
- Low current pnp inputs
- High fan out – driver sinks 40mA
- 20 ns maximum propagation delay
- Std. dered 16 pin DIP

8T31 8-bit Bidirectional Port
- Schottky TTL technology
- Two independent bidirectional busses
- Eight bit latch register
- Independent read, write controls for each bus
- Bus A overrides if a write conflict occurs
- Register can be addressed as a memory location via Bus B Master Enable
- 30 ns maximum propagation delay
- Low input current: 500µA
- High fan out – sinks 20mA
- Standard 24 pin DIP

Three Programs from Randall K. Webb, 123 Stratford Ave, Ventura Ca 93003.

A program for Binary Log Approximations. Location 100_8 is the data word, 101_8 is the integer portion of the answer, and 102_8 is the fractional portion of the answer.

Statement #1	LXI H, 100 000	8	JMP 006 000
	2	MOV A, M	9	INR L
	3	MVI B, 007	10	MOV M, B
	4	ANA A	11	INR L
	5	RAL	12	MOV M, A
	6	JC 017 000	13	HLT
	7	DCR B		

A Bit Reversal program. Location 110_8 is the data word, and 111_8 is the reversed word.

Statement # 1	LXI H, 110 000	# 11	ANI 376
	2	MVI D, 010	12	RRC
	3	MOV C, H	13	MOV B, A
	4	MOV B, M	14	DCR D
	5	MOV A, B	15	JNZ 007 000
	6	ANI 001	16	INR L
	7	ORA C	17	MOV A, C
	8	RLC	18	RRC
	9	MOV C, A	19	MOV M, A
	10	MOV A, B	20	HLT

A program to determine Approximate Standard Deviation. The data list begins at location 200_8 and contains either 4 or 30_{10} elements. The number of elements is placed in statement #2. For a list of 30 elements, insert an RRC instruction between statements number 23 and 24. Location 251_8 will contain the maximum, location 252_8 will contain the minimum, and location 253_8 will contain the approximate standard deviation.

Statement # 1	LXI H, 200 000	# 14	JNC 007 000
	2	MVI C, 004 (or 036)	15	MOV D, A
	3	MOV B, M	16	JMP 007 000
	4	MOV D, M	17	MVI L, 251
	5	INR L	18	MOV M, B
	6	DCR C	19	INR L
	7	JZ 035 000	20	MOV M, D
	8	MOV A, M	21	MOV A, B
	9	CMP B	22	SUB D
	10	JC 025 000	23	RRC
	11	MOV B, A	24	INR L
	12	JMP 007 000	25	MOV M, A
	13	CMP D	26	HLT

Page 10

Thanks to Glen Charnock, Editor of Overmodulation for the following April feature, reprinted from their April issue.

Computer people are well known for their propensity to use acronyms for almost anything. Some very important ones are SMILE? KISS, and DIMWIT. Simplicity Makes It Less Effort. If the logic of a program is kept as simple as possible it will be easier to understand and to remember where you are when writing the program. It will also be easier to modify and it is a natural law that as soon as any program is proven to work up to spec, the user will change his mind about what he wants. KISS - Keep It Simple, Stupid. This is a more forceful reminder of the above. DIMWIT - Documentation Is A Must. Without It Terror. After writing a program it should be well documented so that you can easily refresh your memory of how the program works when you have to change it six months later. All programmers are familiar with the effects of a bug in a program which will cause the program to "blow". The operation of a program is well captured by the following piece of doggerel source unknown: A program is like a nose, Sometimes it runs, Sometimes it blows.

> The Amateur Computer Society is open to all who are interested in building and operating a digital computer.
> For membership in the ACS, and a subscription to Vol. III of the Newsletter, send $5 to:
> Stephen B. Gray
> Amateur Computer Society
> 260 Noroton Ave.
> Darien, Conn. 06820
> The ACS Newsletter will appear every two or three months.

27. The Dyna-Micro kit will supersede the Radio-Electronics Mark-8. A microcomputer learning system, it comes with a series of books on learning the 8080 and the system, and is scheduled for introduction in the May-June R-E.

The Dyna-Micro will be marketed by its manufacturer, E&L, as the Mini-Micro Designer, MMD-1, featuring the 8080A MPU, with everything on a PC board, including 16-key keyboard and 24 LEDs, plus a built-in interfacing breadboarding socket. Keyboard entry is controlled by a ROM, and the 256 words of RAM are expandable to 512. The complete set of parts and boards is $350; assembled and tested, $500.

VIATRON COMPUTERS

Verada 214 (38 French St., Box 438, Lowell, Mass. 01852) got 20 of the Viatron 2111 Microprocessors, hopes to get more. The 2111 "is a complete computer with keyboard input, two cassette tape drives built-in, a video display, an operating system on ROM.... Guaranteed working when they left our plant": $699, FOB Lowell.

Meshna (E. Lynn, Mass. 01904) is offering the "System 21," which appears to be the same unit offered by Verada 214, "sold as it; due to 4 years of storage, may require some adjusting/cleaning"; $425, FOB E. Lynn.

Note that these units are no longer being manufactured, and that most of the mechanical parts (and perhaps some of the electronic parts) are thus not available if needed for repairs. A letter to Interface cries out: "HELP! I have a Viatron model 2101 that doesn't work. Would appreciate contact with anyone who could provide technical information or programming assistance...... Caveat emptor.

Scelbi Drops Hardware

Scelbi Computer Consulting is no longer manufacturing either the 8H or the 8B, but is concentrating on software, and at the moment is working on BASIC for the 8008 and 8080 MPUs. Other MPUs are being considered for future software.

Incidentally, the Scelbi "Machine Language Programming for the 8008 (and similar microcomputers)" is highly recommended by many micro-kit manufacturers, and is now in a second edition, typeset on both sides of the page (the first was all in Teletype capitals, on one side of the paper), still $19.95 (1322 Rear, Boston Post Road, Milford, Conn. 06460).

23. The OSI 300 from Ohio Scientific Instruments (P.O. Box 374, Hudson, Ohio 44236) is a wired trainer using the MOS 6502 MPU with 128-word RAM, 7 address switches, 8 data switches, displays that indicate data, address, and program execution, lab manual with 20 experiments; $99.
OSI has an interesting alternative: Send in $110, get a $315 computer trainer (identical to the 300), return it within 60 days, and you receive three PC boards (super-board, I/O board, video board) and software for TV typewriter and audio cassette monitor, for a system based on either the 6502 or 6800 MPU. To quote from the OSI Feb/Mar flyer: "The 6502 is currently the fastest N-channel microprocessor available.... It is also very inexpensive in small quantities and features an internal clock. These features are very important to the hobbyist on a budget, especially if he doesn't have a good scope. The 6800 is somewhat more expensive and requires an external clock. It is rated for a 1-us cycle time and therefore can operate at only one half of the speed of the 6502. It does feature two accumulators and a more extensive instruction set than the 6502. Therefore, the potential user should carefully consider it when real-time applications are not anticipated.

24. Techtra Corp. (130 Webster St., Oakland, Calif. 94607) will offer the TMC 112, "a replacement for the PDP-8," with operator's control panel, up to 32K of core or semiconductor memory, "a complete range of peripherals," etc. Based on the Intersil 6100 MPU, the TMC 112 is still in prototype, they tell me.

I will now update some of the material that appeared under my name in NL #12, which I received Nov. 28,1975.

First, with regard to the Motorola microcomputer kit (page 4) built around the MC6800, the price of 6800 microprocessors and MC 6870 oscillators has been dropped 60% to $69.00 and $33.00, respectively, for quantities under 100 and unit quantities. This should make the kit cost less than the original figure of $300. The above information was obtained from the Oct. 1975 Micro computer Digest, pg. 7. No address given for the kit but Microcomputer Digest is P. O. Box 1167, Cupertino, CA 95014.

The six volume microcomputer course by Iasis, Inc. (on page 14 of NL #12) now has a price of $99.50 according to page 23 of the same issue of Microcomputer Digest. Shortly after I wrote you about this (several months ago) there was a full two page ad in Popular Electronics by Iasis, Inc., Suite 154, 770 Welch Road, Palo Alto, CA 94304 selling the course for $99.50.

With respect to the item on the Hewlett Packard HP-65 calculator item, on page 13 of NL #12, as of Nov. 13, 1975 there were 3800 programs in the U. S. Contibutor's Library. Publication of the new catalog supplement has been delayed due to new programs being included. There do not appear to be any new Pacs or increase in the European Users Library; the above information was obtained from the Oct.-Nov. 65 Notes.

I have heard very little about the new Texas Instruments SR-52, except for an ad in the Scientific American. It has a little over twice the number of programming steps and twice the number of registers of the HP-65. The price is about half. TI sells programs, but I don't know what or how many.

Yours truly,

David W. Johnston
P. O. Box 3781
Washington, D. C. 20007

12/1/75

Robert B. Schwartz

November 30,1975

MO 3-5549

375 RIVERSIDE DRIVE, 1E
NEW YORK, N. Y. 10025

I'm enclosing $6.00 for the next six issues of The Newsletter. I'm sure you've already reached the 350 renewals required for its continuation. The no. of micros and peripherals on the market seems to be increasing geometrically, and Micro-8 really is necessary to sort it all out.

Your last issue helped some of us in the New York City area form a local group. 15 hobbyists met on Nov. 14 at LaGuardia Community College in Long Island City, Queens. We'll meet Dec. 12, Friday, at 6:30 P.M. at the same place and it looks like we'll continue to meet there on the 2 nd Friday of the month. We welcome all fellow hobbyists.

Sincerely,

Robert Schwartz

GLADSTONE ELECTRONIC SUPPLY CO. LTD.

1735 Avenue Road
Toronto, Ontario M5M 3Y7

TELEPHONE
(416) 781-6811

Dec 30/75

Telex 06-22085
AVETRON TOR

Memo from R. GLADSTONE

If you can continue to publish the Newsletter, please do so. It's absence will be missed by all who are trying to enter this fascinating new hobby.

This is the view from up here in Canada, and personally, I'm sure it is being echoed by many Americans as well.

The writer is considering issuing a Canadian Newsletter, or information exchange, to assist in the formation of local groups across Canada.

Here is my $6.00 and SASE for the next 6 issues. Please don't stop there. You mentioned that the local club's newsletters would eliminate the need for the micro-8. Not so! How about us guys out in the boon-docks? I only found two other names on your subscription list in the whole county. We need you to provide us with timely information.

Now as to where I'm at. I have an Altair 8800 with MITS 4K dynamic memory. Had to send the memory back to MITS where all memory chips were replaced before it would work (they claim they got a bad batch of chips). Anyway it works great now. Ordered an I/O module by phone from Processor Technology Co. in Berkeley, used master charge, and received it in three days. Can you believe such super service? It has a lot of flexability built into it to allow operation with any I/O device. I have also ordered their video display interface and expect delivery any day now. The cassette tape system they have under development sounds great too because it will allow complete computer control of tape motion as well as data transfer.

For the present I am building the Pa nIT cassette because it is simple. Also have a model 15 TTY. I am planning to use the computer to control a telephone switching network.

Well that's about it I guess. Keep up the good work.

Sincerely

George Buttles

Dear Hal or approptiate other:

I received the back issues that I requested with my subscription order. The quality of reproduction in NL 1 to 4 is atrocious. I cannot read any of the diagrams and much of the text. What I can read is good, but surely something can be done to make back issues readable. I am very unhappy about it.

Second: my vote for continuing the NL. Charge whatever is necessary. If you do decide to keep on with it, I'd be delighted to contribute discussions on systems software (editors, assemblers, compilers, etc.) since in real life, that is my thing. (Hardware isn't--took me 6 mos. to get my Mark 8 up and running.) Right now I am working on its operating system...but I think I'm going to have to interrupt and make a hardware stack before completing it, though.

C.H. Claxton
131 Johnstone Dr.
San Francisco, Ca. 94131

We know of a individuals in Ottawa, Toronto and Waterloo, all in Ontario, who would like to get a local club going. There are probably others, and if any individuals will write to me personally at the above address, I will try to get these people in touch with each other.

Keep up the good work, and if subscription funds are necessary to keep going, please advise.

Best regards,

Russ Gladstone

To reply, use other side and return this memo to the writer.

---

hansen associates

electronic   manufacturers   representative

PO BOX 806 RIDGEWOOD, N.J. 07451 • TEL. (201) 652-7055
(212) 947-0379

First off, I would like to tell you how much I enjoy your newsletter. It is super.

I have been getting the feeling that, after everyone has gotten their microprocessors and memorys together, they will then realize the need they have for I/O Devices. I have some Remex Readers, Model # RRK2080. This is an 80 cps eight track tape reader which requires +5V @ 600ma and 24V @ 1.1 a. It is small and sells new for $300. We will offer these to whomever is interested for 1/3 off. They are slightly used, but are fully operational and we guarantee them for thirty days. In addition, we will send literature on these readers to anyone who sends us an SASE.

If interest is strong enough we might also be able to offer a tally star wheel reader for approximately $50 to $100. These would be "as is", but they are still in good shape. We would probably tear some down so we could make parts available to the hobbiest.

Enclosed is $6.00 for Volume 2 Newsletters, 1 through 6. I have also enclosed a data sheet on the RRK2080 Reader as it might provide answers to any of your questions.

If you decide to put our name and address in your newsletter telling about our "For Sale Items", please use the following address:

Ron Boley
Hansen Associates
P.O. Box 806
Ridgewood, N.J.   07451   201-652-7057

Sincerely yours,

Ron Boley

TREK TOURNAMENT   PRESS RELEASE

Trek Competition^{TM} is promoting Trek 75^{TM} — an advanced interstellar computer simulation.

Compete in a tournament using the original Trek 75^{TM}, written by William K. Char, an advanced battle simulation computer game based on the T.V. series "Star Trek".

The game can be played thru any terminal/telephone hookup on the time share systems of GRW Systems, Inc., of Mountain View, Ca. Free assistance available for new accounts. Check local computer store for terminal time.

First mission will run from April 12, thru April 16, 1976. Top three players will share 75% of the entry fees(40%-25%-10%).

Entry fee $5.00. Regulations available for $2.00. Prepaid computer account $10.00. Make checks payable to Commercial Information Systems. Please include SASE on all inquires.

Trek Competition^{TM}

2530 Westford Way

Mt. View, Ca. 94040.

Thank you,
Kenneth Young
3311 West 3rd Street
Apartment 1-319
Los Angeles, California 90020

I don't know much about your organization except that the PCC newspaper made some very favorable comments about you. I just purchased an IMSAI 8080 and am real enthusiastic about the computer hobby field. I hope that your newsletter will help me to develop that interest.

Sincerely,

Kenneth Young

March 3, 1976

Page 12

Micro-8 Computer User Group Newsletter
Hal Singer - Editor
Cabrillo Computer Center
4350 Constellation Road   April 22, 1976
Lompoc, CA   93436   Volume 2, Number 5 4

THE ANSWER TO THE 8008 USER'S PRAYERS IS CONTAINED ON PAGE 11.
--- AN 8008 BASIC---.   IT'S TOO BAD THE PRICE IS SO HIGH BUT THEN
SCELBI INC. DOES HAVE TO MAKE MONEY AND COMPLETE SOURCE LISTINGS
WILL ALLOW USERS TO START MAKING SYSTEM CHANGES AND ADDITIONS.
FIND A FRIEND OR TWO AND SHARE THE BOOK. THAT WILL MAKE THE PRICE
A LITTLE EASIER TO HANDLE.

NOTE ALSO THE NUMEROUS PLUGS FOR THE TINY BASIC NEWSLETTER.
IT APPEARS THAT BOB ALBRECHT IS GOING TO MAKE THIS THE MOST EXCITING
SOFTWARE INFORMATION SOURCE EVER AND A MUST SUBSCRIPTION FOR EVERY
COMPUTER HOBBYIST.

MANY APOLOGIES TO ANYONE INCONVENIENCED BY THE MISSING
ADDRESS FOR THE PIXIE-INVERTER. IT IS ATV RESEARCH, 13TH & BROAD-
WAY, DAKOTA CITY, NEBRASKA 68731. SOMETIMES I GET TOO GOOD AT
TRIMMING THINGS DOWN.

IF YOU HAVE AN 8080 OR A 6800, YOU NEED A CRAMER CUBE!
IT'S A NICELY PRINTED AND FOLDED CARDBOARD SHEET THAT FOLDS INTO
A 4" CUBE WITH A SUMMARY OF EITHER THE 6800 OR 8800 INSTRUCTIONS
ON THE FACES DEPENDING ON WHICH WAY YOU FOLD IT UP. CONTACT JOHN
STEVENSON, MICRCOMPUTER TECHNIQUE, INC., 17201 DAIMLER ST., IRVINE,
CA 92705 FOR INFORMATION. INCLUDE A 4 X 9 AT LEAST SASE.

IN THE CLASSIFIED ADS IN RE AND OR PE THERE IS A SMALL AD
FROM SUPERTRONICS, 29790 TOLAY CREEK ROAD, SONOMA, CA 95476 OFFER-
ING INFO ON AN A4000A UTOMATION COMPUTER FOR $2.00. IT REMINDS ME
OF THE AD FOR INFO ON HOW TO MAKE A MILLION SENT TO YOU FOR ONLY
$2.00 -- JUST PLACE SUCH AN AD! YOU'LL SURE BE MAD IF YOU SEND
SUPERTRONICS $2.00 FOR WHAT THEY SEND OUT.

Harold L. Novick, 2810 Henderson Ct, Wheaton, Md. : I have been holding off
sending you the enclosed reply to Bill Gate's letter in the hope that I
would be able to report that I had interfaced my typewriter with my Mark-8.
Alas, my Mark-8 blew up for some presently unknown reason. However, John
Kapp, a member of Chesapeake Microcomputer Club (CMC), has a beautiful 24
TTL chip interface built for his Dura Mach 10 and Altair. I am getting his
schematics and hopefully will be able to send them to you. CMC is going
strong with over 250 members and 4 or 5 local chapters. Time's up. Will
write later when the Supreme Court hands down its decision in Dann vs John-
son, a case on the patentability of computer software (a banking program
was involved.)

Richard Jinkins, 109 Bishop St, Dodgeville, WI 53533 : I bought the PC
board for the Mark-8 computer August '74, R-E, and can't find a manual. I
thought maybe you knew of a copy for sale or someone who would rent theirs
to me to photocopy. I am a student at University of Wisconsin, Platteville
majoring in Electronics. I was going to do this as a project, but I'm sort
of stuck now.

M.A.C.C.
MIDWESTERN AFFILIATION OF COMPUTER CLUBS
P.O. BOX 83 BRECKSVILLE, OHIO 44141

14058 Superior Dr. Apt. 8
Cleveland, Ohio, 44118
216-371-9304

Dear Hal, Craig, and everyone else,

        Good news!
        The Cleveland Digital Group, in conjunction with
several other computer clubs in this area (Pittsburgh,
Columbus, Dayton, Toledo, Detroit, and Buffalo, to name a few)
has formed the Midwest Alliance of Computer Clubs. The pur-
pose of this group will be to encourage cooperation and communi-
cation between our member clubs. It costs nothing to join
our affiliation and there will be many benefits.

        Our first official action will be a computer convention
to be held this summer in Cleveland, Ohio. More detail can be
found on the enclosed flyer. It's going to be a big deal and
we expect to have a hell of a lot of fun. Future projects in-
clude a communications net, (Clubs around here seem to be bunched
very conveniently for this), group purchases, a hobbyest register,
and a few others. Services offered by the group will include
assistance in starting new clubs in the area, helping people to
get in touch with their local clubs, and perhaps a group news-
letter for groups that feel they are big enough to warrent their
own.

        We expect most of the projects to pay for themselves and
will distribute the profits of our conventions to member clubs.
Our convention is well planned and all of the major micro and
mini manufacturers will be represented by their reps and products.
The Flea Market promises to be a lot of fun. Some of the member
clubs will be chartering busses to come in for this. The techni-
cal sessions should be entertaining as well as educational. The
best part about our convention will be the fact that it will last
a whole weekend and will be held in a convention hotel allowing
attendees the oppurtunity to get a chance to know each other.
There will surely be a lot of all-night bull-sessions going on in
some rooms(at least mine!!!). Enough of this for now.

        The Cleveland Digital Group is growing in leaps and bounds!
We have been donated a clubhouse(7 000 sq. ft.!!!), and some
pieces of equipment that will be auctioned off to the members.
There's a good possibility that we may end up soon with free
computer time from one of our members who owns a service bureau.
We have near 100 members now and have not even begun to recruit!!
Lots of enthusiastic amatuers. And a few real pros too. At our
last meeting five selectric terminals changed hands, and one of
our members moved 4 teletypes into the greedy clutches of our
hobbyests. We have quite a few computers in our group. A few
PDP's, 8008's, 6800's, 8080's, and others.

        More later................ Gary Coleman

                                    Gary Coleman
                                    Secretary, Cleveland Digital Group
                                    Chairman, M.A.C.C.

P.S. Go to the New Jersey Group's Computer Festival!!!!!!!

I am currently working with the Motorola M6800 Microcomputer design kit.
Its detailed applications and programing manuals attracted me. At present
I am awaiting the arrival of the PC board from Motorola. The PC board is
not enclosed in the kit. You must register your name(with a card supplied
by Motorola)in Phoenix and they ship you the board free of charge. I am
also studying the application and programing documents so I can fully under-
stand the 6800 operation.

My plans are to design an inexpensive computer system to sell to local
small businesses for inventory control, accounting and etc. A friend and I
are working at this together. We plan to design software to suit the
individual needs and demands of our clients. We plan to take at least a
year in development of our system. We will be experimenting with all types
of software and system applications and not just limiting to business computer
applications. We are both Engineers. I have a BSEE.

I am sponsoring a SOFTWARE EXCHANGE for those interested. Anyone who wishes
to receive software for any of the microcomputers send me your name, address
and any software you have available. I have software for immediate distribution
When I receive software from other individuals I will distribute the material
to those interested. Please include $3 to cover the cost of mailing and photo
copying. You need not submit software to benefit.

I would like to congratulate you on your fine Newsletter.

Howard Berenbon
2681 Peterboro
W. Bloomfield, Mich. 48033
(313) 851-7966

Sincerely,
Howard Berenbon

Eric I. Pugh, 632 Levering Ave., Nr. D, Los Angeles, CA 90024 : I have
heard from a student in my compiler class that you have implemented TECO
(Text-Editor and Corrector) on an 8080-based system. Being a former DEC-10
user and a proud owner of an Altair 8080, I know the power of TECO and
would like to have a version implemented on an 8080. I would be interested
in any information on the availability of source or object listings/tapes.

David Cvalliere, 103 Richmond Rd, Victoria, TX 77901 : I am negotiating
with R-E on 3 articles on TVT-II modifications, as well as working feverishly
on a color graphics display drive. I will write a complete letter
shortly.

J.C. Depoy, 624 Royal Palm Dr, Virginia Beach, VA 23452 : I just finished
a Mark-8 and have a couple of problems maybe you could help with - It will
execute instructions and data in locations 0,1,2, and 3, then for some rea-
son it does an RST i.e. an interrupt is generated and it restarts, also
an input or output instruction in one of those locations does not get a low
pulse on the in or out. If you can make any sense out of that or could of-
fer troubleshooting advice, I would appreciate it.

Tom Burke, 150 Church St, Burlington, VT 05401 : I have a TVT-II, not yet
debugged. SWTPC is very helpful - too bad their kit delivery is so abys-
mally slow. I'm building and Altair 8800 with CPU and D/C boards purchased
from MITS unpopulated (yes, it is possible, though difficult). I plan to
order the motherboard and I/O board from Processor Technology. All will be
housed in a rack-mount cabinet scrounged from an ancient, monster analog
computer (how appropriate). I am hardware oriented (being an electronic
technician, and find building as much fun as using. My major computer in-
terest is in graphics (particularly games like Spaceman), and as soon as
the Altair is running I will start on the design of as sophisticated a
graphics terminal as I can manage. When at Carleton College (trying to ma-
jor in physics), I had access to a PDP 8/L with a storage scope and FOCAL
modified for graphics. My dream is to have my Altair be able to do what
that could.

---

20 000   307   106   CAL,INIL
         133   054
326   OUT 15   000
106   LCL   055
363   CAL,EXP 074   HST 30
000   017   CPI,017
135   OUT 16   110
303   LAD   017   JF2,020017
20 010   044   NDI,360
         020
360   194   JMP,020000
261   ORB
137   OUT 17

Output is to the LED's. The first four LED's will contain the current(octal)
low portion of the address and the last two LED's will contain the
Hexidecimal value at that location. The user simply depresses the "C"
key on the MIKE 2 keyboard to increment the address pointer and step
through memory.

To use, see the following example:

20 020   Set up the starting address of the area you
         wish to display in hexidecimal.

10 000   066   LLI.000
056   066   LHI,040
104   JMP,020000
000
020

FROM:
John Ford
5561 Esplanada Ave.
Santa Maria, CA 93454

OCTAL TO HEXIDECIMAL CONVERSION
(for MIKE-2 Microprocessors)

I wrote this little subroutine because I was constantly faced with
the conversion task when setting up PROMs to be programmed. It is
simple minded and takes advantage of existing Monitor programs.

An Open Reply To Bill Gates*
by Harold Novick**

In Bill Gates's "Open Letter to Hobbyists" dated February 3, 1976 and published in numerous publications including this issue of "The Analytical Engineer", he critically labels us computer hobbyists as unfair thieves. The problem he faces is the lack of an economic reward for writing micro-computer software which results from the availability and alleged frequent use of Xerox and the like photocopying machines. Are we hobbyists guilty as charged? Are we conspirators and criminals if we did as Bill Gates alleged and must we follow the Watergate crowd to the "public leasure farms?"

Bill Gates poses a very valid question, though he does it in a very insulting and defamatory way. Without getting into a defensive posture or trading accusations, lets assume that Mr. Gates is correct and we hobbyists did copy and distribute software without paying the software's creator. Whether we are guilty of criminal acts or can be sued for mis-appropriation of the software depends upon the legal status of the software.

Software or computer programs are a rare legal bird, they can simul-taneously fit all categories of legal protection and still not be protect-able because of the nature of software. Traditional methods of protection of software includes copyrighting, patenting, keeping as a trade secret, or protecting with a contract.

If the software has been copyrighted (has a copyright notice consisting of © , name of the owner, and year date of publication), then a "copying" of the software is illegal with possible criminal penalties if the copying is willful and for profit and civilly infringes a copyright or in any case with possible civil liability with a required payment of damages. However, a "copying" does not include the use of the software in a computer. The law is unsettled whether a tape onto which the program has been dumped would constitue a "copy" of the original work. In any event, a person would be free to read and use the theory behind the program to write a separate program of his own which does not embody a "substantial copying" of the original program.

Patenting, if possible, of the software would protect the invention behind the program. One could be prevented from making, using, or selling the patent-ed invention even if there were such differences between the patented program and the other program such that there would not be a copyright infringement problem. Unfortunately the Supreme Court is presently considering whether software is patentable and the answer will not be known until a few months from now.

If the software were kept as a trade secret, then the software could never be sold and once it became public, anyone would be free to copy it. Many terminal users are tied in to a master computer in which the software is kept as a trade secret. Because a computer hobbiest can not afford to use a ter-minal, the trade secret route is probably not economically feasible for the programmer.

Finally, the software owner can lease the software under a contract in which the user is bound not to give, sell, or disclose the software to any-one else. The user breaching the contract may be liable for damages if the the software is impermissably disclosed, but the owner may never find out about the breach and even if he did, he probably could not afford to bring a law suit to collect damages that may be less than the legal fees involved. In any event, the owner has no recourse against someone who obtains the soft-ware without knowledge of the contract.

Okay, so what is the answer to whether we hobbyist are thieves? It depends on how Mr. Gates tried to protect his software. His letter is silient on this point. If he tried to protect his work by contract alone, the innocent re-ceipient of the software is not a thief, but the giver under contract may be acting improperly (assuming the contract would be enforced by a court). I'm pretty certain that the software was not patented and it obviously was not a trade secret. Was it copyrighted? Who knows.

Nevertheless, the crucial point of Bill Gates's letter is that there is little or no incentive for professional software people to deal with computer hobbyists and to write for them programs that would be too complex and time-consuming for the hobbyists to write for themselves. Professional programmers have a right to earn a living. With computer hobbyists widely distributing software for free, they are cutting off a valuable resource and source of microcomputer programs.

I would propose that this is a gap that hobby clubs such as CMC can fill. If a few hobby clubs can get together, we can pool our financial resources and hire professional prbgrammers to write programs that we would be unable to write. In this manner, we hobbyists can all share the software rewards without getting a "bad name" or having to "steal" anything. Similarly, com-

puter hobbyist magazines such as "BYTE" may be able to purchase software and publish it for us all to share.

Mr. Gates certainly has made a valid point regarding the difficulty of getting good software developed. Perhaps microcomputer hobby clubs can pro-vide a solution.

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*© Harold L. Novick 1976

** Harold Novick is a registered patent, trademark and copyright attorney with the law firm of Larson, Taylor & Hinds and is admitted to practice in Maryland and the District of Columbia. He is also general counsel for CMC. This article is only for the general information and education of the public and anyone having specific questions should consult their own attorney. Any member having general questions in this area which would be of general interest to the Club should send their questions to the Editor and selected questions may be answered in subsequent articles. CMC stands for the Chesapeake Microcomputer Club and the "Analytical Engineer" is their publication.

Richard Rhinevault, 79 Sprucewood Cr, Geneva, NY 14456, says he has been busy working on a computer language for hobbyists. He wants to know if anyone is interested in a floating-point language lower in complexity than BASIC but higher than an assembler which could be used to write general purpose programs and could even be used to write a BASIC if desired. It uses Polish arithmetic and has provision for character comparisons. He has named it HELP, and is wor-king on it as a language only, since he doesn't have the means to program it in machine language for any uP. He also wants to know if anyone else is inter-ested in the new TI 990 uP (a 16 bit machine with a very elegant architecture).

S. A. COCHRAN, JR.
ATTORNEY AT LAW
P. O. BOX 607
TYLER, TEXAS 75701
PHONE 593-3322
March 24, 1976

Since my last correspondence I have had delivery of an additional 7-K of Memory from IMS, together with their cassette recorder board and their real time interrupt board, each of these units looks great but I have not really been able to play with them, because of a holdup in the delivery of IMSAI's serial output board. Apparently there were a couple of bugs that they found in it and delivery of these boards was held up for about two months, while they were preparing a revised serial input-output board and the revised instructions to go with it. IMSAI very promptly sent a note out to their customers for random access memory, when they found that they had received a shipment of 1.3 micro-second memory chips from Intel at the end of February. I also enclose one of two flyers from IMSAI that appeared at the March meeting of the North Texas Computer Hobbyist Group. One of them relates to IMSAI's new and improved static memory board which has a couple of new bells and whistles on it, at a price reduction of $24.00; the other was their announcement that the price for the basic IMSAI unit would go up from $499.00 to $599.00 effective April 30. At this meeting their was also a report that the Altair 8800B, to be introduced by MITS at its convention next week would be introduced at a price of $599.00. Doubtless, you will hear more about this from other sources if it is true.

Jim Garrett has gone forward to the point of offering the memory board mentioned in his letter of last January. The cost of the bare board will be $18.75 post paid, subject to an additional 5% sales tax for Texas customers. Apparently, he did not have enough demand for the other boards mentioned in his letter.

Phi-Deck had an introductory offer of its Super Board, mentioned in some of the letters from the Digital Group, at a price of $299.00, including power supply, controller, remote controller, and one Phi-Deck, with continuous variable tape advance from 0.5 ips to 20 ips. Upon my order for this introductory package, they gave me a notice of 60 days delivery. I will have to wait and see whether this one comes through or not. National Multiplex Corporation has been putting forward a number of interesting things in their ad BYTE. I would be tempted to trade with them instead.

I have a recent letter from Oliver Audio Engineering in which they insist that their address is 1143 North Ponsettia Drive, Los Angeles, California, 90046, and their alternate address is 7330 Laurel Canyon Blvd., North Hollywood, California, 91605, rather than 7230 Laurel Canyon Blvd., as listed in your latest newsletter. True to its traditions, the U.S. Post office returned my letter addressed to Oliver at 7230 Laurel Canyon Blvd, marking the letter undeliverable.

Please paraphrase this long letter for your newsletter as you see fit.

Yours very truly,

S. A. Cochran, Jr.

John C. Lewczyk, 419 Fredericka St, North Tonawanda, NY 14120, wrote to say that he just purchased a Mk-8 with 1K RAM, and got the address of the NL as a source of information on software, extensions, and modifications. He is a graduating senior at State University of New York at Buffalo, and is a Compu-ter Science major. When he gets a full system running, he hopes to contribute to the NL.

The Oliver thing has been a comedy of errors. Many apologies. The last flap stems from a gal at the SCCS desk display saying, "oh, we have a new address" and penciling it in. One of the two of us messed up a digit and I think it was her. H.S.

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 suprised 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 possesion. 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 comoanies 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 commiting 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.

Bill Gates

MICRO-SOFT
1180 Alvarado SE #114
Albuquerque, NM 87108

BILL GATES
General Partner, Micro-Soft

Dear Hal & Group:

I am sure happy, you have found a way to deal with my long street address - I have received the Newsletter and sure enjoy it. - By the way - if you still have problems with my address, here is a way to make an abreviation, of which I have seen the postal service approve:

> Mogens Pelle
> BHT 416C
> DK-3520 Farum
> DENMARK   - simple - when only you know!

I enclose US-dollars 6.00 and hope to be listed for the next period of the Newsletter too.

With my best regards,

Mogens Pelle

BY ALL MEANS LET'S HAVE THE LETTERS REGARDING BASIC / MITS / BILL GATES, ETC. FOR THOSE OF US HERE IN THE BOONDOCKS OF THE MIDWEST, YOUR NEWSLETTER IS ABOUT THE ONLY SOURCE OF INFORMATION ON WHAT'S HAPPENING "BEHIND THE SCENES", STUFF THAT THE SLICK-PAPER MAGS WOULD NEVER TOUCH.

Joe Mockus
Columbus Ohio

PLEASE REPRINT ALL THE LETTERS ABOUT BILL GATE'S MICRO-SOFT LETTER - I AM QUITE INTERESTED.

ALSO THE VENTURA COUNTY COMPUTER SOCIETY HAS ELECTED A SLATE OF OFFICERS DECIDED TO BECOME AN SCCS CHAPTER, GOT A MAILING ADDRESS (P.O. BOX 525, PORT HUENEME, CA 93041), AND ESTABLISHED A REGULAR MONTHLY MEETING (930 AM ON THE LAST SATURDAY OF EACH MONTH AT THE CAMARILLO PUBLIC LIBRARY CONFERENCE ROOM, 3100 PONDEROSA DRIVE, CAMARILLO.) PEOPLE DESIRING FURTHER INFORMATION CAN CALL ME DAYS AT 805-982-5685 OR WRITE TO THE P.O. BOX WITH A SASE.

SINCERELY YOURS,

John A Borders

JOHN A BORDERS

JOHN A BORDERS
3235 W HEMLOCK #C
OXNARD, CA 93030
APRIL 13, 1976

Page 3

Bob Wallace, designer

PO Box 5415, Seattle, Wa. 98105

New World Computer Services, Inc.

April 8, 1976
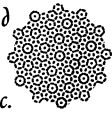
It will be sad to see the end of Micro-8, especially as a forum for good and bad experiences with manufacturers and distributers, and a voice (independent of advertizing) to deal with the computer hobby directions and goals in general. PCC will have to pick up the slack, I guess, as the only other wide circulation mag without advertizing.

I have been following the Bill Gate's Letter controversy with interest. It looks like I'll be going into the microcomputer software business, thanks to a family loan to (finally) get a system of my own. My professional experience is with operating systems and command languages, and I have an idea for a software development system with a strucrured, expanded 8080 assembler and device-independent operating system, probably oriented toward a VDM/TVT operator console (most of the present systems are Teletype driven), and relying on a Restart+opcode mechanism for stuff like dynamic loading and Zilog instruction set emulation.

Anyway, I agree with Bill Gate's philosophy, although the tone of his letter put many people off, I'm sure. I think large software systems should be developed full-time by someone who is financially dependent on the system working reliably. Consider, for a minute, that a system which takes one man-year to design, code, debug, and document would take three years on a part-time basis; i.e. if the developer must work at another job to support themselves while doing the system at night and on weekends. Besides the slowing-down of software development, I would venture to state that the quality of the code and (especially) documentation would be better in general when done by a person paid to do the work, although I'm sure there are cases when a project done for free is better than the same project done for money. I'm talking about large projects, of course; compilers and interpreters for major languages, word processing systems, data base retrieval systems, etc., and not so much smaller projects like math packages and simple assemblers.

I don't know Bill Gates, nor exactly how Altair Basic was developed, nor whether the asking price is unreasonable for either the hobbyist or MITS/Bill. It seems to me that a fair price would be the development cost (programmer labor, computer time, selling costs, documentation costs, etc.) divided by the number of systems to be sold would give a selling price; the big question system developers (including myself) is the number of systems likely to be sold. The computer hobby is so new, it is impossible to guess, even within an order of magnitude, the number of systems the development cost can be spread over.

I do have some suggestions to MITS and other software developers as to pricing and marketing. First, liberal quantity discounts should be available, allowing clubs or stores to buy a number of systems at a discount. This is standard practice for most products, automaticly lowers the per-system price as the number of systems increases, and would decrease the financial attraction of copying a friend's software. Second, the price of a given software system should fall with time, as the system becomes obsolete and the development costs are recovered. Third, a newsletter should be done for each major piece of software, with user modifications and complaints, bugs found and fixed, interesting applications and (for language processors) applications programs written in the language or announcements of software for sale written for the language (a BASIC newsletter might have listings of short demo programs from users, and announcements of longer programs such as a full astrology calculator available from other users). Finally (and most important), a dialog needs to be opened between software writers and users, so each can understand the problems of the other. The problems of developing and distributing software are unique. It's a little like writing a book, except that you don't save much copying a book instead of buying it; a little like a play or movie, except many people benefit when a play is performed and only the user benefits when software is "performed" (curiously, copyright law is being interpreted so that implementing a system based on someone else's copyrighted system manual is like performing a play copyrighted by the playwright); but software is it's own kind of information, and everyone - programmers, manufacturers, hobbyists, stores, magazines, and clubs - needs to get involved in deciding how to handle the situation.

Sorry for all that rambling, but I do hope to see more on the subject; not just "us" versus "them" letters, but also some new ideas.

Other projects - Northwest Computer Club is alive and well, meeting the 1st and 3rd tuesdays usually at Pacific Science Center. Recently we've been discussing cassettes and modems. My list of computer clubs is still growing, and available for 25¢ and a SASE. Comindex, the directory of computer alternatives, is about to come out with issue #2, again through RAIN magazine.

Compufraternally,

Bob Wallace

Bob Wallace

dr. dobb's journal of
COMPUTER
Calisthenics & Orthodontia*
Running Light Without Overbyte

IN THE FIRST ISSUE, January 1976:
- Tiny BASIC Status Letter
- 16-bit Binary-to-Decimal Conversion Routine
- Build Your Own BASIC
- Build Your Own BASIC, Revived
- Design Notes for Tiny BASIC

- Tiny BASIC
- Extendable Tiny BASIC
- Corrected Tiny BASIC IL
- Tiny BASIC, Extended Version (TBX), Part 1
  Example, Command Set, Loading Instructions, Octal Listing
- Using a Calculator Chip to Add Mathematical Functions to Tiny BASIC

IN THE SECOND ISSUE, February 1976 (a partial list):
- Tiny BASIC, Extended Version (TBX), Part 2: *Complete implementation documentation, source listing*
  error corrections, notes on two relocated versions
- SCELBAL—A Higher Level Language for 8008/8080 Systems
- Music of a Sort
- TVT-2 Octal Keyboard Loader
- A Critical Look at BASIC
- Letters, news tidbits, etc.

* formerly DR DOBB's JOURNAL OF
TINY BASIC CALISTHENICS & ORTHODONTIA

What's DDJCC&O all about?

My gawd! Not another computer hobbyist magazine! That was my first reaction when People's Computer Company approached me about becoming Editor of their one-issue-old infant, DR DOBB'S JOURNAL OF TINY BASIC CALISTHENICS & ORTHODONTIA.

PCC had originally planned on publishing three issues of the JOURNAL. The response to the first, patchquilt issue, however, convinced them (and me) that an area of badly-needed information is not being covered by the presently existing publications. Furthermore, it seems unlikely that the other publishers will choose to cover that area; they have their hands (and pages) full just covering hardware and small bits of software.

What is this area; this information vacuum? It's *free and very inexpensive software*. One of the primary thrusts of DR DOBB'S JOURNAL will be to present detailed information concerning low-cost systems software; interpreters, compilers, structured assemblers, graphics languages, floppy disc file systems, etc. This will include user documentation and examples, documentation on implementation including complete source code listings, updates giving errors and their fixes, explicit and detailed notes on the design and implementation of such systems software, and so on. This JOURNAL is explicitly available to serve as a communication medium concerning the design, development, and distribution of free and low-cost software for the home computer.

We encourage you to send in documented software, as you develop it. We hope that you will use the software that we publish in this JOURNAL; that you will study it and modify it to expand its capabilities, and that you will report any bugs you may note to us and to the authors.

We are also quite interested in publishing evaluations of *any* software and hardware that is being sold to the home computer user. We are supported by readers' subscriptions rather than advertising. We will not hesitate to publish positive *and* negative evaluations. We adamantly hold the position that, if a manufacturer of some hardware or software is going to peddle it to unsuspecting consumers for a healthy profit, their product damn well ought to perform as well as their advertisements and profit imply it will!

There are some other areas of information that we expect to cover, not seen in most of the other major computer hobbyist publications. These include complete indices to all of those publications, directories of computer stores and distributors, listings of computer clubs and organizations, listings of users and their equipment, etc. Another tidbit: as long as we can afford to, we will carry classified ads.

We also plan to begin reprinting articles and schematics from the club newsletters. We have heard the comment, over and over, "I wish I could see the stuff that's being printed by all the homebrew groups, but I just can't afford to subscribe to all of them." We expect to help with this desire.

Finally, we will be doing some fairly detailed "blue skying." Everyone is wondering where home computers are going, and what the potentials are. We have a number of ideas (with more rolling in, every day) about what can be done in the immediately foreseeable future. We will be presenting them and encouraging their realization. The Votrax articles on page 32 of this issue are one small example of this.

Thank you for reading. We want your suggestions. We want your contributions of software, hardware designs, evaluations, and anything else you're willing to share with other home computer enthusiasts. And, of course, we want your subscriptions. The more subscriptions we have; the more pages we can print; the more information we can pass along to you and your friends. If you like what you see here, we hope you will spread the word.

Nuf sed, for now. More in a couple weeks. —Jim C. Warren, Jr., Editor

IN FUTURE ISSUES
- Documented source code for the Denver version of Tiny BASIC
- A public-domain floppy disc file system
- Schematics & articles from club newsletters
- Directories of clubs, organizations, stores, distributors, used equipment sources, publications, etc.
- Lists of computer hobbyists & their equipment
- Indices to computer hobbyist articles in many publications

Facing The Music
A microprocessor design engineer standing in an employment line was explaining how he lost his job to the man behind him.

"After several months of sweating, I designed a chip for interpretive control of a piano keyboard. We went into production and sales were booming. I was promoted to project head. After we were fully committed to production, a flaw in the system became apparent, and no amount of redesign could correct it. It seemed that no matter what we did to the device, its Bach was worse than its byte."

M.W. Brown
B.A.R.T.
San Francisco, CA

Dear Bob,
                                        February 4, 1976
Thank you for your note and interest. Our system is growing by small leaps and bounds. We have an Altair 8800 with the Processor Tech. mother board. We also have the following items:

Qty	Description	
1	VLCT (octal loader)	Altair
1	PIO	Altair
1	256 byte static RAM board	Altair
2	4K RAM boards	Altair
2	4K RAM boards	Godbout
3	3 P + S	Proc. Tech.
1	wire wrap prototype board	Proc. Tech.
1	cassette interface	TCH
1	VDM	Proc. Tech.
1	Real time clock and VI	IMS
1	ASR-33 (10 cps)	Teletype
1	Silent 700 (30 cps)	TI
1	2K ROM board	Proc. Tech.

We are building a version of the TCH graphics interactive display with direct Altair plus in boards (double-sided).

We are also ordering the Processor Tech. dual cassette drive, controller and PTCOS.

We have several interactive editors, assemblers, monitors, and cross assemblers. We are currently experimenting with minimal editors and assemblers and have a strong desire to put together a micro-BASIC (Tiny BASIC). The editor package looks like it will be around 510-512 bytes and the same for a "mini-assembler." We are also looking for 4K, 8K, and 12K BASICs which are public.

We are hoping to eventually acquire a TV Dazzler and a floppy disc to extend our system. Future desires also include the IMS shared processor/ 12K-16K more low power status RAM memory. Who knows what else the future has in store?

We are strongly interested in developing software (for the Altair and other micro-processors) which can be used for instruction and instructional support in the school media center.

Our research interests vary considerably here so we also will be running some basic human learning experiments under processor control. We have been involved in research in CAI and computer-managed instruction for about 9 years here. We have PLANIT, COURSEWRITER, PICLS, PLATO (TUTOR), and BASIC available and a wide range of instructional programs for these language.

Franz. We would be *very* interested in publishing the source code and documentation (user *and* implementation details) for the "tiny" editors and assemblers you are implementing. Any chance of your forwarding copies, once they are up and running? —JCW, Jr

Franz Frederick
Associate Professor
112 Education Blg
Purdue University
W. Lafayette IN 47907

U.S. Subscriptions:
☐ $1.50 for a single copy
☐ $3.00 for the first three issues
☐ $10.00 per year (10 issues/year)

For foreign subscriptions:
☐ add $4.00 per year for surface mail, or
☐ add $12.00 per year for air mail

Payment must accompany the subscription. We do not invoice for subscriptions or single orders.

Necessary Information:

Name (last name first) _____

Mailing Address _____

City _____ State _____ Zip Code _____

☐ yes ☐ no: This information may be published in directories and lists of individuals interested in computers in non-commercial environments.

Questions: What would you like to see published in DR DOBB's JOURNAL? It will help guide us if you will rate these, 1 to 10 (1 = minimally desire; 10 = super-eager to see) or 0 (would prefer we not waste space publishing it).

___ Schematics and acticles from all of the computer club newsletters
___ Short news articles directly related to home computers
___ Short news articles concerning computers in general, particularly their social implications
___ Indices to all articles in all other computer hobby publications
___ Indices to selected articles from other computer, electronic, and trade publications
___ Letters having technical, critical, or entertaining content
___ Classified ads (as opposed to display advertising)
___ Suggestions and "blue skying" about what can be done with home computers in the foreseeable future.

Primary areas of interest concerning non-commercial and home computers:

Directories of:
___ Users of home computers and their equipment   ___ Computer clubs
___ Computer stores and distributors   ___ Sources of used equipment
___ Manufacturers of computer kits   ___ Microprocessor and minicomputer manufacturers

Source code listings and documentation: For which microprocessor?
___ Nearly full-sized (much less can be published)
___ Reduced as in recent issues (more difficult to read, but more info included in each issue)

Optional Information:
Equipment that you have or are planning on purchasing, immediately:

Make & model _____ Manufacturer _____

CPU model _____ CPU Manufacturer _____

I/O Devices _____

Mass storage peripherals _____

What kind of software would you like to see developed and placed in the public domain?

Importance Rating _____ Software Description _____

What else would you like to see in publish?

Please use another page or ten, if you need them.

Page 4

TINY BASIC AVAILABLE FOR THE 6800

A version of Tiny BASIC has been developed for the Motorola and AMI 6800. A tape and instruction manual for it are available for $5 from:

Tim Pittman
Box 23189
San Jose CA 95153
(408) 578-4944

We understand that the source code will not be made available, however, we expect that Tom will back his "product" . . . and the price is right.

We would be interested in hearing of the joys and/or woes incurred by those who purchase Tom's Tiny BASIC.

BYTE SWAP

We are experimenting with offering a "Want Ad" section. We will continue to do it as long as we can afford it (in terms of staff time and printing costs). Note: the charge for running an ad will undoubtedly increase as our circulation (and printing costs) increases.

Please follow these instructions in submitting ads. Ads received in other than this form cannot be accepted, and will be returned to the sender.

1. **Type the ad, with a blank space between each line, in lines no more than 50 character positions in length.**

2. **Include at least your name and address as part of the ad. "Blind" ads will not be accepted.**

3. **Compute the charge on the basis of $1 per line or partial line, per issue.**

4. **Forward the typed copy and a check or money order payable to "PCC," to: DDJ Byte Swap, PCC, Box 310, Menlo Park CA 94025. Do not send cash. Your cancelled check is your receipt. Payment must accompany the ad.**

SAVE MY MARRIAGE! Buy my new assembled IMSAI 8080, loaded 22 slot mother board, 8k Ram, regular price, $1835.00. Will sell to highest bidder above $1700.00. Also, IMSAI 8080 kit, still in box, large mother board, regular price $578.00. Will sell to highest bidder above $547.00. Send bids to: Eric Stewart, 664 Via Alamo, San Lorenzo CA 94580.

I am looking forward to an annotated source code listing for TBS; like to do some tinkering. Floating point and math functions would also be nice to have. Dr Suding's scientific calculator interface looks good. However, it's only available through MiniMicroMart and doing business with them has been a frustrating experience.

When deciding on the future of the newsletter keep in mind that hardware is available and getting cheaper. Software has been a big problem and probably will be for some time to come (unless you can afford to pay for it). The newsletter is a step in the right direction to solve this problem. Please don't stop after three issues.

Adolph Stumpf   5639-A Ute
                       Glendale AZ 85307

A BIT OF BLUE SKYING

Bob,   February 19, 1976

By all means keep up the Calisthenics & Orthodontia. But I suspect that as *Tiny BASIC* matures it will acquire a full set of canines, bicuspids, and molars. As the price of main memory continues to drop, the need for a minimal BASIC will assume less importance and the emphasis will shift to better performance and convenience. Still, IL is a good tool for those who may want to experiment with variants of BASIC or some other language. As unlikely as it may seem, I think that by 1980 most hobbyists will be using a subset of PL/I. I also predict that the 1980 hobbyist will own a computer system the size of a breadbox and comprising a 16-bit CPU, 256K bytes of main memory, 8M byte floppy disc, dual tape cassettes, full ASCII keyboard, CRT display, modem, and non-impact printer (all in one box). The whole thing will sell (assembled) for $695 at Sears and will have the computing power of an IBM 370. Last, but not least, the CPU chip will be designed expressly for the hobbyist, not for some pedestrian application such as traffic signal control.

Jim Day   17042 Gunther St
                       Granada Hills CA 91344

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jim day's DAZE
[reprinted from PCC Vol. 4, No. 5]
COMPUTERS THAT TALK

Wouldn't it be nice if your computer could speak to you in English, French, German, or Esperanto like the computer on the starship Enterprise? Then it could say things like, "Wake up, sir" or "Get with it, turkey" (depending on what kind of mood it was in) or maybe, "The time is six o'clock, the temperature is 46 degrees, and tomorrow is your wife's birthday." Most people have probably assumed that some day, perhaps by the year 2000, talking computers will be a reality instead of simply science fiction. Well, hang onto your prognostications, people, because that day is today!

In recent years many people have been working on voice output devices for computers. Some of these devices have been electro mechanical analogs of the human vocal tract, similar in principle to the Voder exhibited at the New York World's Fair in 1939. Others have used electronic waveform generators to synthesize human speech sounds. Of these, the Votrax synthesizer can truly be said to represent a significant breakthrough with respect to voice quality, ease of programming, and cost.

Smaller than a breadbox and priced at about $3500 for the basic unit, Votrax is produced by the Vocal Interface Division of the Federal Screw Works (500 Stephenson highway, Troy MI 48084; (313) 588-2050). Any computer capable of outputting a string of ASCII code to a terminal can be used to control Votrax. As an output device, Votrax can be used alone or in conjunction with an ordinary TTY, using embedded ASCII control codes and simple logic to switch voice strings to Votrax, and print strings to the TTY, TVT, or other conventional terminal.

Programming Votrax is a snap. Using BASIC, FORTRAN, APL, PL/I, or just about any other programming language, it's easy to convert ordinary English (or other natural language) into voice strings for Votrax. The best quality of vocal output is obtained by using a dictionary lookup technique to substitute a string of phoneme codes for each English word. Votrax responds to ASCII codes for 63 different phonemes (basic speech sounds) and each phoneme can have one of four levels of inflection.

If perfect voice quality is not essential and random-access file space is not available for a large dictionary, an algorithm can be used to convert English words to phoneme codes. Such an algorithm, developed by Bell Telephone Laboratories, is said to work almost as well as dictionary lookup. An unpronounceable string such as "PDF-8" can be spelled out phonetically as though written "pee dee eff dash ate," and the number 10.6 can be rendered as "ten point six" by means of a simple subroutine. Pauses can be inserted automatically in response to punctuation and paragraphing.

Maybe you are wondering where you can actually need Votrax and, if so, how did they like it? The answer to both questions is yes. People are using Votrax and they like it a lot. For example, the Coast Community College District in Costa Mesa, California, is using Votrax for computer-aided instruction and also in an on-line student information system. Votrax was chosen in preference to other audio response units not only because it is much less expensive but also because it functions well in a real-time environment. In the student information system application, Touch-Tone telephones are used as "terminals." Although this limits the user to numeric input, it would be hard to find a cheaper or more readily available I/O device. Several extensions to the district's present use of Votrax are being developed, such as a voice-output interface for their on-line budget system, allowing administrators to inquire about specific accounts and receive immediate vocal replies. David Clements, senior programmer/analyst for the district's student information system, reports that he is amazed at the results achieved with Votrax and believes that sophisticated voice output will become a more useful and medium in the near future.

Another application of Votrax is as an aid to blind programmers. In the Homer system, written in FORTRAN for a CDC 6500 at Michigan State University, Votrax is used to echo each line input from a conventional terminal. It is also used to deliver FORTRAN diagnostics and as a tool in the editing of source program files.

Operating in conjunction with an optical page reader, Votrax can be used to convert printed matter, such as books, magazines, and newspapers, into audible form. If desired, the output from Votrax can be tape recorded for distribution to the blind.

There are but a few of the uses to which voice output can be put, and it appears likely that voice output will soon become a familiar feature of many computer systems. Maybe yours will be one of them.

(Also see "Talking Calculator" in November 1975 PCC [Vol. 4, No. 3, p. 9].)

COMPUTERS THAT TALK – UPDATE

Jim Day had an article in the most recent issue of PCC discussing the use of a Votrax machine to allow a computer to synthesize speech [article is reprinted, herein]. In the article, he indicated that the machine, essentially a solid-state phoneme generator, was priced at about $3500 for a basic system ... a bit high for most hobbyists' budget. [Phonemes are the basic components that make up spoken words.]

Well, we just finished talking to the west coast rep for Votrax for about an hour and a half, and have some exciting possibilities to report!

Votrax is currently selling relatively few of their systems. It would be easy for the computer hobbyist community to *significantly* increase their sales (and, presumably, thereby drive the price per unit significantly downward). And, the rep didn't even know the hobbyist market existed; *he does now.*

First of all, the price that Jim quoted was for a turnkey system; one that includes two 25-pin interconnect boards, an 80-byte buffer for the incoming phoneme codes, an amplifier, and a power supply Such a configuration is usually expected and demanded by the commerical and industrial users. However, it's a different matter with computer hobbyists. Hobbyists are accustomed to using breadboarding, can supply their own buffering via their system's memory, invariably have the ability to input to a hi fi amp, and usually can find super-cheap power supplies.

Assuming this, all that one *really* needs to purchase are the four phoneme generator boards, and have access to the interface engineering specifications and schematics. These are available for under $2K in small quantities; $1800 @ in groups of ten, and $1600 @ in groups of fifty.

Would you rather have a $1600 hardcopy device or *the ability to generate English speech, including inflection?* Since the Votrax equipment is based on phoneme generation, the vocabulary is essentially unlimited. Further, since the generators are entirely electronic, the equipment has much greater reliability than electro-mechanical equipment. Also, the Votrax equipment and circuitry has been in the field for about half a decade, now, and is thoroughly debugged.

If you would like for Votrax equipment to become available to the hobbyist community:

(1) Write to John McDaniel, Votrax, 4340 Campus Dr., No. 212 Newport Beach, Ca. 92660; tell him that you would like for your computer to be able to *talk* to you, and indicate how much you would be willing to pay for that facility. Give him correspondence to support him when he approaches Votrax management. Make him and them aware of their untapped potential market for stripped-down systems in the hobbyist community.

(2) Tell the owners of your local computer store about Votrax and encourage them to contact Mr. McDaniel.

Mr. Hal Singer—Editor   April 1, 1976
Micro-8 Computer User Group NL,
Cabrillo Computer Center,
4350 Constellation Rd.,
Lompoc, CA 93436

Dear Hal;

I received Vol 2, #3(Mar. 10) of the NL a few days ago.

The day of the computer with printer for under $500 is here due to Texas Instruments. They have a new programmable calculator, the SR-56, with 100 programming steps, ten registers and functions such as sin, cos, tan, log, ln, etc. that has a price of $180. It is programmable from the keyboard only, not like the 224 step, 20 register SR-52 that uses magnetic cards as well as the keyboard for program entry and costs $395.

Both the SR-52 and the SR-56 can use TI's new PC-100 thermal printer that uses 2 1/2 inch tape, no alpha's just numerics. The price is $295. For the SR-56 and the PC-100 the price is $475 and for the SR-52 and the PC-100 the price is $690. I don't believe any printing terminal has this low a price. It would be nice if TI would bring out an alphanumeric printing terminal for the SR-52 and SR-56, however, the price would probably be quite a bit higher than the PC-100.

I understand that Texas Instruments has a SR-60 and that's all I know about it. Does anybody know?

Yours truly,

David W. Johnston

David W. Johnston
P. O. Box 3781
Washington, D. C. 20007

Continue the good work and I'll continue reading it.

Regards,

Steve Ciarcia

Speaking of suppliers, how is Maury Goldberg? Actually, I have no complaints. I bought 9K of RAM and several other things from him and received them each time within one week. There is a catch though. You must call Maury first and see if he has the parts in his hot little hands and make sure he has enough to last until you can ship some cash to him as fast as possible. If you are willing to do business this way, then he can give you some good buys.

Since last talking to you, I've built a graphics terminal. Right now I'm using my 5" scope and would like to hear from anyone having a 12" xy display for sale or trade. (I have one of those ping pong, squash, hockey TV games complete with sound and video scoring available for trade.) Once you have seen a graphics display in action, you'll never be satisfied with just a TVT again. They are fascinating.

You ask yourself, whatever happened to Steve Ciarcia? He's still alive and well and residing in Connecticut. I haven't given up on micro computers, but I've been rather low key about it since I've found it too easy to get burned in this business. How many times have you purchased 4K of RAM at $250 only to have someone selling it two weeks later at $200 and so on until it's at $100 now? I haven't been inactive, but I've been sitting in the background waiting for the smoke to clear. The newsletter has been beneficial by providing reviews of new micro processors and equipment manufacturers and, now rather than purchase everything hot off the wave solder machine, I wait until it cools off and the competition catches up.

I've received a lot of mail from newsletter readers as a result of my power supply article. Most ask about parts and suppliers. I cannot vouch for the company, but Delta Electronics carries all the required parts.

Steve Ciarcia   March 31, 1976

Leor Zolman, 742 North June Street, Hollywood, CA 90038 has IMSAI 8080 and could use info on building it up.

124 HEBRON AVENUE, GLASTONBURY, CONNECTICUT 06033 / 203-633-6781

MARK-8

BUGS: So far, I have no indication that anybody has actually tested to see whether their Mark-8 has the bugs in my letter in vol. 2, issue 1p11. Apparently, I made a mistake in not pointing out that "just because you haven't encountered these bugs in no way means your Mark-8 doesn't have them—it is very unlikely that any one user to find these bugs, and try tracking them down (especially the register B,D bug—I found it only when I implemented my asynchronous ports; even experienced users are virtually certain to think "isolated peculiarities" are their mistake in operating the Mark-8). It is still quite possible that these bugs are in all Mark-8's, and I would be interested to hear the results anybody actually obtains from testing their Mark-8, whichever way the test goes. (Note: I got the registers switched in the issue 1 letter; D is sometimes clobbered for wait times near .4 sec.; a second 8008 produces the same symptoms.)

SUPPORT: I feel there is a tremendous need for newslett rs that specialize in individual microcomputers (or at least individual microprocessors), answer questions, provide hardware, software, help for that machine, etc. (The Mark-8 has nothing to compare with "Computer Notes" for the Altair.)

SUGGESTION TO HELP BEGINNING PROGRAMMERS

Publish octal byte input and output routines (for each u??) encourage beginners to try various input data and calling sequences ranging from adding 2 bytes together to storing as low address in a JMP instruction to select one of several routines. Alternative I/O modes: binary, characters, hexadecimal (for appropriate u??) and a separate input port with 8 switches or output port with readout for each data byte—would allow the program to run continuously, thus giving an "instant" response to changes. (NOTE TO RETAILERS: 8 SWITCHES IN A DIP would be far more convenient for inputting 8-bit bytes than 7.

I've used a similar scheme to determine what the 8008's unpublished op codes do, as well as analyzing other properties by a hardware debugging technique based on setting up a continuous/repetative scope display (8 traces using 74151). Another hardware technique I've made extensive use of uses a latch and readout clocked by some signal (whose delay is adjustable)to sample display logic states at any point during the waveform, thus getting around scope frequency response limitations by allowing any signal TTL's can catch to be displayed.

DOCUMENTATION IDEAS

SOFTWARE: comments should tell how data being manipulated relates to data, for example, the entry point to a subroutine, to avoid having statements like "lAB load register A from register B" lose the reader by making him wonder "what data is being loaded?"

HARDWARE FLOW CHART NOTATION that is "state" and "transition" oriented—uses fewer boxes. (Example: issue 10,p43.) Also: arrows showing cause-effect relationships between states and transitions in both waveform diagrams and flow charts; a related logic notation.

FUTURE PLANS: When I get the interrupt version asynchronous ports working, I intend to make a relocatable loader, and a SUFFIX notation programmable calculator, as my expertise runs the full range from hardware through software to a knowledge of continued-fraction series for transcendental functions.

"Impossibility proofs" of SAVING ALL 7 REGISTERS, FLAGS on any 8008 system without any special hardware ignore one register—as I have written a routine.

MORSE CODE PROGRAMS could use a scheme for encoding dot-dash sequences for each character as a single 8-bit byte (no separate length code, etc.) as well as the same table for conversion both ways without fouling up input timing. The bit position of the most significant "1" would determine how many dots and dashes are represented, with a "1" in the sign bit indicating a sequence of 8 starting with a dot (thus allowing "error" and "attention" to be encoded).

Thomas R. Amoth
228 Fox Rd.
Media, PA 19063
ph:(215)566-1068
4/4/76

Sincerely yours,
Thomas R. Amoth

Thomas R. Amoth

CONTROL DATA

THE MOD 80 DOCUMENTATION PACKAGE

The MOD 80 Documentation Package includes:

1. A description of the MOD 80 system
2. Component placement and schematics for the system
3. Detailed board descriptions
4. Parts Lists for the boards
5. The Monitor 80 software, a source code listing and description of its operation
6. The MIL cassette interface documentation including a software listing
7. Additional notes on the system and debugging hints

MOD 80 Hardware

The hardware of the system is based on eight 4-1/2 inch by 6 inch printed circuit boards.

The MOD 80 CPU Board   This board contains the 8080 CPU, clock generators, state decoding, address and bus drivers.

The MOD 8-2 Restart, TTY I/O Board   This board contains TTY I/O and reader control logic.

The MOD 8C-3/Nano 80-J Jumper Board   This board personalizes the backplane to the 8080.

The MOD 8-4 ROM Board   This board will hold up to 2K × 8 of 1702A PROM.

The MOD 8-5 RAM Board   This board will hold up to 2K × 8 of 2102-1 memory.

The MOD 8-6 Input Board   This board has three 8 bit input ports.

The MOD 8-7 Output Board   This board has three 8 bit output ports.

The MOD 8-8 PROM Programming and Backplane Board   This board interconnects the others and also contains PROM programming circuitry.

The boards are available from:

Space Circuits
156 Roger Street
Waterloo, Ontario
Canada

The Monitor 80 Software

The Monitor 80 contributes greatly to the power of the MOD 80. This powerful 2-1/2k monitor can be run on almost any 8080 system. The Monitor 80 has the following features:

LDS   A load symbolic routine accepts the standard Intel mnemonics. This routine interactively accepts symbolic input and creates object code. This is a one pass assembler.

DPS   A dump symbolic routine disassembles object code and creates source.

LOC, DLP   A routine initializes a location pointer and allows one to start entering code at any place in RAM. A routine displays the contents of the location pointer.

XQT   An execute routine allows for execution of a program at any place in RAM.

EDT   An octal editor enables one to examine any location in memory and modify any location in RAM from a keyboard.

CPY   A copy routine moves blocks of data from one section of memory to another.

TRN   A translate routine allows for relocation of code by translating jump and call addresses.

SBP, CBP   These routines set and clear breakpoints. When a breakpoint is encountered, the flags, the contents of the 8080's registers and the memory pointed to by H, L. are printed.

LDO, DPO   The load and dump octal routines allow for loading and dumping of paper tapes for backup.

PRG   A PROM programming routine intelligently programs 1702A PROMS.

Software drivers control an ASR 33 teletype or other teletype compatible device.

This code is contained in 2-1/2K of ROM and needs 100 bytes of read write memory to run.

The MOD 80 hardware, in conjunction with the Monitor 80 represent a powerful microcomputer system.

The following are available:

1. The MOD 80 documentation package $20.00
2. A Monitor 80 object code paper tape $20.00
3. The Monitor 80 programmed on 10 1702A PROMS $200.00

The above prices are postpaid. Delivery is generally one week ARO.

Order from:

Robert Swartz
195 Ivy Lane
Highland Park, Ill. 60035

DEAR HAL ET AL:

I GUESS IT HAD TO HAPPEN, THE END OF THE MICRO-8 NEWSLETTER I MEAN. GUESS THOSE OF US WHO HAVE BEEN WITH YOU A WHILE THOUGHT IT WOULD GO ON AND ON AND ON...

FOR THOSE OF YOU WHO ARE LOOKING FOR SOFTWARE FOR YOUR 8080 BASED SYSTEMS HERE IS MY CONTRIBUTION. THIS SHORT PROGRAM LETS THOSE OF YOU WHO HAVE A TVT-1 HOOKED UP TO AN ALTAIR AS I HAVE, ALONG WITH A PARALLEL I/O BOARD, PRINT THE 64 CHARACTERS OVER AND OVER AND OVER...THE PROGRAM TAKES 23 LOCATIONS.

LOCATION	MNEMONIC	OCTAL CODE
000	MVI r (B)	006 (load register "B")
001	data	277
002	MVI r (C)	016 (load register "C"
003	data	377
004	MOV r1,r2	170 (move "B" to ACCUMULATOR)
005	CMP r	271 (compare ACCUMULATOR TO "C"
006	JZ	312 (jump if ZERO bit = 1
007		000
010		000
011	MOV r1,r2	127 (move ACCUMULATOR TO "D"
012	INPUT	333
013	CONTROL CHANNEL	000 (ANY EVEN NUMBER PORT)
014	RRC	017 (ROTATE ACCUMULATOR CONTENTS RIGHT
015	JNC	322 (JUMP IF CARRY BIT= ZERO)
016		012
017		000
020	MOV r1,r2	172 (move "D" TO ACCUMULATOR)
021	OUTPUT	323
022	DATA CHANNEL	001 (ANY ODD NUMBER PORT)
023	INR r	074 (increment register "A")
024	JMP	303 (UNCONDITIONAL JUMP)
025		005
026		000

I WILL TRY TO GET SEVERAL MORE "SUB PROGRAMS" TO THE MICRO-8 GROUP BEFORE THE LAST ISSUE IS PUBLISHED. I AM RUNNING MY TVT-1 AT 30 cps WITH MY ALTAIR 8800.

M DOUGLAS CALLIHAN, BERKLEY ST. R.F.D. # 1, BERKLEY, MASS 02780

MIKE'S T.V. REPAIR

MICHAEL G. SCOTT
BOX 105 • KIRON, IOWA 51448
(712) 6754255

11 APR 1976

Dear Hal & Group:

Well after waiting and bothering Howard Sams I've finally received my copy of Don Lancaster's "T.V. Typewriter Cookbook" and as a true Lancaster fan I think it's GREAT!

After reading it cover to cover I think that the whole book is every bit as good as the few short clippings which have been published in BYTE.

There are 9 chapters starting with the basics and covering Memory, Timing circuits, Cursors, Keyboards, Teletype and television interfaces, cassette recording, and also how to modify an IBM Selectric Typewriter for use as a terminal.

Also included are some pinout diagrams and info about common and some not-so-common I.C.'s.

I have gained a great deal from it and it has helped me in designing my own CRT Terminal (T.V. Typewriter).

If anyone else would like one, here's the information:

COST: $9.95   Product No.: 21313

Send to: Howard W. Sams & Co., Inc.
4300 West 62nd Street
Indianapolis, Indiana 46268

Sincerely,

Michael G. Scott

MENLO PARK, CA ■ 94025

P. O. BOX 310 ■

April 10, 1976

page 1 of 2

Greetings,

There is a viable alternative to the problems raised by Bill Gates in his irate letter to computer hobbyists concerning "ripping off" software. When software is free, or so inexpensive that it's easier to pay for it than to duplicate it, then it won't be "stolen."

Example: There are at least five versions of Tiny BASIC up and running on at least three processors. A cassette containing Tiny BASIC for the Intel 8080 is available for five bucks. A version for the Motorola and AMI 6800 also costs $5, including complete user documentation. If the price is still too high, complete user documentation and implementation details for one of the 8080 versions has already been published. This includes complete annotated source code. Anyone is welcome to retype it and reassemble it. No one will yell, "thief." All details of a second version will be published before the end of April. Several more versions will be published shortly thereafter, including a cross-assembled version created using the macro facilities of the IBM 360 Assembler. Versions are expected shortly thereafter for the MOS Technology 6502, and Signetics 2650. Note: Tiny BASIC is, essentially, BASIC sans array and floating-point operations, although one of the versions has array operations, and another uses a calculator chip to obtain floating-point capabilities. It is explicitly designed for minimal memory micros.

Example: Gary Kildall, who built the PL/M compiler for Intel and the PLuS compiler for the Signetics 2650, is making an entire floppy-disc operating system available. He plans to sell a disc and complete documentation for not much more than what it would cost to duplicate them.

Example: A complete alpha-numeric music system, including amplitude control, has been designed and made available. The documentation costs only $2, including complete schematics for the minimal hardware that must be added.

Information on all of these systems–and much more–is being published in a new, reference journal for home computer users (and anyone else interested in micros), *Dr. Dobb's Journal of Computer Calisthenics & Orthodontia*. The *Journal* is publishing all available details. For instance, the first issue contained: complete design details for Tiny BASIC, complete user documentation for the first 8080 version, complete details for using a calculator chip to obtain mathematical and floating-point functions, and a 16-bit, binary-to-decimal conversion routine.

The second issue included: complete implementation details and annotated source code for the first version of tiny BASIC, complete documentation and source code for a simple music program for Altair 8800s, design notes on a forthcoming high-level language for 8008/8080s, two articles on a $1K phoneme generator kit

for micros that allows unlimited English speech synthesis, and a quick note on the 6800 version of Tiny BASIC.

The third issue will include complete details and code for the second 8080 Tiny BASIC which includes 1-D arrays, a simple debugger for the 6502, a keyboard loader for octal code, details of a contest to generate public-domain graphics software for CroMemCo's TV Dazzler, and much more. The *Journal* is also reprinting carefully selected, good stuff from the growing multitude of computer club newsletters. Additionally, it is publishing complete indices to all major computer hobbyist publications and selected articles from other publications, lists of hobbyists and their equipment, used equipment sources, clubs and organizations, computer stores and distributors, etc. Finally, it is actively pursuing a consumer advocacy role relative to the home computer user.

The point is that all of this information–systems software, design notes, schematics, etc–is being made available for little more than the cost of reproduction. The *Journal* came into being, explicitly to aid creation and distribution of that information. In some ways, it creates a sort of manufacturer-independent user's group.

It is reasonable to expect that free and inexpensive software will become increasingly available to and through the hobbyists' community. This is true, in spite of the failure of such SHAREing in the business and industrial communities.

1. Hobbyists are developing home-grown hardware and software, just for the fun of it. Since it's "fun" rather than "work," they have shown a great willingness to share and distribute what they develop. This is not an unknown phenomenon. It is the usual practice in most other hobby environments, and is certainly true in the academic environment.

2. As with the industrial mini and micro markets, hobbyists have learned to be wary of purchasing hardware from manufacturers who provide no software support. Through common sense, and by observing Mr. Gates' experience, those who wish to sell software for significant sums of money must realize that there is only one group that can practically be expected to pay for it: the hardware manufacturers. They need it to enhance their products in a highly competitive marketplace.

3. Concerning quality: A significant minority of computer hobbyists are also experienced computer professionals. It's their (our) play as well as work. The competency level is more than sufficient for the design and implementation of excellent systems software.

4. Finally, the approach used in producing the Tiny BASICs will be continued and expanded, a sort of modified Chief Programmer Team approach: An experienced pro does the overall design and outlines the implementation strategy (via the *Journal* and other hobbyist publications). Following those directions, the more experienced amateurs do the necessary hack-work (exciting to them, but drudgery for the "old pro"). Since it is a symbiotic effort, the implementors are almost certain to share their work with the designers, and hence, with the larger community of home computer users.

It's amazing how much "good stuff" becomes available when the producers think of their labor as "play" instead of "work." All who wish to do so are invited to join with the publishers of *Dr. Dobb's Journal* in the pursuit of realizable fantasies.

Jim

Jim C. Warren, Jr., Editor
Dr. Dobb's Journal of Computer Calisthenics & Orthodontia

P.S. *Dr. Dobb's Journal* is published by People's Computer Company, Box 310, Menlo Park CA 94025. Subscriptions are $10 per year. PCC is an established publisher of *PCC* newspaper (devoted to computers in education, and computer games), and of numerous computer books.

S. A. COCHRAN, JR.
ATTORNEY AT LAW
P. O. BOX 607
TYLER, TEXAS 75701

PHONE 592-3833

April 5, 1975

Re: Burroughs Model 9350-2 Communicating
Typewriter

Dear Sir:

I have just received a letter from the Public Relations Manager of the Federal and Special Systems Group, Burroughs Corporation, at Paoli, PA, referring to the aobve equipment. The operating paragraph of this letter was as follows:

"The subject equipment, which we had classified as obsolete and surplus, was disposed of some time ago, to a machinery dealer on an 'as is, where is' basis. Since no documentation - either hardware or software currently exists, we regret that we are unable to assist you."

Translated into English, he means that under extreme duress, Burroughs will admit that some such equipment formerly existed, carrying their logo, but that they are unwilling even to admit the equipment, if it now should chance to exist, can be made to type. The facts aren't very much better than that. I, for one, was surprised that anyone should build a unit that looked so very much like a type=writer, and leave the backspace key and equipment off of it.

I wonder if one of the readers of the newsletter who is now in the Armed Forces may have access to a manual on the use and connections of this equipment. If so, I wish that he would drop me a line saying how I could obtain a copy of the manual, and if disclosure of its contents would be permitted under current security regulations.

Yours very truly,

Sid Cochran, Jr.

P.S.: Thanks to Max Wymore for his short brief on the remedies available where delivery is delayed!

JAMES G. CALLAS, M. D.
EVELYN R. CALLAS, M. D.
631 NORTH SAN PEDRO ROAD
SAN RAFAEL, CALIF. 94903

Page 7

4/6/76

Thought the following hint might be of help to users of Processor Technology's superb I/O board in running MITS Basic. The trick is to invert the status signals.

Jumper the channel select, in area B, left to right so that channel C=00 and D=01. An extra IC can be wired into the unused spot on the lower right of the board (I used a 7400). Connect "RDA" to the inputs of one gate and "C0" to its output. Connect "TBE" to the inputs of another gate and the output to "C7". Works great.

Sorry to hear the NL is folding, but we've all come a far piece from those early days, struggling with the wretched 8008 boards and worse instructions, that you did so much to clarify, as well as the early uncertainties of whether the Altair would turn out to be any good. Now you have to move on (and hopefully upward) too.

Regards,

Jim

April 5, 1976

Would you please send me c copy of any schematics you h ve for an optical type paper tape reader. (you've promised such in several NL issues!!) I have a mechanic (capstan) type paper tape reader with a photoregistor read head but burnt out transitor type electrcnics. I'd like to update the ele ctronics and interface it with the IMSAI 8080.

I now have an IMSAI 8080, with 8K of Proc Tech, 3P + S, TVT-I with Hogg scrolling circuit and ascII keyboard.

I have the IMSAI B basic on order (soon to be received I hope.)

The IMSAI 8080 is a rack mount ty e and its in a nice 19" rack.

Does anyone have schematocs for a teoc Mt-6 data cassette transport assy 193^c5^{000}-09, it also goes by NCR (not c sh reg) modue M63-2 part ^{006}-$^{00}62^{07}$?

I have ordered four IMSAI 8^08^0's as part of a group purchase and have had no difficulty in dealing wth IMS: They promised (Mr Karush of IMS) delive y in 3^0 days, I got them in 26 days. Their product is vastly superior to the Altair, they have 4K Basic for basic machine owners now free of charge. ^{8}k Basic costs eight dollars (ownere only 12K twelve dollars.)--Why bother with MITS???

I now have the documented comversion to convert the TVT-II to a 64 character per line display.(it works!) Interested readers should semd a SASE and 50cents for copying.

* TVT-II Owners

Thats all   Look AT This

Gary Alevy, Emory University, Box 21393, Atlanta, GA 30322

JOHN ANTHONY TELEVISION

Childs Park Road   Dingmans Ferry

Pa. 18328   717-828-7480

Dear Hal and Readers,

There is an excellent engineering paper put out by Harris Corp., Broadcast Products Div., 123 Hampshire Street, Quincy, Ill. 62301. by A.V.Juettner Jr.

It describes Harris' System 90..One of the first direct applications of MicroP's to broadcasting. This system replaces the conventional hardware wired control automation devices and puts the whole concept of station control in the hands of the 8008 with a little help from its friends!

I think the cost of a stamp and a letter to Harris is well worth the effort for application minded readers.

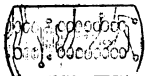Best wishes from a neo-byte (do you life THAT one ?) ,

John Anthony.

GINDY /W?

Man's Best Friend

A budding young engineer decided that a microprocessor system could be designed to maintain his apartment and that it would be more cost-effective than hiring a maid or getting married. The system he designed did absolutely everything for him. It woke him in the morning. It controlled the coffee pot and stove so that breakfast was waiting for him when he stepped out of the shower. It was programmed to provide stimulating conversation while it continued with its regular duties. Soon, it became more than just a microprocessor system so he gave it a name. He called it Mary. One evening, while working late, he required Mary's services so he typed in a commmand. Finally, after a long pause, the microprocessor responded: "Not tonight, I have a headache."
Les Papp
Southern Alberta Institute
of Technology
Calgary, Canada

The Best of Creative Computing - Volume 1, David H. Ahl (ed.), Creative Computing Press, P.O. Box 789-M, Morristown, N.J. 07960; 1976; 8½ x 11, 328 pp. ISBN 0-916688-01-1 Paper $8.95

The diversity in "The Best of Creative Computing - Volume 1" can only be described as staggering. The book contains 328 pages of articles and fiction about computers, games that you can play with computers and calculators, hilarious cartoons, vivid graphics and comprehensive book reviews.

Authors range from Isaac Asimov to Sen. John Tunney of California; from Marian Goldeen, an eighth-grader in Palo Alto to Erik McWilliams of the National Science Foundation; and from Dr. Sema Marks of CUNY to Peter Payack, a small press poet. In all, over 170 authors are represented in over 200 individual articles, learning activities, games, reviews and stories.

This 328-page book has 108 pages of articles on computers in education, CAI, programming, and the computer impact on society; 10 pages of fiction and poetry including a fascinating story by Isaac Asimov about all the computers on earth linking up after a nuclear war to support the few remaining survivors; 15 pages of "Foolishness" including a cute cartoon piece - called

"Why We're Losing Our War Against Computers"; 26 pages on "People, Places, and Things" including the popular feature "The Compleat Computer Catalogue" which gives capsule reviews and lists sources for all kinds of computer-related goodies; 79 pages of learning activities, problems and puzzles; 29 pages contining 18 computer games including a fantastic extended version of the single most popular computer game -- Super Star Trek; and 32 pages of in-depth book and game reviews including Steve Gray's definitive review of 34 books on the Basic language.

Creative Computing magazine, from which the contents of this book was assembled, has been described by reviewers as: interesting (The Space Gamer), unique (Bit Blaster), innovative (Output), thoroughly pedagogical, emphasizing brainwork (Modern Data), lively and fun (American Libraries), refreshingly informative (Page), very practical school-oriented activities (Media Mix), makes learning fun (Curriculum Product Review), entertaining and informative (HP Educational User Newsletter), recommended (Computer Notes). What more can we say?

"The Best of Creative Computing - Volume 1" is currently only available by mail for $8.95 plus 75¢ postage from Creative Computing Press, P.O. Box 789-M, Morristown, N.J. 07960.

# # # #

March 24, 1976

Mr. Hal Singer, Editor
MICRO-8 COMPUTER USER GROUP NEWSLETTER
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

Dear Mr. Singer:

We market a high quality mechanical calculator for adding and subtracting hexadecimal (base 16) numbers. The machine is extremely useful to computer programmers, operators, designers, etc.

We have been selling this machine for several years at $35.95 to companies and individuals in the data processing industry. Our customers include IBM and other computer manufacturers, Bell Labs, Western Electric, US Army, Navy, and Air Force, and others too numerous to mention. We have just recently become aware of the new field of computer hobbyists. It seems to us that hobbyists should be particularly interested in this machine because programming a microcomputer is mostly done at the machine language level.

POST OFFICE BOX 13861
ATLANTA, GEORGIA 30324
(404) 321-4390
RADIX PRECISION

The calculator, called HEXADAT, is a precision instrument made of the finest materials. We have included a sample machine so you can see for yourself the quality and workmanship.

The machine automatically indicates a credit balance or the complement of a positive total. This complement is especially useful in determining unused memory capacity.

Conversions from decimal to hex are done by adding on the machine the hex equivalents of the decimal number from the conversion table. Example: convert 745 to hex - enter hex equivalent of 700, plus hex equivalent of 40, plus hex equivalent of 5. The total indicated by the machine, 2E9, is the hex equivalent of the decimal number 745. To convert 2E9 to decimal you take from the table the decimal equivalent of each position of the hex number: 9 + 224 + 512 = 745.

We feel that HEXADAT should be of interest to readers of MICRO-8 COMPUTER USER GROUP NEWSLETTER, and are enclosing a press release and glossy photo for your use. Any space that you may devote to this unusual product will be appreciated.

Sincerely yours,

RADIX PRECISION CO.

Jim Oxford
Jim Oxford

/gl
enc

Page 8

TAYLAB

2009 N. GEYER ROAD

ST. LOUIS, MO 63131

314 961 4372

John E Taylor   April 6

I will sure miss your deft touch in editing
the newsletter, and was surprised that there
are not more subscribers.

Regarding mail order suppliers, in addition
to those previously recommended, such as
Solid State Music, Godbout and James, I
would add:

Digi-Key - good prices
S. D. Sales, Inc. - good values
Solid State Systems   - but wait for the
                         20% discount sales

I started a Mil Mod but was side tracked by
other matters, including an evident need to
beef up my understanding of current electronic
and computer technology. Now that I am getting
back to construction, I have decided to pick
up some components and boards for an Altair
type bus system. The way things are going, it
would pay to stick with a general purpose,
readily modifiable design so that you can
take advantage of new developments. The
processor will cost little whereas peripherals
and software can be quite expensive.

Speaking of peripherals, I do not know that
I would recommend either the Creed or the
Herbach and Rademan terminal for print out-
except perhaps as an interim solution until
a cheap matrix printer comes along. *

Neither am I impressed with the audio
cassette as a practical memory device.
A much better solution to this problem
could be cheap EPROMS and RAMS, which
are in the works.

Sincerely,

John E Taylor

* I have both.

---

5 April, 1976

Dear Hal,

Again, many thanks for the information via
the phone call last night. Here's our $14
and hopes for continued success with the
newsletter.

In regards to our problem with Tim Barry's
Creative Computer, another phone call last
night (hopefully) solved the question.

It seems the flu bug got hold of the com-
puter bugs and printing etc. was delayed.
We were promissed shipment in mid-April and
letters are now going out to all who paid
and/or inquired offerring refunds if de-
sired.

Dear Hal,

After waiting many months for delivery of a MITS 680
I cancelled my order with them. I decided to go with a
Digital Group 8080 System. The boards are very well done
and it made the assembly relatively easy. The kit assembly
does assume some building experience. This probably
accounts for why the Digital Group Systems are offered in
several different versions from bare boards to completly
assembled units.

In assembling the system I had two self caused problems
with the TV board. One was a solder bridge and the other
was a folded pin on an IC. After completing the assembly
of the boards and putting the system together it worked the
first time I tried it. I then loaded the tape cassette
which was supplied with the system which contained some
sample programs and they worked well. I am using a Clare-
pender keyboard which was also purchased from the Digital
Group.

I would be very interested in hearing from anyone
living in lower Delaware that is interested in Micro-Computers.

I enjoy reading your newsletter and often get some
interesting information from it please keep up the good
work.

Bart DiCarlo
308 N. Bradford St.
Seaford, De. 19973

302-629-6378

MIKE 2 INFORMATION PACKET NUMBER 1

Preface

Enclosed you will find over 100 pages of hardware design and software list-
ings. I hope you find this information as exciting and useful as I have.
Included are theory, operation and design of interfaces for cassettes,
modems, CREED, RS232, TTY 33 ASR; a countdown circuit, and a hardware push/
pop stack. About sixty percent of this Information Packet contains software
listings of programs for testing and using the push/pop stack, keyboard
monitor program, Super-Nim game, cassette cold start, Mike testor and demo,
cassettes monitor, and CREED input/output routines. The MIKE 2 Testor and
Demo Program starting on page 91 is an earlier version of the one starting
on page 57. I included both as I have not had time to verify that the latter
version includes all of the first.

Contributors

The names and addresses of all contributors are given below. Please feel
free to contact them if you have any questions. I would appreciate it if you
would send copies of any errors and improvements you find to both the contri-
butor and myself.

Mark A. Condic, III
Department of Computer Science
Illinois Institute of Technology
Chicago, Il 60616
(312) 567-3000

Jim Farschon/Tom Kasper
3949 Mt. Everest Blvd.
San Diego, CA 92111
(714) 292-9180

Eric Schott
808 14th Ave.
Juniata
Altoona, PA 16601
(814) 944-5998

Jim Tucker
3 Grove St.
Exeter, NH 03833
(603) 772-3903

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ment. I assume no responsibility for errors, its use or consequences thereof,
nor for any infringement of patents or other third party rights resulting
from its use, nor are any patent licenses implied.

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It is believed that all material contained herein is in the public domain.
This material is being sent to you at cost. If you reproduce it you save
me the cost of reproduction and mailing. I ask that you send me one dollar
donation for each copy reproduced to help defray the fixed bosts of copy
preparation and print plates. Any profits realized from the sale of this
Information Packet will be used to support the formation of a Mike User's
Group.

MIKE User's Group

It is hoped that this Information Packet will stimulate enough interest in
the MIKE system to form a MIKE User Group. Activities could include:

● Dissemination of MIKE information to computer hobbyist clubs and
  publications. (Note that I am not suggesting another newsletter.)

● Publication of Information Packets based on User contributions.

● Group projects such as cassette interchange standards, system configura-
  tion, software development (Tiny Basic, 8080 → 8008 Translator).

Your comments on the above and suggestions for other activities are actively
solicited. The MIKE User's Group can succeed only if you support it.

Future MIKE Information Packets

Frankly, I priced this Information Packet too low. By reducing two pages to
a side where possible and printing on both sides I hoped for a 5¢/page cost.
This is possible only with a large volume, free material, and donated copy
preparation and editing. For the future I propose we pay a royalty of 1¢
per page per copy for reduced copy and 2¢ per page per copy for computer
listings. Twenty-five orders in advance would be required for printing at a
price of $7.50 per copy. The cost breakdown is as follows:

$4.00   Printing
$1.50   Royalties
$1.25   Postage
$0.75   Copy Preparation
$7.50

The above budget assumes camera-ready copy. Your help is needed to contri-
bute material and volunteers are needed to type and redraw submitted mate-
rial. Part of the royalty could be forfeited to support the preparation of
non-camera ready contributions.

Please address any comments you have on any of the above or on any of the
contents herein to:

Jim Farschon
3949 Mt. Everest Blvd.
San Diego, CA 92111
(714) 292-9180 (after 8 pm)

Also in the conversation, we learned that
he's the Tim Barry of RE's "Komputer Kor-
ner", so backgound should be good. Likewise
he's an active programmer (DEC etc.) with
a lot of respect for the 8080 series. The
course is mainly geared that way with leads
towards other units.

In case you might like to contact him,
Creative Computer, P. O. Box 50, Palo Alto,
CA 94302. The price for the 350+ page
study course is $49.95 with mention of
a possible "graduate course" at a later
date. We let you know our progress towards
the end of the month.(?)

Thomas M. Alewine, Jr.
103 Fredrick Street
Brandon, Miss. 39042

Page 9

CHEAP AND GOOD.

1 SUPER CASSETTE BOARD

Computer Hobbiest Dual Cassette Interface
Plus + + + + + Dual I/O
Plus + + + + + E Prom Software Driver
All on One High Quality Board
$24.00 Gets You The Bare Board
$85.00 Gets You The Kit
$110.00 Gets You The Kit Assembled & Tested

2 PROTOTYPING BOARD

Solder or Wirewrap
1362 Through Holes
Takes four 40 Pin Chips Not Just Two
OR..... Six 24 Pin Chips Not Just Three
Plus a Bunch of 14 or 16 Pin Chips
Extra Heavy Pads-They Won't Fall Off
$22.00 Gets You The Bare Board

3 EXTENDER BOARD

Fits Exactly
Use Wirewrap Connector ($5.00 instead of $10.00)
&Get Test Points For Each Pin
$14.00 Gets You The Bare Board
$19.00 Gets You The Board & Connector
$5.50 Gets You The Connector

4 B.S.

All Boards Are Top Quality (MilSpec. Board Shop)
Prototype & Cassette Boards Have Gold Contacts
Absolutely Fit Altair & IMSAI
They're So Good We Use Them Ourselves!!

SEND CHECK OR M.O. TO:

GARY MITCHELL
PO BOX 35
CHULA VISTA, CA.
92012

ROBERT DELP
EDITOR

THE **ELECTRONIC PROJECTS NEWSLETTER**

BOX 1026
FREMONT
CALIFORNIA 94538

Dear Colleague:

We hope you and your students have enjoyed building the projects featured this year in "The Electronic Projects Newsletter." With the variety of projects covered this year, I'm sure many of your students found the "right" project for them. Next year's students will no doubt gain the same enjoyment and learning experiences which come from creating an electronic device from a handfull of parts.

Your subscription expires next month, so now is the time to send us your renewal. This will insure a continuing source of student-tested project plans, in a format designed for easy reproduction.

As your file of project plans grows, you will be able to offer your students an even greater selection of project choices. When a student selects a project in which he has a strong interest, the learning is far greater than would otherwise be possible.

Your school's purchase order is welcome, or you may include payment with your renewal. Either way, your renewal now will insure a continuing source of project plans for the year ahead.

Sincerely,

RETURN to
BOX 1026
FREMONT
CALIFORNIA 94538

Robert Delp, Editor

Please renew my subscription.

Enclosed is my $10.00 by ☐ check   ☐ money order   ☐ purchase order

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SCHOOL		
ADDRESS		
CITY	STATE	ZIP CODE

NAME ___ ADDRESS ___ APT# ___
CITY ___ STATE ___ ZIP CODE ___

[ ] KEY PADS ● 18.95
[ ] DATA ENTRY PRINTED CIRCUIT BOARD ● 29.95
[ ] PROFILE PRINTED CIRCUIT BOARD ● 29.95
[ ] DATA ENTRY SYSTEM KIT ● 109.95
[ ] PROFILE CARD KIT ● 79.95
[ ] COMPLETE SYSTEM KIT (2 CARDS) ● 189.95
[ ] ASSEMBLED DATA ENTRY SYSTEM CARD ● 199.95
[ ] ASSEMBLED PROFILE CARD ● 139.95
[ ] ASSEMBLED SYSTEM ● 299.95

CALIFORNIA RESIDENTS ADD 6% SALES TAX
PLEASE SEND ME THE FOLLOWING:

ASSOCIATED ELECTRONICS, 17855 SKY PARK CIRCLE, IRVINE, CA 92714
MASTER CHARGE NUMBER ___ EXPIRES
BANKAMERICARD NUMBER ___ EXPIRES

MiniMicroMart
1618 James Street, Syracuse, N.Y. 13203; Phone: (315) 422-4467

March 15, 1976

Dear Mr. Singer:

Some weeks ago I mentioned the possibility of doing something for the benefit of 8008 users--a sort of hardware and software manual for those who own and are using 8008 systems. You discouraged me saying it would probably not be financially rewarding.

For no sound business reason and primarily to serve a need (we thought) we some months ago attempted to market improved Mark 8 boards. We no sooner got the project underway when 8080 prices took a real dive, and the whole Mark 8 program turned into a financial disaster and public relations nightmare for various and sundry reasons. Brother Thomas McGahee of the Salesian Center in Columbus, Ohio, who does some software and hard-ware consulting for us, is an avid Mod 8 user and has prepared some improved scientific calculator software, some improvement to Mod 8 hardware, and revisions to Monitor 8 including a fine overlay for parallel input and output (TVT, ETC). We have reproduced all of this material including some of his comments on the use of Monitor 8. The cost of all this material, shipped postpaid, will be $2.25 which will hardly cover the cost of printing, collating and shipping. We are suggesting that you let people know of the availability of this material for a number of reasons...your newsletter started as an 8008 group and we really need to know whether we should continue any further support of 8008 base systems in either hardware or software.

Perhaps the response to our offering of this $2.25 package will serve to test the market. If we get an unfavorable response to our $2.25 offering of some very useful material to any 8008 owner, then perhaps we should forget any further efforts in this direction. Incidentally, besides being useful to anyone who has an 8008 system or a scientific calculator, it should be of interest to anyone who is considering a scientific calculator interface or considering Monitor 80,as we suspect that we will shortly see from Brother McGahee revisions to Monitor 80 including parallel I/O routines, scientific calculator software, and audio cassette software.

Sincerely,
MINI MICRO MART

Maury Goldberg

P. S. The material is available now for immediate distribution. I would like very much to hear from your readers and hobby clubs as to whether a market still exists for 8008 software and hard-ware. Owners of Mod 8's can update their system to 8080 or 6800 systems with our boards, but the Mark 8 user can't, and I suspect there are a lot of 8008 users who are perfectly content with their CPU. They should be heard from, however, if they expect Mini Micro Mart or any other vendor to put any real efforts in developing hardware or software strictly for the 8008 user.

Jeb Boswell, M.D., 29 Kenilworth St, Newton, Mass 02158 (617)969-2740 wrote to say " My present system is the Scelbi-8H converted to the 8D eith the help of the Digital Group's 8K RAM memory board which gives me 8K memory at much less cost than going to the Scelbi-8B. I have fixed up an adapter for the 8H to plug into the last memory slots on the Scelbi mother board. the Adapter will accept two of the digital group's 8K RAM cards, which will work directly with the Scelbi. The adater is made up of punched board, "Circuit-Stik" 22-pin edge connector patterns, a piece of aluminum cookie sheet, two small blocks of 1x2 white pine board, and wire wrap wiring (Wire wrap is great- first time I ever used it.) By making 6 connections on the mother board to otherwise unused con-nections on the memory board sockets (to bring the address lines to the 8K RAM boards), the Scelbi 8H is otherwise unmodified, and can be used with the stan-dard Scelbi 1101 1K RAM cards if there is any reason to go back to the origi-nal configurations. If anyone is interested, I have two fully populated Scelbi 1K RAM cards for sale as a result of the above modifications. The 1101s are Poly Paks, so no guarantee, but they worked for me for several months after replacement of bad chips. I would like to ask $75 for both cards. The cards will be sent for check clearance (10 days) or immediately with postal money order. I have the Digital Group TVT and Cassette boards, both operating. The TV monitor is a Motorola terminal. Keyboards are the original Dr. Suding diode matrix/TTL design, and the Digital Group Clare-Pendar. The Clare-pendar blew its keyboard chip, which was replaced by the Digital Group for the cost of mailing. (The fellow who answers the phone at Digital Group is laconic, but they sure produce.). ...I have a fast manual loader hardwired a la the Scelbi newsletter (now defunct) and a relay operated Baudot teletype loop. James Electronics is excellent. They left out part of my order, and immediately sent the item when queried. Solid State Sales and S-D also been excellent. Forget Micro Mini Mart. I have the Mod8 board and PROM and do not have time to fathom whats going on without adequate documentation. I can design better boards. My power supply is based directly on the NL information. Works beautifully cool even with 8K RAM. Future plans inculde implementing the programs listed in the various Scelbi manuals. Next time I write, I hope to have the Editor working. The Scelbi Manuals are very useful, once you adapt to the style. The one program I have developed myself is a keyboard to specific memory location. It lets me change any memory location by keying in the address and change or rapidly enter programs from the keyboard. Otherwise, I use parts of the Digi-tal Group's System relocated to high memory locations."

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SCELBAL - A HIGHER LEVEL LANGUAGE FOR 8008/8080 SYSTEMS

The goal of about ninety percent of small systems owners appears to be to get their systems up and running with some kind of I/O and then procure enough memory to support a higher level language.

Unfortunately in the past when a system owner reached the stage of having enough memory a major problem arose. Unless the individual had purchased an entire system from one or two select suppliers, the cost of a copy of a higher level language was likely to be out of reach!

Even if one was financially able to purchase a higher level language from an equipment manufacturer one was likely to find that such programs were designed to operate with specific I/O devices which the prospective language user might not have access to or desire to obtain. If one did not have those specific devices for which the program was designed, one was usually in a tough spot. Despite advertisements that such programs came "fully documented," the "full documentation" was not likely to include a source listing of the program. Hence, attempting to modify such a complex program was a risky, frustrating, and often downright impossible task. And, without doing so, one was hard put to make the language work with unique types of I/O devices. Furthermore, such programs could not practically be modified to serve the particular wishes of individual users. If you were not satisfied with the program and what the program author's had decided to emphasize or leave out, that was simply too bad!

Few "canned" programs can be tailored to have all the features desired by all the possible potential users. To attempt to do so would result in programs requiring more memory than users could afford. The answer to this problem is, of course, to supply the programs in such a manner that they can be readily modified and altered by the users.

This means, simply, that the detailed source listing for the program must be made available to the purchaser. Assisting the program owner by also providing detailed comments with the listing, a general overview of the program's organization and operation, and general flow charts can further enhance the value of the program to the owner. With this information available, the program user can safely proceed to tailor the capabilities of the program to serve the user's particular interests and requirements.

This is the approach SCELBI COMPUTER CONSULTING, INC., has taken in presenting its new higher level language for 8008/8080 machines. The language has been given the name SCELBAL for SCientific ELementary BAsic Language. As the reader can easily surmise from the title it is similar in capabilities to the highly popular language referred to as BASIC. This language was specifically developed to be able to run on 8008 based microcomputers. It is believed to be the first such higher level language to be made generally available that is capable of running in a system equipped with the ubiquitous 8008 CPU. The program can of course also be run on systems using the more powerful 8080 CPU though it is not as memory efficient as it could have been if the program had forsaken 8008 capability.

The language was developed to operate in an INTERPRETIVE mode. This means that the entire program resides in memory at one time along with the program written in the higher level language that is to be executed. When the INTERPRETER is given the RUN command it immediately proceeds to INTERPRET each line of the higher level language program and perform the necessary calculations and functions. This differs from a COMPILER which would first convert the higher level language source listing to machine code, then later execute the machine code.

A COMPILER oriented system generally is cumbersome to run on a small system that lacks reliable, high speed bulk memory storage facilities. For instance, if the program had been designed as a complier, the following steps would have been necessary in order to execute a higher level language program.

First one would have to load an Editor program into the computer and create the desired higher level language version of a program as a source listing. A copy of the source listing would then have to be saved on an external memory medium. Next, a portion of the compiler program - the actual compiler, would have to be loaded into memory. When it was resident, one would produce the desired machine code version of the higher level language statements by having the compiler process the source listing several times. (Much as an Assembler program would process the mnemonic listing when programming in machine language.) The machine code produced would have to be stored on an external memory device at this stage. Finally, the RUN TIME portion of the compiler would have to be loaded into the computer along with the machine code produced by the COMPILE portion of the program. The higher level language program would then finally be ready to run. Too bad if you made an error in the original source coding for the program that was not detected until run time. You would have to go all the way back to the Editor program to correct the higher level language source listing and start the process over again!

Developing the program as an INTERPRETER eliminates the requirement for the constant use of an external bulk memory device in order to get a program from the concept to execution stage. An INTERPRETER is definitely a much more convenient program for the small systems user. The entire INTERPRETER program resides in memory at one time. An area is set aside in memory to hold the higher level program. An executive portion of the program allows the user to enter the higher level language listing directly into the area where it will be operated on when

the program is executed. The executive in SCELBAL will provide for the user entering a program from a manual input device such as a keyboard. Or, if the user desires to run a program that has been developed previously, a LOAD command will direct the program to read in a program from an external bulk memory device such as a magnetic tape peripheral.

SCELBAL has been designed so that it can operate in a "calculator" mode or operate in a stored program mode. In the calculator mode, each statement is executed immediately after it is entered by the input device. In this mode, the program is ideal for solving simple formulas when the user only needs to obtain a few values.

When operating in the stored program mode, the INTERPRETER will follow an entire series of instructions as directed by the higher level program. To enter a program that will be operated on as a stored program, the operator simply assigns a line number at the beginning of each statement.

The executive portion of the package allows the user to "edit" a program at any time. Lines may be deleted and new lines entered anywhere in the program. If the operator makes a clerical error while entering a line, a special erase code may be used to effectively backspace within a line and then re-enter the correct characters. Furthermore, the executive checks for various types of syntax errors as statements are entered, and will display a two character error code to the programmer when such errors are detected.

The executive portion of SCELBAL has five major commands available to the operator which are defined and explained below.

SCR for SCRatch effectively clears out any previous program stored in the program buffer along with any variable values.

LIST causes the present contents of the program buffer to be displayed for review or to make a copy for record keeping if a printing device is in use.

RUN causes the higher level language program stored in the program buffer to be executed by the INTERPRETER.

SAVE. This command directs the program to save a copy of the program stored in the program buffer on the user's external bulk storage device. A program saved in this manner can later be restored for execution by using the following command.

LOAD. This command causes the program to read in a copy of a program from an external device that was previously written using the above SAVE command.

A higher level language program is made up of STATEMENTS that direct the machine to perform selected types of operations. The SCELBAL language can execute 12 different types of STATEMENTS which are explained below plus the END statement which is used to signify the end of a program.

The REM for REMarks statement indicates a comments line which is ignored as far as program execution is concerned. Information on a REMarks line is intended only for the use of programmers and is used to document a program.

The LET statement is used to set a variable equal to a numerical value, another variable, or an expression. For instance the statement:

LET X = (Y*Y + 2*Y - 5)*(Z + 3)

would mean that the variable X was to be given the value of the expression on the right hand side of the equal sign.

The IF combined with the THEN statement allows the programmer to have the program make decisions. SCELBAL will allow more than one condition to be expressed in the statement. Thus:

IF X <= Y THEN LL

states that IF X is less than OR equal to Y that the program is to go directly to line number LL. Otherwise, the program is to continue on to the next statement in the program.

GOTO directs the program to jump immediately to a specified line number. The GOTO statement is used to skip over a block of instructions in a multiple segment or subroutined program.

The FOR, NEXT and STEP statements allow the programmer to form program loops. For example, the series of statements:

FOR X = 1 TO 10
LET Z = X*X + 2*X + 5
NEXT X

would result in Z being calculated for all the integer values of X from 1 to 10. While SCELBAL does not require the insertion of a STEP statement in a FOR - NEXT loop, a STEP value may be defined. The implied STEP value is always 1. However, it may be altered to be an integer value other than 1 by following the FOR range statement by the STEP statement and a parenthesis containing the STEP size. Thus:

FOR X = 1 TO 10 STEP (2)

would result in X assuming values of 1, 3, 5, 7 and 9 as the FOR - NEXT loop was traversed.

GOSUB is used to direct the program to execute a statement or group of statements as a subroutine. The statement is used by designating the line number in the program where subroutine execution is to begin.

The RETURN statement is used to indicate the end of a subroutine. When a RETURN statement is encountered the program will return to the next statement immediately following the GOSUB state-

-1-   -2-   -3-

ment which directed the program to the subroutine.

SCELBAL permits multiple nesting of subroutines in a program.

DIM for DIMension is used to specify the formation of a one dimensional array in a program. Up to four such arrays having a total of up to 64 entries are permitted in a program when running SCELBAL. The statement:

DIM K(20)

sets up space for an array containing 20 entries. (Array size must be designated by a numerical value, not a variable.)

The DIM is an optional statement that may be left out of the program to provide additional program storage space in systems having limited memory.

INPUT is used to cause the program to wait for an operator to INPUT information to the program. After the information has been received, operation of the program automatically continues.

PRINT is used to output information from the program. Using the PRINT statement the user may direct the program to display the value of variables, expressions, or any information such as messages. The PRINT statement allows for multiple mixed output on a single line, and the option of providing a carriage-return and line-feed after outputting information or suppressing that function. For instance, the statement:

PRINT 'X IS EQUAL TO: 'X

would result in the program first printing the message 'X IS EQUAL TO:' and then the value of the variable X on the same line. After the value of the variable had been displayed, a carriage-return and line-feed combination would be issued. To suppress the issueing of the CR & LF the programmer would merely include another semi-

colon at the end of the statement! A comma sign in a PRINT statement will direct the output to start at the next TAB point in a line. A special function may also be called upon to direct the output to begin at a specified position in a line to allow for neat formatting.

The power of the language is further enhanced by the inclusion of seven functions that may be used in statements. The seven functions available in SCELBAL are discussed below.

INT returns the INTeger value of the expression, variable, or number requested as the argument. This is the greatest integer number less than or equal to the argument.

SGN returns the SIGN of the variable, number, or expression. If the value is greater than zero, the value +1.0 is returned. If the value is less than zero, the value -1.0 is returned. The value 0 is returned when the expression or variable is zero.

ABS returns the ABSolute value (magnitude without regard to sign) of the variable or expression identified as the argument of the function.

SQR returns the Square Root of the expression, variable, or number.

RND produces a semi-psuedo-RaNDom number in the range of 0 to 0.99. This function is particularly useful to have available for games programs.

CHR is the CHaRacter function. It may be used in a PRINT statement and will cause the ASCII character corresponding to the decimal value of the argument to be displayed. (A reverse function is available for the INPUT statement which will return the decimal value of a character when it is inputted.)

TAB may also be used in a PRINT statement to direct the display device to space over to the column number specified in the argument. This function allows the programmer to format the output into neat columns.

-4-

GENERAL INFORMATION

User defined variables are limited to one or two characters. A variable must begin with a letter of the alphabet. Limiting variables to a maximum of two characters helps conserve memory space. Up to twenty different variables may be defined in a single program.

SCELBAL allows the use of fixed and floating point notation. A minimum of twenty-three binary bits are used in the mantissa portion of all calculations allowing for six to seven significant decimal digits to be entered or outputted. The exponent range is from plus to minus the 38th power. Numbers may be inputted in either fixed or floating point notation. Output from the program is automatically selected to be either fixed or floating point, depending on the size of the number that is to be displayed.

The package, without the optional DIM statement, is designed to run in an 8K 8008 or 8080 system leaving approximately 1250 bytes for program storage. With this amount of storage available, surprisingly complex programs can be executed. The program authors have successfully loaded and run such games as Lunar Landing in this configuration by reducing the number of messages issued to the player.

The DIM statement requires approximately three pages of memory. It is recommended that the user desiring to include the DIM capability have more than the minimum 8K of memory available in their system. A particularly attractive feature of SCELBAL is that users with more than 8K of memory can use the additional space for program storage. Thus, for example, a 12K system will enable a user to execute SCELBAL programs having as many as 150 to 200 statements!

A major concern of the developers of SCELBAL was that the 8008 CPU might make the language so slow that it was impractical for the user. Our tests indicate

that the time to perform typical calculations, while they are slow compared with more powerful machines, are certainly tolerable. For instance, the typical response time between the displaying of a new set of parameters when running the Lunar Landing game is in the order of six to seven seconds. A program that calculates the mortgage payments on a house on a monthly basis, and displays such values as the payment number and balance after each payment, requires a few seconds between the displaying of each new line of information. A dice playing game responds with new throws of the dice in the order of a second or so when using a formula that includes the use of the random number generator. These times are by no means fast, but they are certainly adequate for the intended uses of this language on an 8008 system. The developers were pleasantly surprised with the overall speed performance of the package. Of course, these response times can be cut almost in half by using an 8008-1 CPU. Naturally, if the program is installed in an 8080 system, the response time is improved an order of magnitude.

Since the program will be supplied in the form of a publication that includes a complete highly commented source listing (as well as assembled object code for both the 8008 and 8080), the user who desires to modify or expand the capabilities of the basic package will be in a position to do so. It is felt that the availability of such a powerful program in this form will greatly enhance the general usefulness of small systems and open new vistas to users. The program in this form should also be of considerable value to educationalists who desire a good reference framework from which to introduce students to the development of similar packages.

The publication will be made available in June, 1976, by the developer, Scelbi Computer Consulting, Inc., 1322 Rear Boston Post Road, Milford, CT 06460.

Book Price: $49.00

THE CASSETTE INTERFACE, NAKED RAM, AND 8080 MICROPROCESSOR BOARD ARE ALL PARTS KITS USING TOP QUALITY
PARTS, SOCKETS, AND BOARDS. EASY ASSEMBLY IF YOU KNOW HOW TO SOLDER AND CAN FOLLOW DIRECTIONS...OR IF
YOU DON'T HAVE TIME TO DO IT YOURSELF, WE SELL ASSEMBLED VERSIONS FOR 35% OVER THE KIT PRICE

Cassette Interface $72

This cassette interface has two parts: the hardware to talk to the cas-
settes, and the software to do so intelligently. Our cassette inter-
face board comes with 512 bytes of ROM software---enough software to
talk to three cassette machines simultaneously, run an RS-232/TTY in-
terface, and use the on-board RAM (again, 512 bytes worth) as data
buffers when you're reading into and from memory.

Although this board contains all the software you need, not all the
hardware is implemented. This way, you can start off with our basic
board, and expand it as your capabilities and system complexities in-
crease. For example, the basic board only talks to one cassette ma-
chine; but you can add two more cassette channels for only $12. Other
options include TTY interface hardware, and a general purpose, 8 bit
I/O port. There's room for all these options on the board; all you
need to add are the parts for implementation. No kluges required for
upgrading!

PLEASE NOTE: The software in the cassette interface starts at $000
hexadecimal. Also, there are certain default addresses (I/O address
4, 5, 6, and 7). But since this is all EROM anyway (therefore program-
mable), we can make any changes desired for special system require-
ments: please note them on order form or separate sheet.

ALTAIR 8800/IMSAI compatible, plated through holes, sockets for all
ICs, industrial quality PC board, onboard +5 and -12V regulation, same
size as an ALTAIR card.

PLEASE NOTE: CASSETTE INTERFACE AVAILABLE APRIL 1st.

CASSETTE INTERFACE BASIC BOARD.....................$72.00
2 EXTRA CASSETTE MACHINE CHANNELS..................$12.00
TTY INTERFACE HARDWARE.............................$ 5.00
I/O PORT HARDWARE.................................$ 6.00

4k x 8 Naked RAM $79.95

This 4k x 8 RAM board is compatible with the JOLT system---same size
card and connector scheme --- but is also electrically compatible with
other 8 bit machines using a bi-directional buss. Uses 2112 memories
and draws little current: only about 700 mA. The board is industrial
quality, and a compact 7 by 4.25 inches. And we really took advantage
of the double sided/plated through holes aspect of the board: all the
heavy trace concentrations are on the top side of the board (where you
don't solder), so the soldering on the bottom side of the board is much
simplified...none of this solder bridge stuff. Includes TI low-profile
sockets for easy assembly, as well as instructions and a logic print of
the unit.

These boards do not have buffers. What does this mean to your system?
Although the DC characteristics are less than 1 mA load on any line,
there are approximately 100 pF of capacitance on the 8 low order address
lines and 50 pF on the data lines...so the AC characteristics are a
little tougher than standard TTL. However --- starting May 1st, we'll
be offering a slightly larger board that has address buffers and data
transceivers. This will allow you to hang 65K of memory on a JOLT,
Non-buffered boards allow 16K of memory, which means you can hang four
of our NAKED RAM boards on a JOLT system...and unless you're a very
fast programmer, that should hold you until May 1st.

Finally, the NAKED RAM connects into your system using the popular 3M
style flat cable 40 pin connector, which is not supplied with the kit.
However, we do stock AP connectors. For $20 we send you (2) male
headers which solder into the board and (1) molded cable assembly,
consisting of 2 female connectors connected together by a 3" piece of
flat cable. These AP connectors have one especially neat feature:
there are small holes on the outside of the connector so that you can
probe the signal lines, which sure makes life easier if you need some
test points.

8080 Microprocessor
Board (s) $139.95

AVAILABLE MAY FIRST. Actually, we're talking about two boards here:
the "Bigger Board" and the "Smaller Board". They have more similari-
ties than differences, so we'll cover the common areas first:

Both are 8080 based systems with a crystal driven 8224 clock driver,
using 8192s as address buss drivers and data out buss drivers, and an
8212 as a receiver for the input buss. There are also a number of in-
novations...such as

**Onboard 8 X 32 ROM plus associated circuitry allows the microproces-
sor to be halted properly, so that the state of the machine (that is,
registers, flags, stack pointer, program counter) are preserved at the
keypad control panel. Once halted, the micro, processor executes a pro-
gram in the on board EROM and allows the user to examine and alter all
registers of the microprocessor --- just as if you were at the front
panel of a minicomputer. This program also accurately simulates a
step function, allowing the user to run through programs one step at
a time. Either in step or continue, the original or user altered con-
tents of all the registers and flags are restored to their original
state before control returns to the user's program.
**16 key calculator type keypad and nine 7 segment readouts allow you
to painlessly load and examine memory. Unlike some machines that only
let you examine next, with this board you can also examine last, al-
lowing you to retrace your steps --- catch errors, makes life easier
when debugging. Tape recorders have always had rewind as well as fast
forward; now your 8080 does too.
**In the on board EROM, there's software for an RS-232/TTY interface,
and there's room on the board for implementing the hardware for this
interface.
**The buss is four 50 connector 3M style flat cable connectors, ar-
ranged in such a way that with the aid of a paddle connector, this CPU
can plug directly into the edge connector of an Altair type buss.

DIFFERENCES BETWEEN THE TWO

"Smaller Board"---card size 6.25"x15", which just by coincidence re-
places both the CPU board and front panel of an Altair 8800, fitting
in exactly the same area. When used in this manner, you have a cure
to many of the problems experienced with other microcomputers: no over-
loaded address busses (LEDs being incorrectly driven), no one-shot
driven clock pulses, no erratic front panel instruction execution, and
none of that ready line problem either. Although this board isn't ex-
pandable on board like the "Bigger Board", you can expand by using
standard Altair sized boards from companies like MITS, Godbout, Proces-
sor Technology, Cromemco, or other "second source" RAM and ROM boards.

"Bigger Board"---won't fit into the Altair front panel anymore, it's
too big...but still plugs into the Altair buss. The extra board space
buys you room for 1K of RAM, 4K of ROM, and two cassette interfaces
for mass storage. If you're looking for a board that can be expanded
at a later date, then this one is the correct choice for you. We al-
so have options:

CASSETTE INTERFACE (talk to two machines)..............$30
EDITOR/ASSEMBLER programmed in EROM....................$99
HARDWARE FOR RS-232/TTY INTERFACE......................$20

8080 Chip Set

The 8080 has become the de facto industry standard as
more hobbyists and companies use them in systems. We
have tried to make things a little easier for you by
assembling the support stuff and the 8080 in the same
place at the same time; the chip set includes:

1- 8080 8 bit CPU
1- 8224 Clock driver
1- 18 Mhz crystal
1- 8212 I/O buss receiver/latch $44
4- 8T97 hex tri-state buss drivers

...And an application schematic.

MICROPROCESSORS

In addition to the "industry standard" 8080, we're happy
to offer two new up-and-coming microprocessors. For data
see below:

8080 $24.95 A popular 8 bit CPU.
SC/MP $22.00 DATA PACKET $3.50 EXTRA   National's new
8 bit, CMOS/TTL compatible CPU Designed for super easy
use, especially for applications where a conventional CPU
would be too complex or costly. With application note.
SBP0400 $35.00 New from Texas Instruments: a 4 bit, I²L
bit slice microprocessor.

Programming Service

1702A	8 X 256 EPROM	$7.50
5203	8 X 256 EPROM	7.50
5204	8 X 512 EPROM	10.00
5600/10	8 X 32 PROM (MANUFACTURER: INTERSIL)	4.50
6330/31	8 X 32 PROM (MONOLITHIC MEMORIES)	4.50
82S126/129	4 X 256 PROM (SIGNETICS)	6.00
82S130/131	4 X 512 PROM (SIGNETICS)	7.50
74S287/387	4 X 256 PROM (TEXAS INSTRUMENTS)	6.00

All our programming is done with an intelligent PROM
programmer made by Pro-Log

We provide FREE hexadecimal coding forms to users of
our programming services Please send SASE to defray
postage costs

BOOKSHELF

Find out how to apply all these new whiz-bang parts with
our various data books Please include enough for post-
age (any excess refunded)

SC/MP DATA PACKET---EDITED FROM THE NATIONAL VERSION
$3.50

8080 USER'S MANUAL---THE BOOK FROM INTEL. $5.00

SBP0400 DATA PACKET---NEW FROM TEXAS INSTRUMENTS. VERY
COMPLETE, TOO. $2.50

8080 ASSEMBLER, EDITOR, MONITOR SOFTWARE LISTING $6.50

8080 MICRO-MONITOR SOFTWARE LISTING $3.50

SIGNETICS 2650 USER'S MANUAL---FROM SIGNETICS $5.00

PACE DATA PACKET---EDITED FROM THE NATIONAL VERSION
$2.50

HELP WANTED

Many times computer hobbyist companies have no way of
knowing what the response will be to a new product in-
troduction. So, the standard procedure --- whether ad-
mitted or not---has been to announce a product, collect
orders on it, and if the response is good, the company
gets the product together...hopefully before people be-
gin complaining

We don't think this is a good way to approach things,
so we're going to try a new method. Listed below are
4 products we're considering for introduction this year
with each one identified by a number. On the order
form on the other side is a "ballot". Rate the 4 pro-
ducts in order of your interest, with 1 being the one
that interests you the most, 2 the one you like second
best, and so on. Feel free to add comments, we'd like
to know what you're looking for.

#1 8K ROM board for JOLT systems, target price, $60
Sort of a "Naked ROM" board, using 5204s.

#2 Motherboard/Power supply for Altair/IMSAI machines,
target price $130. Some neat features 12A transform-
er/diodes/filter caps bolt on circuit board---no wires;
solder mask prevents edge connector solder bridges;
massive ground plane and other extras

#3 16K Static RAM board, ALTAIR/IMSAI compatible
Target price about $300, but memory prices are so vol-
atile that figure is very tentatively given.

#4 Low cost (under $225) floppy disc interface for Al-
tair/IMSAI machines.

Free Public Service

LEARN HOW TO STOP A MICROPROCESSOR...applicable to 8080s,
SC/MPs, 6502s, etc. This scheme is a spinoff from the
8080 Microprocessor Board...it allows you to start or
stop a microprocessor and examine or alter the registers
of the processor, just as if you were at the panel of a
minicomputer. In fact, this trick eliminates one of the
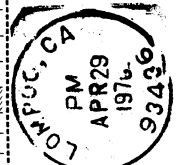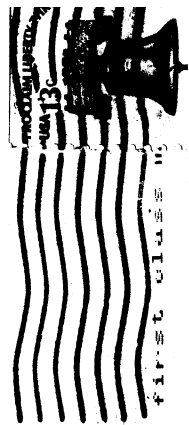major differences between a micro and a mini.

If you send us a self-addressed, stamped envelope, we
will send you the complete story on learning to stop mi-
croprocessors. You don't have to buy anything, just
send the SASE and your name and address.

GUARANTEE
Satisfied
customers
are worth
more than
money, and we want to keep you happy. We will re-
place, refund, or repair---your choice---if something
doesn't match your expectations. Sorry, we cannot
be responsible for user-inflicted injuries.

TERMS: Californians add tax; no COD orders. Please add
shipping for our data books; otherwise, we pay postage.
BANKAMERICARD customers are welcome. Please print care-
fully and give your street address if possible.

MORROW'S
Micro-STUFF Order Form

Order Form

SHIP TO:
NAME
STREET
CITY   STATE   ZIP

QUANTITY	Part Description & No.	Unit Price	TOTAL

BANKAMERICARD
SIGNATURE
ACCT. #   EXP
BILLING ADDRESS
CITY
STATE   ZIP

TOTAL	
SHIPPING	
Cal. Res. add Tax	
GRAND TOTAL	

"HELP WANTED" BALLOT: Please rate the four products in or-
der of preference, as explained on the other side under "Help
Wanted". THANK YOU VERY MUCH for your opinion.

PRODUCT	RATING
#1 8K ROM Board for JOLT	
#2 Motherboard/Power supply for Altair, IMSAI	
#3 16K static RAM board for Altair	
#4 Floppy disc interface	

MORROW'S BOX 6194 ALBANY, CA 94706
Micro-STUFF

8080 Micro-Monitor

What we've done is taken a 5204 EROM and programmed it
with some software for your 8080 With this software,
you may:
---Examine and fill memory
---Punch and read paper tape $22
---Branch to, and recover from, programs

This is a convenient little IC for computer hobbyists.
Our package consists of the programmed 5204 as well as
a complete software listing

SUPPORT ICs

8224	8080 CLOCK DRIVER WITH GATED READY AND RESET	$9.00
8212	8 BIT I/O BUSS RECEIVER/LATCH WITH INTERRUPT REQUEST FLIPFLOP AND TRI-STATE OUTPUTS	$4.50
8205	8 LEVEL DECODER WITH TRIPLE ENABLE INPUTS	$1.75
74273	8 BIT LATCH WITH CLEAR	$1.75
74LS273	SAME AS ABOVE, BUT LOW POWER SCHOTTKY	$2.25
8T97	3 STATE HEX BUSS DRIVER WITH HI Z PNP INPUTS AND 30 LOAD OUTPUT DRIVE CAPABILITY	$1.45
74S287	4 X 256 HIGH SPEED PROM WITH TRI-STATE OUTS	$4.50
74S387	SAME AS ABOVE, BUT OPEN COLLECTOR OUTPUTS	$4.50

MICRO-8 USER GROUP COMPUTER CENTER
CABRILLO CONSTELLATION ROAD
4350 CA 93436
LOMPOC,

first class

MORROW'S MICRO STUFF

PM APR 29 1976 LOMPOC, CA 93436

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Proposed Micro-8 Publication Schedule

Issue # 7 -- middle of Sept.   These publishing dates may be
      # 8 -- middle of Oct.   moved up if some very timely
      # 9 -- middle of Nov.   information or articles come in.

SCCS Newsletter Reprinting Service

Consideration of the SCCS newsletter reprinting service was on the agenda for the last board of directors meeting but some very important business is suppose to have tabled all scheduled agenda items so we will have to wait for word on whether they feel they can support this idea.

Experience With Suppliers

I just got thru placing several hundred dollars worth of component orders and thought I'd report my results:
1) Solid State Music, 2102A Walsh Ave., Santa Clara, CA 95050
   Fantastic 5 day service. All items received except some 74LS157's which were not in the catalog but which I ordered anyway. The 5320 National TV synch generator chip only cost $4.95 and James has it listed for $18.95. Burgoon's boards and kits receive universal acclaim. This is where I intend to do my business in the future.
2) Electronic Discount Sales, 138 N. 81st St., Mesa, AZ
   Fantastic 6 day service. I ordered the TCH cassette interface kit for $28.50. It came with a good quality plated-thru PC board, all IC's, resistors, and capacitors packaged and identified with the schematic part numbers and 2 unit select relays (12 volt). Certainly beats trying to round up all the parts by yourself. Their TV II kit at $115 may be a super buy.
3) S. D. Sales, PO Box 28810, Dallas, TX 75228
   Excellent 7 day service. I ordered 2102-1's at 8/$12.95 and asked if there were more 1702A's available. I received Signetic 21L02-1's and a free 1702A and data sheets on each. You can't argue with service like that!
4) Bill Godbout, Oakland Airport, CA 94614
   Twelve day service and a real loser! I ordered 8 standard catalog items and they were out of 4 of them. Which ones? The ones I placed the order for in the first place, naturally. And how can you run out of 14 and 16 pin IC sockets? I have heard that there is a reliability problem with one version of his 4K Altair memory board.

Factory Prototyping Kits Are Great But Where Do You Get A Teletype?

One of the most exciting developments that will certainly benefit the computer hobbyist is the rapid proliferation of manufacturer's single board prototyping kits priced very attractively. Some Examples:
1) MOS Tech KIM ($245 assembled) 2) Fairchild F-8 ($185 assembled, $145 kit) 3) AMI 6800 ($149 partial kit, club purchase) 4) National SC/MP Kit ($59) 5) Intel SK 8080 ($399 ?), etc.

The biggest hangup the hobbyist has in utilizing these fantastic buys is that each has a monitor that requires use of a 20 ma current loop TTY and how many of use have one of those or the $1000 to get one? The monitors can be changed but that entails reprogramming and reburning PROMs. Adding a UART and current loop I/O to an existing TVT design is complicated and ends up costing close to $300 plus.

What we need is a cheap but versatile TV set video driver that will take a 20 ma current loop TTY. Rumor has it that RCA and maybe some other companies will soon announce TV video driver chips that will make the job easy but I'll believe that when Solid State Music stocks them. I would like to be the first (but a little competition would be welcomed) to announce a design for a device that meets the following specs for under $125 (hopefully under $100). Anyone willing to accept the challenge?

El Cheapo Glass Teletype Specifications

Display - 16 lines of 32 or 40 characters with full scrolling & cursor
           Reset button clears screen
           Received character codes:
               Erase to beginning of screen
               Erase to beginning of line
               Backup cursor 1 character
               Carriage Return & Line Feed
Inputs   - Reset Pushbutton
           7 ASCII lines & keyboard strobe (negative logic)
           20 ma current loop receive (110 baud standard)
Outputs - 75 ohm composite video output
           20 ma current loop transmit (110 baud standard)
Power   - +5, -12, (+12 if necessary)
Other features desirable (but not necessary)
           Upper/lower case
           Selectable baud rate
           Speaker for received bell code
           Selection of character line width (32/40/65 char/line)
           20 or 24 lines
Price   - PC board and all components (IC's preferably socketed)
           Under $125 --- (Preferably under $100)

SWTPC 6800 Computer Newsletter

If you have an M6800 system you will definitely want to write Southwest Technical Products Corp., 219 W. Rhapsody, San Antonio, TX 78216 and ask them how to get a copy of their newsletter. The first is 50 pages and contains source code for an editor and micro-BASIC written by Robert Uiterwyk, 4402 Meadowwood Way, Tampa, Fl 33624 and Bill Turner as well as a bunch of other interesting programs. Their new graphics terminal looks neat but watch the fine print. It looks to me like you have to take the timing signals from the SWTPC TVT-II.

Robert Legge's Visit To The US

Robert of Sao Paulo, Brasil stopped and visted many participants and companies on a swing around the US. He even visited us in Lompoc! (Where in the world is Lompoc?) He is heading back to Brasil with an F-8, SC/MP and hopefully a Digital Group Z-80 system. I'm sure he will be yelling for help to get all that stuff running soon. When he does, please send letters to him by airmail or they will take months to get there.

SUBSCRIPTION FORM
(Copy if you don't want to mess up NL)

[ ] ....Volume 1 back issues 1 thru 4 $3.50
                 (56 mice-type pages)
[ ] ....Volume 1 back issues 5 thru 12 $6.00
                 (186 mice-type pages)
[ ] ....Volume 1 combination 1 thru 12 $8.00
                 (the principal is on my back because we have
                  too many boxes cluttering up the computer center)
[ ] ....Volume 2 issues 1 thru at least 9 $6.00

Name_____

Address_____

_____

Zip _____

Telephone No. _____
          (may be published -- leave blank if you prefer)
Please also include a little note describing your equipment, plans for
the future, experience, etc.   Thank you.

Computerizing A TV Game by Gary Schober

The following information covers the computer games system I demonstrated at the last ACG meeting. The game is a General Instruments AY-3-8500-1, which is preprogrammed to play six games; tennis, hockey, squash and practice or rifle shooting. To the basic circuit, I added the colorizer and KIM I/O circuitry. The output of the colorizer circuit will drive the video input of a standard color monitor. Note that additional circuitry is required to interface the unit to a color TV receiver.

The game can be interfaced to the microcomputer so that the computer assumes the role of the opponent and you can play against the computer. Warning; it is very difficult to beat the computer! The KIM program is listed below. The program is easily loaded using the keyboard/display on the KIM computer. Have fun!

TV Game Program   6502-KIM

Label	Address	Op Code		Comments
SETPIA	0100	A9 01	LDA	LOAD 01
	0102	80 01 17	STA	SET UP I/O: PA7=Ball (input)
				PA6=Bat (input)
				PA0=Output (error)
BALLCK	0105	2C 00 17	BIT	Test for Ball (PA7=1)
	0108	30 02	BMI	To Output ones; if N=1
	010A	70 00	BVS	To Output zeros; if V 1
	010C	A9 FF	LDA	Load PA0 with one
	010E	8D 00 17	STA	Store in PIA @ 1700
Batchk	0111	2C 00 17	BIT	Test for bat yet?
	0114	10 03	SPL	To output zeros if N=0
	0116	4C 05 01	JMP	Jump back to BALLCK
	0119	A9 00	LDA	Load PA0 with zero
	011B	8D 00 17	STA	Store in PIA @ 1700
	011E	4C 05 01	JMP	Jump back to BALLCK

PIA = 1700   PA7 = Ball Input   PA6 = Bat Input   PA0 = Output
(Note: the printing in my copy was rough. What you get is what I could see when I retyped it and redrew the schematics. See ELECTRONICS, June 24, 1976 for a fascinating article on video games -- must reading!)
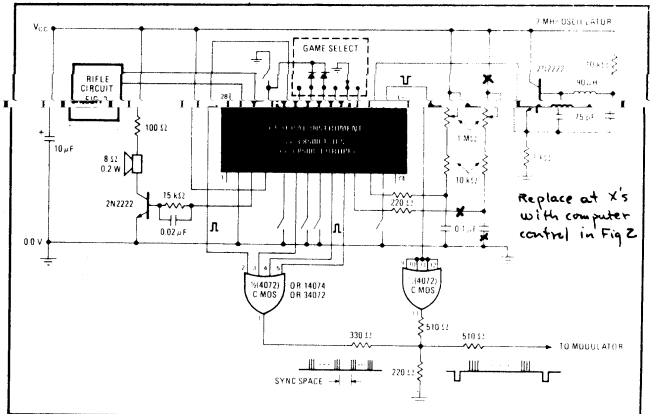
1. Play chip. With General Instrument's n-MOS chip it is possible to build a six-game video display unit with only a few outboard circuits: an oscillator for clock pulse, two pots for paddle control, loudspeaker, and video processing circuits, plus a video modulator (not shown)
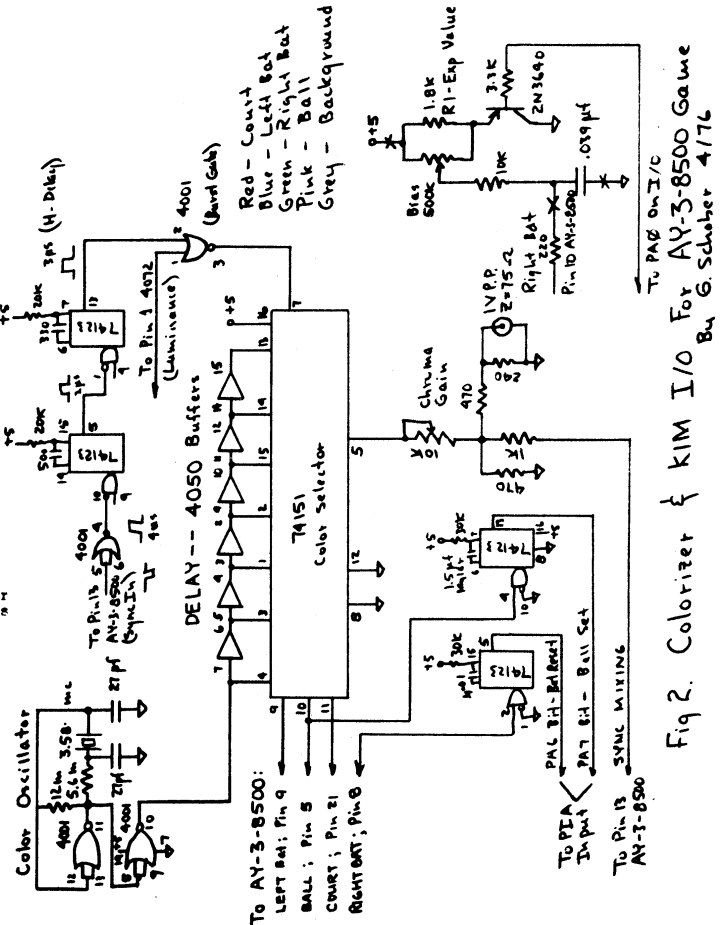
Replace at X's with computer control in Fig 2

Fig 2. Colorizer & KIM I/O For AY-3-8500 Game
By G. Schober 4/76

IMPLEMENTING A SOFTWARE CURSOR
FOR A SUDING/D.G. TV READOUT

Soon after the initial enthusiasm of toying with a Suding/ Digital Group TV readout has worn off, the inevitable question will come to mind -- WHERE IS THE CURSOR? Am I going to have to count off the spaces? #7&*@#% ! The Suding TV readout presents to the hobbyists one, if not the most, inexpensive forms of output available today. Its only drawback being the lack of a cursor. A simple solution that has been proposed is filling the screen with periods rather than blanks on a home erase command -- so a dot marks the spot. We shall explore a more acceptable approach at obtaining a software cursor.

Recognition is in order to Phil Mork for his suggestions and modifications to the earlier Suding TV Readout (See Digital Group Clearinghouse Vol 1. No. 1). These modifications have been incorporated in the present generation of TV Readouts. The mods basically allow the moving the "invisible" cursor forward without writing or erasing. This allows the positioning of this "invisible" cursor anywhere on the screen, thus creating a so called "pseudo" cursor. Now, if we could only see it!

All we need is a little software! The procedure is as follows:
1) We define our cursor to be an ASCII underscore "_" (337_8);
2) Everytime a character is to be inputed, the cursor is written on the screen and then the "pseudo cursor routine" is called upon to advance the invisible cursor 511 positions. Thus the input will overwrite the visible cursor! Simple, right? It should be obvious that the cursor is only effective and needed when inputing from the keyboard. The program output does not need it, only the human at the keyboard. Therefore, any cursor routine such as this one should be tied to the keyboard input routine only. When the input routine is called, it will output the visible cursor and then reposition by advancing 511 spaces, then the routine should fall through to the regular input routine. Now admit it, it is simple!

Below are 8080 listings for the software solution to the problem:

LINE	ADDRESS	BY1	BY2	BY3	LABL	OPERATION	COMMENT
0010	006 000	305			CURS:	PUSH B	Save register status
0020	001	076	337			MVI A,"_"	Load cursor
0030	003	315	372	000		CALL WRCHR	Write it on TV
0040	006	001	377	002		LXI B,255,2	Load B,C w/no. of
0050							spaces pseudo cursor
0060							is to advance
0070	011	315	036	006		CALL PSCUR	Advance pseudo cursor
0100	014	301				POP B	Restore register used
0110	015	333	000		IN :	IN 0	
0120	017	376	200			CPI '200'	Strobe present?
0130	021	372	015	006		JM IN	Wait for strobe
0140	024	365				PUSH PSW	
0150	025	333	000		NIN :	IN 0	

LINE	ADDRESS	BY1	BY2	BY3	LABL	OPERATION	COMMENT
0160	006 027	376	200			CPI '200'	Strobe present?
0170	031	362	025	006		JP NIN	Wait for no strobe
0200	034	361				POP PSW	
0210	035	311				RET	
*							
*		076					
0220	006 036	076	001		PSCUR:	MVI A,1	Load cursor advance
0230	040	315	372	000		CALL WRCHR	Output it
0240	043	015				DCR C	
0250	044	302	036	006		JNZ PSCUR	Advanced one page?
0260	047	005				DCR B	
0270	050	302	036	006		JNZ PSCUR	Advanced all?
0300	053	311				RET	
*							
*							
0310	000 372	323	000		WRCHR:	OUT 0	Output to TV
0320	374	257				XRA A	Clear A
0330	375	323	000			OUT 0	Output to clear
0340	377	311				RET	

Some of these routines (IN, WRCHR) are very likely to reside in your present system so the routine is not as long as it first appears. Next month a 27¢ modification to the readout will be presented which will cut the software overhead required for the cursor routine by half. If in the meantime you have any questions feel free to contact me--Roberto Denis 11080 N.W. 39 ST. Coral Springs, FL 33065

Dear Hal:

I had the pleasure of witnessing The DIGITAL GROUP's presentation in Milwaukee on 22 May and Chicago at the CACHE meeting on 23 May. I was very impressed with many aspects of their operation.

They have a very clearly defined and explicitly stated set of technical and business philosophies. Much of it is contained in their literature. They have an approach that is going to provide total performance to their customers; the whole will be greater than the sum of the parts, it seems to me.

Contrary to most designers - who start with a CPU chip and design outwards from it (good industrial practice) - Dr. Suding, based on his experience in ham radio and his appreciation for the hobbyists needs, has started with the peripherals and designed inwards towards the CPU. This has a number of very important results.

1) CPUs come and go, but your peripherals live on forever - well, almost. The outside in design approach means that a new CPU does not obsolete all your peripheral interfaces. If you decide to upgrade your CPU, you don't have the tremendous expense and trouble of changing everything else.

2) A major expense for a system is memory. If you have bought good memory chips to begin with, changing the CPU will not affect your memory boards. The bus for the memory is not dependent upon special characteristics of the CPU, so again, you can change the CPU without having to reinvest in new memory boards.

3) To change to a different or new CPU means changing only one board. Everything else works just as before. Of course, the software may be different and we are always talking about 8-bit systems.

All the CPU boards in their system come with EROM and 2K of RAM. As soon as you turn on the power it displays a message telling you to load the operating system cassette. This done, you can immediately use the keyboard to enter programs or select a demonstration program already on the cassette that comes with the system. Right away your wife and kids can use the computer themselves. That's the kind of total performance I like - it helps in buying 8K more memory soon!

During his discussion, Dr. Suding switched from one CPU to another to another and had each up and doing things in the time it took to speak only a few sentences. All it took was swapping the CPU cards and the operating system cassettes. An ordinary home cassette recorder of reasonable quality is all that is needed. Both the "3-board system" (2K of RAM) and "4-board system" (10K of RAM) come with a cassette interface (110 baud) and a TV-monitor interface. Both of these systems include a mother board and an I/O board with 4 input and 4 output ports. The user has 2 7/8 input and 2 7/8 output ports available for his use.

SPEECH TECHNOLOGY CORPORATION

Thank you for your inquiry on the Model 200 Voice Generator. A product bulletin and price list are enclosed.

You will note that the Model 200 contains a general-purpose vocabulary suited to many system and instrumentation applications. It is easily interfaced with 7 or 8--level parallel data sources, such as tape-punch interface, or (with optional RS-232 interface) to serial data sources, such as a Teletype controller.

However, the technology and functional elements of the Model 200 lead to tailored configurations of extraordinarily low-cost. For example, a multichannel voice-generator, operating from computer-stored vocabulary data, can be supplied at less than $500 in 100 quantity (with single voice channel). Additional voice channels, operating simultaneously and independently from the same vocabulary, can be supplied at about $200.

The standard Model 200 is deliverable in two weeks. Optional serial interface and memory extension can be delivered in six weeks.

Please call or write me if you would like further information.

631 Wilshire Blvd.
Santa Monica, CA 90401
(213)393-0101

Yours sincerely,

John E. Stork
President

Page 2

Two important aspects of the DIGITAL GROUP's business philosophy the hobbyist should be aware of are:

- They do NOT formally announce a product until it is ready to go into production and can be delivered as advertised. (Of course, a forthcoming shortage of common IC types that some are predicting will foul up all our suppliers.)

- They provide many options in their catalog. This can be confusing, but it does allow you to save money by using things you already have.

I built my "3½" board system over Memorial Day weekend. (I already had a bunch of 91L02s on order from another source, so I got the 3-board system plus the memory board with everything except the memory chips.) I worked slowly and carefully. It took 15 3/4 hours to assemble the boards. In all my double and triple checking, I still managed to assign the I/O ports to 60 - 63 instead of 0 - 3. As soon as I corrected that error the message "Read 8080 INITIALIZE Cassette" appeared. Very satisfying! I did find that the clock frequency was not quite right and sometimes did strange things. It appears that the crystal is marginal and at the time of writing this letter they are sending me a replacement.

So far, I am very well satisfied and it looks like I will continue to be. This is because of their total performance package. First I will spend considerable time with their "EDUCATOR" software cassette package. This shows the contents of the CPU registers in such amanner that you can readily see the effect of each mnemonic machine language command as it is entered. It should really enable me to learn the 8080 command set. Then I will begin working with their "TINY BASIC EXTENDED" cassette and have some fun with their game cassette packages. In each case, all I have to do is pop in the cassette and the monitor screen will tell me what choices I can make on the keyboard. Incidentally, the operating system cassette contains routines to test memory, test the CPU interrupt handler, and to make the system perform as a frequency counter, as well as cassette read or write, keyboard program, register, flag and stack pointer display, and storage dump.

They have other products I saw in operation - the Zilog Z80 CPU, half a megabyte of storage on two Phi-decks (built to Dgital Group specs) complete with its own operating system, and others. The Zilog looks fantastic! Dr. Suding apparently was the first peron in the country to have the Zilog going in a system - it was just 3 weeks after the factory made its first chips.

Now that the DIGITAL GROUP has started to advertise (June magazines) and their volume picks up, it will be interesting to see how they manage themselves. I expect they will encounter many of the difficulties that other new, successful companies in this hobby business encounter. They do have interesting products and appear to have a unique approach.

Yours truly,

Charles F. Douds

RICHARD GATES, PO BOX 756, KENTFIELD, CA 94904
I HAVE AN ALTAIR 8800 WITH 20K, CASSETTE INTERFACE, TTY INTERFACE, BYTESAVER, AND A DISK SYSTEM COMING UP IN THE FALL. I TEACH EDUCATIONALLY HANDICAPPED STUDENTS AT THE HIGH SCHOOL LEVEL AND USE THE ALTAIR AS A MOTIVATIONAL TOOL.-NON READERS AND POOR WRITERS AS WELL AS KIDS WITH LOW MATH SKILLS, NO LOGICAL THINKING ABILITY-REALLY DIG THE COMPUTER AND IN THE PROCESS OF PLAYING GAMES, TYPING RESPONSES, LEARNING A LITTLE BASIC , ETC.. . ARE IMPROVING ALL OF THE ABOVE SKILLS THAT EVERYONE HAD GIVEN UP ON THEIR LEARNING LONG AGO!!
MY PROBLEM IS THAT I DON'T KNOW MUCH , IF ANYTHING ABOUT COMPUTERS-EITHER HARDWARE OR SOFTWARE. AS A RESULT A LOT OF COMPUTER POTENTIAL IS BEING WASTED. I NEED ALL THE HELP I CAN GET IN OBTAINING PROGRAMS THAT WILL BE USEFUL IN THE SETTING I JUST DESCRIBED. "THE QUICK BROWN FOX" IN THE APRIL ISSUE OF INTERFACE IS A GOOD EXAMPLE OF WHAT I NEED. ALSO, I NEED TO FIND SOME PEOPLE IN MARIN COUNTY . WHO WOULD HELP ME GET THE SYSTEM UP WHEN IT BOMBS. WE LORE A LOT OF VALUABLE TIME BECAUSE OF MY LACK OF TECHNICAL KNOW HOW.
ALL SUGGESTIONS WILL BE GREATLY APPRECIATED.

Richard Anderson, 1000-B Lund St., Austin, TX 78704 (512) 441-2655
is just getting started with computers but has been working as a microwave radio repairman. He is now a geologist with the Univ. of Texas and his first system will be an AMI 6800. He is interested in seeing more about vocal output.

TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

May 20, 1976

Dear Hal,

Sorry not to have written in such a long time. First, I'll compliment you on the continuence of the NL and its tremendous usefulness to the hobbyist.

I've finally completed work on my Monitor and Loader Program for the 8008 along with full documentation of the source code and hardware add-ons. As indicated in the enclosed "ad" which you may wish to run in the NL, I am offering a 47 page Packet to interested readers for $7.50 postpaid. In writing the program, I've tried to make all commands as easy to use as possible and still stay under 1K memory usage. If you'd like, I'll send you a free copy in appreciation for what you've done for us hobbyists.

Although the program development itself took only a week, the write-up of the source code required nearly a month of sporadic typing. Hence, I've decided not to release my 4k text editor TEXTED to the public as hand assembly and documentation of the source code is too time consuming. I know this is exactly the type of software people are looking for, but I cannot take the time from my other work to prepare it. Any suggestions on how to distribute such programs would be appreciated.

I finally gave up on my Sudding Cassette circuit and purchased a National Multiplex Corp. CC-7 Digital Data Recorder ($149.00 -- see ads in BYTE). Delivery time by UPS was great -- only 8 days. And, the unit has performed flawlessly at 300, 600, 1200, and 2400 baud. After several long dumps and recoveries of an entire 12K at this latter rate, I feel confident to use 2400 baud for all my storage. They have also announced the CC-7A which has a variable motor speed control allowing for the matching of one recorder to another of the same or different users. ($169.00 I think).

Scelbi's Galaxy Game for the 8008/8080 is really great! Running in 4K, it embodies nearly all the commands and excitement of the BASIC and FORTRAN versions of STRTRK. Their well documented book is available for $14.95. See the ad in BYTE for details.

The best news for me is that I've finally entered into a purchase contract for DEC's new DATASYSTEM 310 W word processing system for use in our real estate business. Based around the PDP-8 processor, it features dual floppy disc drives, 24x80 character CRT, and 540 wpm letter quality printer. Delivery is to be before Aug. 17. I may also be purchasing their scientific operating system giving me FORTRAN, BASIC, and assembler. So, while I'll always retain a fondness for the 8008, it's on to better things!

Sincerely,

Bill

William E. Severance, Jr.

NOW READY

OS-8 MONITOR AND LOADER PROGRAM

FOR THE 8008

Fingers tired of flipping those sense switches? Go bananas with every crash or power failure? The answer is simple: Burn into 1K of 1702A or 5204 pROM the OS-8 Monitor and Loader Program. Featuring eleven human-engineered commands, it allows full control of the loading and examining of memory, octal or hex dump, initiation of execution at any address, and the reading, writing, and control of cassette tape mass storage.

Software/Hardware Packet Includes:

25 pages of source code which also contains many useful routines for octal input, octal or hex output, ASCII text output, cassette handling, etc.

12 pages of operating instructions including many examples.

Schematics and documentation for 256 level hardware Pushdown Stack, Serial-Parallel Interface and Controller for use with Sudding or many other Cassette Modems, pROM interface.

Although I am not attempting to make a profit on the M&L Program, I must charge $7.50 postpaid for the complete package to cover my printing and mailing costs. Since I do not know what the response to this offer will be, it will be necessary to delay printing until fifteen orders are received. If this number is not reached, I shall return, uncashed, your check by July 1, 1976. Unfortunately, Xeroxing is out of the question, coming to about $12.00 for the entire package.

If you have any questions about the M&L, or would like to place your order, contact:

WILLIAM E. SEVERANCE, JR.
Center Lovell, Maine 04016
Tel. (207) 925-2271

Concordia Lutheran High School

1601 ST. JOE RIVER DRIVE • FORT WAYNE, INDIANA 46805 • 219 483-1102

GUENTHER K. HERZOG, PRINCIPAL
WILLIAM C. BECKMANN, VICE PRINCIPAL

May 13, 1976

We are about to order a microcomputer system for use in our school, being compelled by finances to implement a low cost computing system. Our principal uses will be teaching of programming in the BASIC language and running educational simulation programs.

We would appreciate it if you would share with us any information you might have about the reliability of the following systems.

1. Altair 8800
2. IMSAI 8080
3. SWTP 6800

The components we are considering are listed in the general description on the attached page.

Your comments on such things as difficulties in kit building, quality of BASIC software, ongoing maintenance, and manufacturer support would be very helpful.

Please feel free to respond with informal notes. Whatever information you can send will be very much appreciated.

Sincerely,

Donald K. Gayer

Donald K. Gayer
Coordinator Educational
Computer Concepts Curriculum
Project

P.S. We have heard rumors that there is a university writing BASIC software for the 8080, but we have not been able to find out which one. We would appreciate any information you might have about this too.

Member North Central Association of Colleges and Secondary Schools

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Editor - Micro 8 Newsletter
Cabrillo Computer Center
4350 Constellation Road
Lompoc, Ca. 93436

Dear Hal;

May 6, 1976

Good news and bad news. I still don't have the CW program from the keyboard finished nor the 360 cross assembler though both are over 3/4 done. I am taking 7 credits this term through UCSB Extension and I'm swamped with work. One class is writing a compiler and the other is writing an operating system including a Virtual Machine simulator. I understand the same project was done at Vandenburg so you may be familiar with it.

On the good side, I got one of the Sargents Dist Co. keyboards and it really looks good. I haven't had time to interface mine yet but Bill Cowley has his running. I'm working on getting my Model 15 Teletype interfaced to my 2 Meter FM equipment. I hope to be on 146.58 and 146.10-146.70 late this month or early in June. (My call is WB6JKM). Dave is working on the ASCII to BAUDOT boards and we both hope to have hard copy this summer. Pete's Electronics 3007 Ventura Blvd Oxnard, Ca. 93030 (Highway 101 between Rice and Almond off ramps) is now an IMSAI dealer and has a lot of other surplus electronics including some really great Teletype test sets 37.5 to 9600 Baud, 5,6,7, and 8 level code, internal test message on a diode matrix plug in board, distortion switch selectable 0 to 49% and other features. Mine works like a champ.

73

Glen Charnock WB6JKM
560 W. Gonzales Rd.
Apt. 22
Oxnard, Ca. 93030

<u>**May 9, 1976.**</u>

ROBERT B. LEGGE
PO Box Nº 30.069 /Ave Alvaro Ramos 1142
Zip Code = 01.000 São Paulo, Brasil.

Dear Hal:

Following your recommendation, on April 7 I sent TINY BASIC $ 3,00 for the first three issues of Dr. Dobbs Journal etc. and another dollar for airmail postage, which amount proved to be grossly insufficient. Nevertheless, TINY BASIC have already Airmailed me the first three issues of their N.L. and I consider it very good indeed.

To continue, of course, they need more subscriptions and I hope you might request all readers of your m8 NL to support their enterprise, by sending $ 10 for one year's subscription (ten issues). Foreign postage or Airmail is extra, of course. I am continuing my own subscription with them, and of course sending them the extra airmail postage.

Your newsletter continues to arrive quickly, by Air. I hope you will get around to answering some of my letters & queries, soon. Please publish my revised address as above - our P.O. Box number has been altered.

Best regards and good wishes - Sincerely:

Bob Legge

SPECIFICATIONS FOR MICRO-COMPUTER SYSTEM

Micro-computer with CPU board, cabinet, power supply
    and expansion capability
Bootstrap loader on ROM or PROM
16K RAM TO 32K RAM
Serial I-O interface with two RS-232 Ports
Single floppy disk drive
Extended BASIC Software (Multi-user)
Disk operating system software
Should be able to handle TTY type terminals
    in a Time-Share mode (program simultaneously)
Diagnostic software to help pinpoint
    electrical malfunctions

*   *   *   *   *   *

We hope to expand at a later date to include
    dual floppy disk and CRT or flatbed graphics.

Contact Person
Donald K. Gayer, Coordinator
Educational Computer Concepts
    Curriculum Project
Concordia Lutheran High School
1601 St. Joe River Dr.
Fort Wayne, Indiana 46805
219-483-1102

TO: Computer Clubs
Dear Members: May 10, 1976

Enclosed you will find the installation instructions for my 32 to 64 character/line TVT-II modification board and 2K memory board. Radio Electronics has had my article on this subject since early February but will not make a decision on publishing it because they feel there is not sufficient interest in computers to warrant publication. You and I know that they are wrong and I felt that everyone would want to know about the design before RE catches on. Please bring all of your Club member's attentions to the enclosed instructions. The modifications can be made easily by wire wrapping or they can purchase a set of boards. My TVT-II has been modified since early October and I am using a very old TV with no bandpass problems.

The boards I am offering are fine quality MIL-STD with tin/lead fused plating and plated through holes. The boards are also silk screened on the component side for easy assembly. My board manufacturer is tooled up for manufacturing the boards and can guarantee shipment within 3 weeks after receiving orders. I also have layouts complete for an uppercase/lowercase auxiliary board for the TVT-II as well as the computer controlled cursor interface mentioned within. These boards will also be provided if there is enough interest.

Please provide this information to all of your members. Board prices are $5.00 for the auxiliary board, $12.00 for the 2K memory board and $16.00 for the set. Shipping is included in these prices. Texas residents add 5% tax. Please make checks payable to Digital Designs.

Digital Designs
P. O. Box 4241   Sincerely yours,
Victoria, Texas 77901   David O. Valliere
                              David O. Valliere

P.S. Please excuse the poor quality of these reproductions. The instructions shipped with boards will be photo offset.

DIGITAL DESIGN

TVT-II
32 TO 64 CHARACTER/LINE MODIFICATION

If you are using your TVT-II as a computer I/O you may have found the 32 character/line format somewhat limiting. By making minor modifications to the TVT-II board you can lengthen the 32 character line to 64 characters/line and thereby expand your system's capabilities.

The TVT-II memory is continuously being addressed through nine address lines to generate the vidio data used by the television display. The tenth address line (A9) is used to switch from page one to page two. By using the A9 address line for continuous addressing, the TVT-II can be modified to display 64 characters/line. Since the additional 512 characters being displayed are what used to be page two, additional memory will have to be added to provide storage of a second page.

HOW IT WORKS The basic design of the TVT-II make the modifications required to make it display 64 characters/line quite simple. IC21 and IC14 on the main TVT-II board normally count up 32 characters and upon reaching the 33rd count pin 11, IC14 and address A0 go high which disables the "dot clock" until the next line is started. Being in the 33rd character position also enables the vidio blanking circuit through IC12C and IC5B. With the "dot clock" disabled and the vidio blanking circuit enabled the line is blanked until a new line is started. By allowing the vidio generation and the "dot clock" to continue operating until the 65th character position is reached, 64 characters/line will be counted. This can be done by disconnecting pin 11, IC14 from the vidio blanking circuit and connecting it to address line A9, after having disconnected A9 from the page 1-2 flip-flop. Pin 11, IC14 is also tied to pin 14, the input of the unused counter in IC14 whose output (pin 12) is then tied to the vidio blanking circuit. Thus we have effectively added an additional 32 counts to the vidio lines through pin 12, IC14 and transfered the vidio blanking function to the 65th character position through pin 12. Since the RC oscillator network of the "dot clock" IC18B was originally tuned for 32 characters/line, capacitor C4 will have to be replaced with an 8 pF unit to provide the dot rate required for 64 characters/line.

Since we are now addressing the memory continuously through ten address lines/page, the cursor compare circuitry must be modified to provide comparison of the A9 address bit. This modification will require providing an additional cursor position count bit and a comparator. The designer used a 74193 BCD counter to allow preloading the additional cursor bit through a computer cursor position interface and still minimize the components required. The additional 74193 (IC1, FIGURE 1) is attached to the carry and borrow bits of the original cursor counter IC35 after disconnecting them from the 5th bit flip-flop IC27A. Carry and borrow bits are generated by the new counter through nand gates IC4A and IC4B and are sent to the original 5th bit flip-flop IC27A. The cursor count bit generated by IC1 is tied to pin 15, IC42 on the main board and compared with the A4 address bit. The output of the 5th bit flip-flop IC27A which was originally compared with the A4 address is brought on to the new circuitry and compared with address A9 by the comparator IC2. The cascaded "=" pulse from IC42 on the main board is inputed to IC2 whose output "=" pulse is sent to IC41. Thus we have provided an additional cursor count bit which is compared with address A4. Our new A9 address is compared to the old 5th bit flip-flop whose output has now become the 6th bit count. IC42 and IC41 on the main board IC2 in the new circuit provide the compare pulse required to position the cursor on the 64 character line.

Since we are now addressing the full 1024 addresses in the memory continuously, an additional six 2102's will be required to store a second page of data. By tieing the CE pins of each group of memories to pins 8 and 9 of the page flip-flop IC27B the pages will role over as originally designed.

ASSEMBLY The modifications will require cutting the foil traces at several points on the main board. This can be done quite easily with a single edge razor blade. Care should be taken to avoid getting the small pieces of foil removed in between the pins of the ICs on the board. Several jumper wires must be installed from the main board to the auxiliary cursor count board. These jumpers should be made with 26 Ga. or finer insulated wire cut as short as possible. Loops and crossovers should be avoided to minimize noise.

To provide the 64 character count the following connections should be made on the main board.

( ) Cut the trace between pin 11, IC14 and pin 9, IC12.

( ) Connect pin 11, IC14 to pin 14, IC14.

( ) Connect pin 12, IC14 to pin 9, IC12.

( ) Cut the trace between pin 9, IC27 and J7-9.

( ) Connect pin 11, IC14 to J7-9. This is the new A9 address line.

The cursor modifications can now be made. The new cicuitry is contained on the 3 in. by 2 in. single sided board shown in Figure 2. This board has been designed to be mounted directly above the +5 v. and GND buses which run across the center of the main board. Mounting of the board should not be done until all other connections are complete. The components should now be mounted on the board from the silk screened side. Refer to Figure 3 to verify component positioning.

( ) Mount IC1, 74193 BCD counter.

( ) Mount IC2, 7485 comparator

( ) Mount IC3, 7404 hex inverter

( ) Mount IC4, 7400 quad nand gate

( ) Mount C1, 0.1 mfd disc capacitor

The following cuts and connections should now be made on the main board.

( ) Cut the trace between pin 9, IC28 and pin 13, IC35.

( ) Cut the trace between pin 10, IC28 and pin 12 ,IC35.

( ) Cut the trace between pin 12, IC35 and pin 11, IC33.

( ) Cut the trace between pin 13, IC35 and pin 13, IC33. **Page 4**

( ) Connect pin 9, IC28 to pin 13, IC33.

( ) Connect pin 10, IC28 to pin 11, IC33.

( ) Cut the trace between pin 6, IC42 and pin 3, IC41.

( ) Cut the trace between pin 15, IC42 and the plated through hole immediately adjacent to IC42.

We are now ready to make the following connections from the main board to the auxiliary board.

( ) Connect pin 14, IC35 to B

( ) Connect pin 11, IC34 to C

( ) Connect pin 12, IC35 to D

( ) Connect pin 13, IC35 to E

( ) Connect the plated through hole adjacent to IC42 to G

( ) Connect pin 15, IC35 to H

( ) Connect pin 11, IC33 to J

( ) Connect pin 6, IC42 to K

( ) Connect pin 3, IC41 to L

( ) Connect pin 11, IC14 to F

NOTE: Connection point A is for the cursor count preload and will not be made at this time.

( ) Mount the auxiliary board on the main board using heavy gauge wire. M is connected to the +5 volt bus and N to the GND bus. Note that the M & N connecting points are positioned such that the board can be mounted directly above the bus traces running across the center of the board.

( ) Replace the 38 pf capacitor C4 on the main board with an 18 pf capacitor.

MEMORY MODIFICATIONS Modification of the original memory is not required if you do not need two pages of I/O. If you would like to have two page capabilities two methods are available. You can use the 2 memory board shown in Figure 4 or you can piggyback the additional memory onto the original TVT-II memory board. If you are using the 2 K memory board the instructions are given below.

2K MEMORY INSTRUCTIONS The 2K memory board not only provides two page storage for the 64 character/line TVT-II but also provides storage of the seventh ASCII data bit. Storage of this bit is essential for complete communications to the computer when using the Screen Read option. The original TVT-II memory board does not provide this capability.

( ) Install capacitors C1-C14, 0.10 mfd. Note: These are decoupling capacitors and are not necessarily needed, however at least one should be present on each column (C8-C14).

( ) Install connectors J7 and J8.

( ) Connect pin 8, IC27 to J7 terminal 10 on the main board.

( ) Omit this step if sockets are used. Solder ICs Z1-Z6 and Z8-Z13, 2102 memories to the board using care to avoid solder bridges. Refer to Figure 4 for proper positioning. Note: These are MOS devices and care should be taken to avoid static discharge to the pins. Use only a fully grounded soldering iron.

( ) Solder in ICs Z7 and Z14 if the board is to be used with the Screen Read option.

( ) If sockets are used solder in place and carefully load ICs Z1-Z6 and Z8-Z13, 2102 memories as stated above. Load ICs Z7 and Z14 if the board is to be used with the Screen Read option.

( ) Connect a short length of wire to pin 9, IC27 on the main board. The other end of this lead is to be connected to the CE terminal on the memory board. This connection should be made with some type of slip on connector to facilitate easy removal of the memory board.

FIGURE 1

FIGURE 2

FIGURE 3
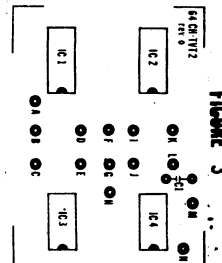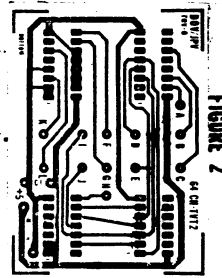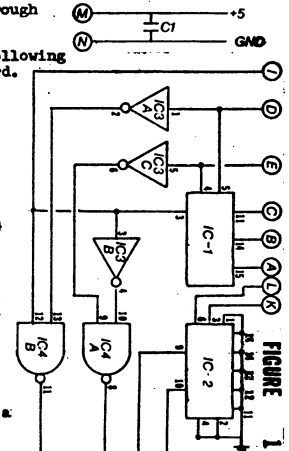
NOTE: Connections D70A, D71A, D70B and D71B are for the seventh ASCII data bit and will not be used when the Screen Read option is not being used.

The memory board is now complete and is ready for testing on the main board.

PIGGYBACKING INSTRUCTIONS: If you are not using the 2K memory board but would like to have two pages of data this can be done by piggybacking six additional 2102s onto the existing six on the original TVT-II memory board. The procedure follows.

( ) Cut the trace between the CE trace and ground on the memory board. This short section is located directly above IC6 on the board. The CE trace goes to pin 13 of all the memories.

( ) Connect the CE trace to pin 8, IC27 on the main board.

( ) Carefully bend pin 13 of six new memories out so that it is parallel to the chip.

FIGURE 4
2K MEMORY BOARD

● DIGITAL DESIGNS
1976
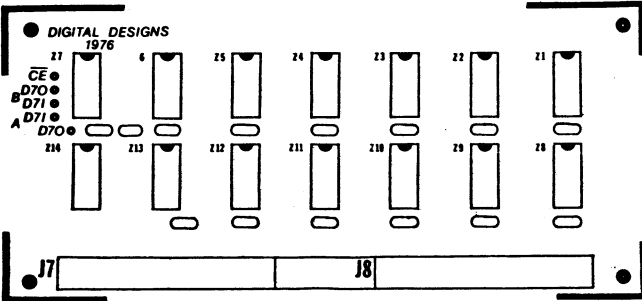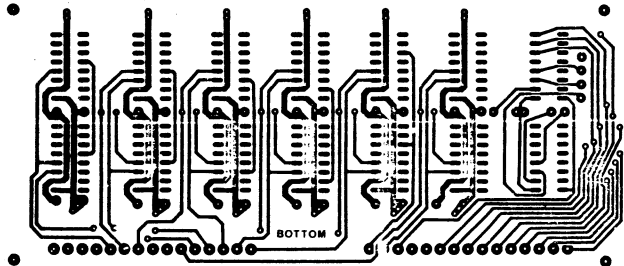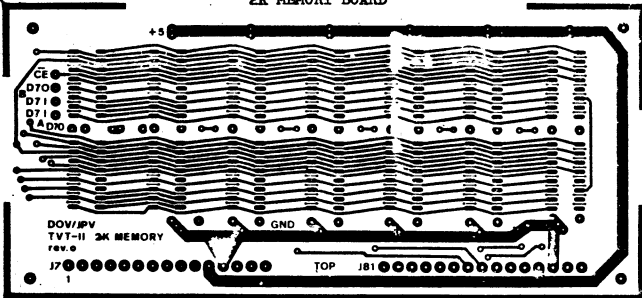
( ) Carefully position each of these chips on top of the existing memory chips on the board. Solder each of the 15 unbent pins to the pins of the existing memories. You should now have six 2102s piggybacked on top of the existing 2102s. Note: Use grounded soldering iron.

( ) Carefully connect the CE pins of the new chips together with a length of wire. This is the page two CE line.

( ) Connect this wire to pin 9, IC27 on the main board

You now have two pages of data which are automatically rolled over by the page flip-flop IC27 which enables the CE line of either six 2102s.

EARLY TVT-II MEMORY MODIFICATION
You may have an early design TVT-II which uses the CE line on the memories. If you have one of these units terminal 10, J7 will have a trace leading to it. If you have one of these units the memory modification will require the following additional procedures.

( ) Cut the traces between pins lands 1 and 2, 4 and 5 and between these pins and the ground bus of IC4 on the auxiliary board.

( ) Connect pin 8, IC3 to pins 1 and 4, IC4.

( ) Cut the trace between pin 8, IC17 and terminal 10, J7 just before it reaches J7.

( ) Connect pin 8, IC17 to pin 9, IC3 on the auxiliary board.

( ) Connect pin 8, IC27 to pin 2, IC4 on the auxiliary board.

( ) Connect pin 9, IC27 to pin 5, IC4 on the auxiliary board.

( ) Pins 3 and 6 of IC4 should now be used in place of pins 8 and 9 of IC27 for driving the two CE lines. IC3 inverts the normal CE pulse which is then nanded with the output of IC27B, the page flip-flop. The nanded signal is then used to address either page of memory through the CE lines.

After checking all connections and foil cuts the power can be turned on with the memory board out. The screen will be filled with either ? or ● symbols. R38 should be adjusted to provide a steady display. R6 and R4 can then be used to center the display on the screen. If the characters appear smeared, your TV has a limited bandpass and cannot be used with a 64 character display without modifications. Most TV's should be able to handle the increased display density with no problems.

You are now ready to shut the power off and install the memory board. Turn the power back on and enjoy the 64 character/line display. Don't forget to revise your TVT-II schematic with the modifications that you have made. **PARTS LIST**

2K MEMORY BOARD

Z1-Z6, Z8-Z13	2102 memories	
C1-C14	0.10 mfd capacitors	

Optional
Z7, Z14	2102 memories

Wire 26 Ga.
2 15 pin Molex board connectors

64 CHARACTER BOARD

IC1	74193
IC2	7485
IC3	7404
IC4	7400

C1	0.10 mfd disc
C4 on main board	18 pf

Wire 26 Ga.

The auxiliary board and 2K memory boards shown are available from DIGITAL DESIGN, BOX 4241 VICTORIA, TEXAS 77901. Both boards are Milspec with tin/lead fused plating and silk screened component placement. The auxiliary board is single-sided whereas the 2K board is double-sided with plated through holes. The auxiliary board is $5.00 The 2K board is $12.00. If ordered together they are $16.00 Shipping is included in board prices. Shipment within 3 weeks is guaranteed. Texas orders add 5% sales tax.

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Glendon C. Smith, 5822 Daffodil Cr., Dayton, OH 45449   May 20, 1976

Gentlemen:

Enclosed is a short description of a TV display circuit I use in my Altair 8800. Although I have not yet used the graphics display capability, it should be useful, as is, for games requiring a playing board. With synchronization as discussed, fast games should be clearer.

Others may wish to make changes in the logic which sometimes was the result of space limitations. If fast data selectors are used as specified, the memory can probably run without wait states.

Sincerely,   Glendon C. Smith

T. V. Display With Graphics
By Glendon C. Smith

The TV Display described in this report is intended for direct plug-in to the bus of an ALTAIR 8800 or other similar microcomputer. The circuits could be adapted to CPU's other than the 8080.

This display differs from the TV Typewriter circuit in three major areas. 1) The screen refresh memory is connected to the bus when it is being loaded or altered. 2) The display can produce 128 characters stored in a Motorola ROM (12 lines of up to 32 characters each) and/or up to 128 graphic shapes (8 x 8 picture elements) stored in RAM (24 lines of 32 shapes). 3) A crystal controlled commercial sync generator IC is used to provide vertical interlace and a jitter-free display. Other features include the ability to have the 8th bit in the byte used to specify a character or a graphic shape cause that character or shape to blink or to reverse itself, the ability to reverse the entire display by software, to display a border or not, and the capability of having software scrolls, an erasing cursor, and other custom features.

As presently implemented, switching from refresh operation to the bus is not synchronized with the blanking for borders so that insertion of a character causes the loss of about two sweep lines (a white or dark band about 1 mm wide provides notice that a letter was written). This is not annoying to those who have seen the display. For fast games, it might be advisable to switch the memories back to the bus during FIELD and delay the CPU if these memories are addressed during FIELD. This would slow the display slightly. Without synchronization, a software line feed or scroll up (moving 384 characters) takes about 10 milliseconds or about one-half of a vertical sweep of the TV screen.

The construction of the prototype of this display was eased by using two commercially available boards (and associated components) which were connected together by hinged bars the length of the connector spacing on my ALTAIR mother board. The memory board (MB-2 from Solid State Music) has its copper traces connecting all 8 of the 2102's comprising a bank (1K x 8 bits) before connecting the next bank. Before mounting the sockets, it is necessary to cut many copper traces between banks. The bank nearest the bus connector will become bank 0 (lowest address). It is not used by the TV Display.

The next higher bank (bank 1) stores the 128 graphic shapes (8 x 8 bits each). Bank 2 stores the codes for the graphic shapes (24 x 32 bytes and has some space which my be used for subroutines. If the graphic capabilities are not being used all three lower banks may be used as part of main memory. The highest, bank 3, stores up to 1024 characters which may be arranged as 32 lines (only 12 displayed) of 32 characters, or as two pages with enough space left over for routines which write on either page (page 1 has scrolling, cursor, etc.). The latter system is the one I have used thus far, but I can imagine applications such as text editing which might use several K of memory for character storage with more elaborate scrolling schemes.

The other board used is a Universal I/O Board (IO-1) from Solid State Music. It just barely has space for all the circuits for the TV Display plus one INPUT Port for a keyboard (Clare-Pendar). Eight pieces of 8 or 10 conductor ribbon cable handle the interconnections between boards and help in keeping the bits in order.

One of the changes to the memory board which is not shown in the diagrams concerns chip enable and R/W inputs to the 2102's. Pin 3 of each bank or 2102's was disconnected from pin 11 of 7400 A and now received its input from one of the address selectors as shown. Pin 12 on the 74L42A was ungrounded and connected to pin 11 of 7400 A. The outputs of the 74L42A then became R/W feeding the address selectors and the pin 13's of the 2102's formerly connected here are all connected to +5 volts so the chip outputs are enabled.

Several other points will come up in preparing the Solid State Music boards for this use. The designer of the I/O universal board ran +5 and gnd lines to many positions, expecting you to use 16 or 14 pin IC's there. However, he did not leave a space between the ends of the IC positions as their length requires, so many of these traces must be cut before sockets are installed. Because the output port (200 octal in my system) does not need an output connector, traces to this 14 pin pad are cut and an IC is installed there. On the memory board MB-2, all the data input lines are left intact as are all the address lines from the connector to the nearest 1K bank of memory (which will become bank 0). All the data outputs are isolated by cutting the traces at appropriate points, as are the address lines to banks 1, 2, and 3. The chip enable and R/W lines are discussed above.

Other arrangements of the 2K memory used in the generation of the graphics portion might be useful. For example, a 128 x 96 display of individually addressable points (each point, however, is 4 times the area of a picture element of the current display and the blinking and reversing possibilities appear to be out). One might build only the character portion or only the graphic portion (and generate the needed characters). The display described here may stimulate club members to design a special display as a group project and to produce p.c. boards to ease the labor for all concerned.

I use the Hitachi PO-3 12" B&W TV. It is easy to interface, is all solid state with instant on, and is available for about $68. Interface information is available.

Output Port - Control Byte Functions

The 8212 output port is cleared by the fron panel switch so that the 3 banks of memory can be dumped (or loaded) without special instructions in existing programs.
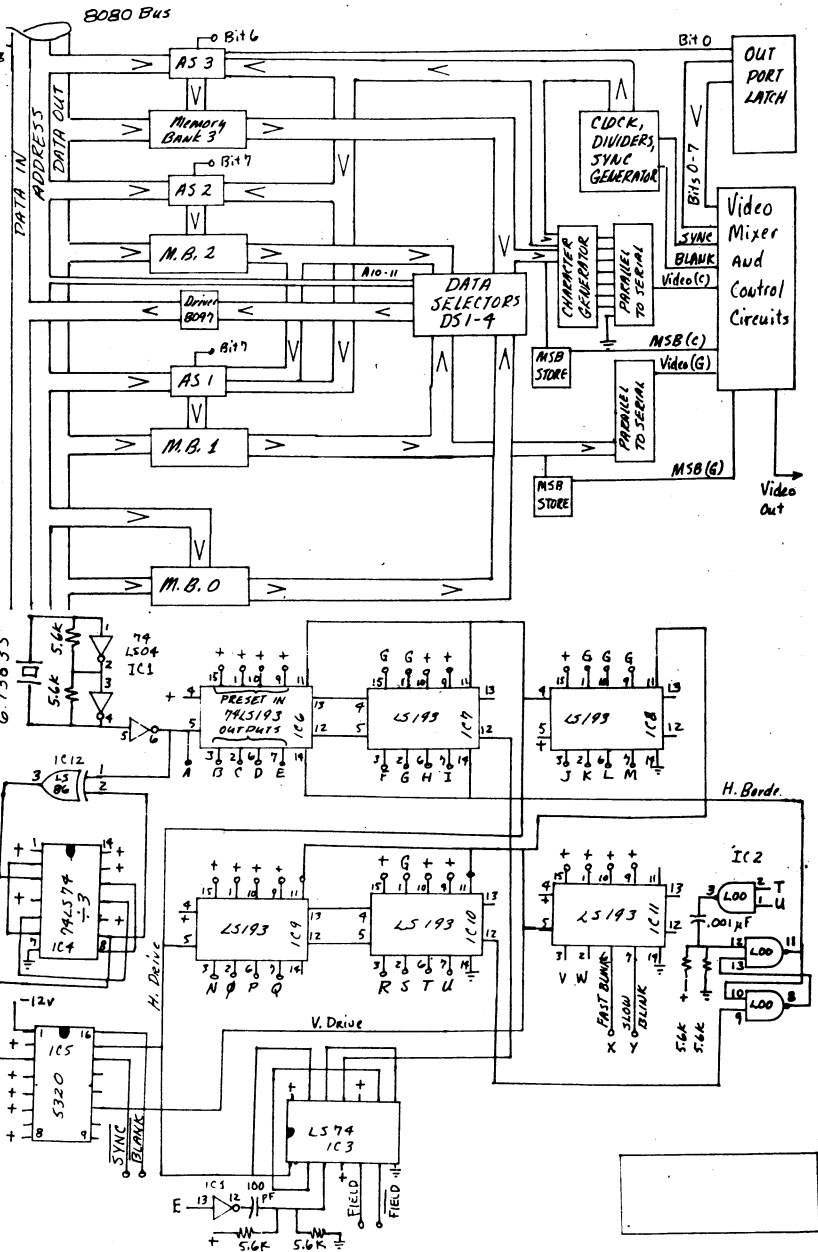
Suppliers

The MCM6571C character gen. came from the Digital Group but I understand that a new version only requires +5 volts. The 5320 (National) Sync Generator ($4.00) came from Solid State Music as did most of the I.C.s.

THIS IS PAGE 2

It has special effects including BLINKING SINGLE or multiple letters and a full set of characters

)'&%$#"!1234567890 -'/*+)¦><?/
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz, ·-

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Address Selectors / Data Selectors

ADDRESS SELECTORS (DM 81L22's)

AS1-1 AS2-1 AS3-1
AS1-2 AS2-2 AS3-2
AS1-3 AS2-3 AS3-3

Bank 3   Bank 2   Bank 1

MSBS, IC4, IC3 = 74LS74N
GSR, CSR = 74L165N
IC13 = 74LS10N
IC14 = 74LS02N
IC12 = 74L86N

Zener Diodes

7805 +5   7805 +5

Use 8-10 ea
0.1 Mfd disc
bypass caps on
+5 lines - divide
IC load between Regs.

Hinged Bars
to MB-2 board
4 ea 74LS193N

INPUT PORT IF NEEDED FOR 1 KEYBD

OUT PORT

Data Selectors (tri-state) 81L23's

DS1 (2-0) 1SG
DS2 (0-2) 1SG
DS3 (3-1) 1SG
DS4 (-1) 1SG

CSR 74LS165 Character SR

GSR 74LS165 Graphic SR

CG MC6571 Character Generator

MSBS 74LS74

D Pulse   1.8K 100pF D
          1.8K

Note:
M.B. = memory bank
Driver refers to input
terminal of DM8097
driver of bus data
line (on memory board)

M.B.3 is the highest
1K bank which
stores ASCII codes
for characters

M.B.2 stores codes
for the graphics

Notes:
M.B. = memory bank -
1K × 8 bits
C.G. = Character generator
N.C. = no connection
A = highest clock frequency
D = A ÷ 8

M.B.1 stores up to
128 - 8×8 graphic
shapes

IC1 A10 — LS04 — A10 Bus

Page 7

Data inputs not marked are connected to the corresponding
bus address line. As Bank 3 selectors (Memory address outputs
lines go to the corresponding banks of memory.)

Do = Least significant Data bit from a IC bank of
memory, bank
M.B. = memory bank
N.C. = no connection

UNIVERSITY KITS

The following University Kits are available to classes and individual student projects. All Kits contain functional devices which have been rejected for cosmetic defects. Documentation describing the operation of the units in each Kit is also included.

Kit A	Kit B	Kit C
1 – 4040	1 – 8080A	1 – 3001
1 – 4201	1 – 8224	1 – 3002
2 – 4002-1	8 – 2102A	1 – 3003
2 – 4002-2	1 – 1702A	1 – 3212
1 – 4008	4 – 8212	1 – 3214
1 – 4009	1 – 8205	4 – 3226
4 – 1702A		10 – 3601

Please include a check payable to Intel Corporation in the amount of $20.00 per Kit. California ship-ment's must include 6% sales tax.

UNIVERSITY MICROCOMPUTER KIT REQUEST

Name: _____

School: _____

Your Position: _____

School Address: _____

Phone: _____

Number of Kits required: Kit _____   Number _____

Please describe the nature and intent of the class or project.

If you are an instructor, how many students are involved in this class or project? What is their level of sophistication (undergraduate, graduate, etc.)?

If you are a student, please provide the name and school address of your faculty advisor.

Is this an individual project or are other students also involved?

Intel is interested in making available general applications information to all microprocessor users. Do you anticipate producing a final paper (or perhaps a program) that we might make available to other users?

Please return this form to:

Dr. A. J. Nichols, Manager
Microcomputer Applications
Intel Corporation
3065 Bowers Avenue
Santa Clara, CA 95051

-2-

W.A. Harnell,
165 Merkley Square,
Scarborough, Ontario,
Canada   M1G 2Z1

April 11, 1976

I have just finished reading Vol 2 No.4 and feel that I must express my disappointment and difference of view relative to the announced phase-out of the N.L. I feel that you and your associates have done a great deal to assist the advancement of the hobby computer movement to date. This is not the appropriate time to bail out.

I also understand that publishing the letter must take a great amount of your time as well as the time of your students, whose presence is ever noted (the hand-written addresses on the letters) and do appreciate it.

Is there no way to prolong the life of Micro-8 by increasing subscription costs etc.? I somehow don't feel that BYTE, PCC, TCH or any of the other currently available publications can replace the services which you have provided. I do hope that you will reconsider and am sure that hundreds of other computer hobbyists will write expressing their concurrence. Should you go through with your decision to phase-out, I would like to extend my thanks and gratitude for the services which you have rendered as well as my best wishes for your future activities in whatever field they may be.

I would like to say also, that I am in full agreement with you and Dr. Michael Hayes regarding MITS Basic. From some of the correspondence that I have seen, I believe that Bill Gates' greatest problem stems from the fact that he had an ineffective marketing plan for the software or is grossly naive or both.

NOTE: I am attempting to locate a copy of information or schematics on both for a Mowhawk Data Sciences Paper Tape Reader, Model 3005 which I have recently procured. I would be happy to pay for any copying or other associated expenses. Thanks.

What a pity that he nor Ed Roberts could not understand that if the price for Basic was right, they probably would have sold the package to better that 50% of Altair purchasers, particularly if the package had been included with the initial purchase. They may have got less per package but they surely would have reaped greater profits. I do not have a copy of their Basic and I do not intend to either purchase or use it. I have, however, placed orders with Processor Tech. for their ALS-8, SIM-1, EPT-2 and the recently announced FOCAL. I'd much rather pay $440.00 for the firmware and feel that I had received something for my money than a "screwing" which is the feeling I get every time I consider Basic.

One other very interesting point is the announcement by IMSAI of the inclusion of 4K Basic in their initial basic kit. I believe that Ed Roberts said as late as the last newsletter the noone would ever give software away. I believe that this is true but IMSAI makes the purchase (and so does Proc. Tech.) very palatable. I may be taking a screwing anyway but the way that these people do it makes you feel that you have been loved and kissed in the process.

I have a lot of respect for some of the things that MITS have done in the past year but the 'Basic' controversy and Bill Gates' name calling do not go down well. These people have succeeded in alienating a very great number of their past, could have been future, customers; a most unfortunate situation for them as well as the computer hobbyist. Please do publish letters re: the software flap. All of us should know just what is going on.

Mr. R.B. Legge of Sao Paulo, Brazil will find available from IBM do Brasil, In Sao Paulo, the following manuals related to his Selectric I/O problems as well as other pertinent publications:

1052/1053 Theory-Maintenance   Form no. S225-3179
Selectric I/O keybd Printer Manual of Theory of operation
                        Form n. S225-6595
72 I/O Reference & Adjustment Pocket Book
                        Form no. 9Q2-111-0

Regards,
Bill Harnell

I have available 3 4K Altair RAM boards completely assembled and in excellent operating condition for $180. The memory IC's are in sockets and the board has been thoroughly tested and burned-in. Less 100-pin edge connector, but will ship postpaid. Anyone interested should contact me at the above address. I also have an Altair 1K static board in the same condition for $100.

I might point out that Mikra-D has a good deal on a video terminal. For $495 you get a complete, direct teletype replacement CRT terminal. Worth looking in to.
Mikra-D Incorporated, Box 403, Holliston, MA 01746

Sincerely Yours,
John Martin
JOHN P. MARTIN
808 DAY STREET
FAIRMONT, MINNESOTA 56031

Art Hicks, Box 642, La Jolla, CA 92038 In V2,#3 you asked about opinions of OSI superboards. I just got their CPU, 4K RAM, proto, & backplane boards. They specified 60 days but it only took 5 weeks for the CPU & Ram. I'm still waiting for the other two boards but it's still 2 weeks until promised delivery. Boards are good but not perfect quality. The documentation is not for a beginner but if you're into designing your own system as I am, its quite adequate. My system will consist of a 6800 CPU, 8K static RAM, OSI video terminal and various features such as hardware mult/div and breakpoint. When completed, I'll let you know if OSI stuff is as good as they claim.

Steve Newberry, 24225 Summerhill, Los Altos, CA 94022 says he is a novice in hardware but has some programming experience and hopes to get a M6800 based system and has a SWTP kit for the TVT-2.

Len Cupryk, 94 Maisonneuve St., Chateauguay, P. Que, Canada is presently building an ALTAIR 8800.

"There is a Washington, D.C. Amateur Computer Society, even though we have learned of a couple of other Computer-Oriented groups in our area: the Chesapeake Microcomputer Club, and the Amateur Radio Research and Development Corp. Both of these organizations meet in the far suburbs, so it seemed a good idea to get one going to fill the hole in the middle. Besides that, we based our society at the Catholic University of America to make use of its resources; we use their Computer Center Annex to meet and their computer to edit and produce our newsletter. We have no dues, we ask for donations from those who can, we have a constitution, but it includes a clause to keep things "as informal as possible". Anyone is welcome to join---just show up. We meet officially on the last Friday of each month, at 7:30 pm in the Computer Center Annex of the Catholic University of America. We meet informally almost every friday night, some place, talking hardware, playing games on the timesharing PDP-10 with the six Decwriters in the annex. I, as director of the society, extend a welcome and invitation to other hobbyists to stop in and visit us, if they are visiting the nation's capital during the Bicentennial year."

Robert J. Jones, aa
4201 Massachusetts Avenue, #168,
Washington, D.C. 20016
April 16, 1976.

I look forward to receiving your newsletters because, with a friend of mine (Bill Gunn) I have opted to join the "Computer for the People" movement.

Our equipment at present consists of:

1 Altair 8800 with modified (15 Amp, preregulated) power supply.
1 IMSAI 8080.
1 Teletype.
1 B & W video display system - Processor Tech. VDM.4 keyboard.
1 Cromemco "Dazzler" and "Bytesaver".

On order we have a Tarbell cassette interface and 16K of static memory to augument the 12K we presently have.

Evaluations:

a) Altair 8800 - took a long time to get running properly - had to replace 8212's - power supply was inadequate when more than 4 boards were used.

   - CPU - card had a gold bridge between PREADY line and WAIT line.

b) Godbout 4K memory board - constant headache - after replacing almost all its chips, is still not reliable.

c) Processor Tech. memory boards - good quality, no problems.

d) Processor Tech VDM display - worked almost immediately and it was no problem to modify a B & W TV to use with it.

e) Cromemco Dazzler - was difficult and time consuming to debug.

We are also thinking very seriously of implementing a floppy disc system to go with our IMSAI 8080. To do this we will either buy the IMSAI flappy disc system or, much more cheaply, build the flappy disc system described by Hal Chamberlin in The Computer Hobbyist.

One request - I would like to acquire an advanced text editing system - that is, one that would be suitable for producing a newsletter, producing address labels, form letters, etc. If you, or your reader, know where such software might be obtained (we are willing to pay!) I would appreciate hearing from you. In the near future we intend to start a hobbyist computer club in our area.

Yours truly,

April 26, 1976
Karl H. Brackhaus
#203 - 1625 W. 13th
Vancouver, B. C.
Canada V6J 2G9
(604) 738-9341

Each time I get a new issue of the Micro-8 Newsletter, I get the same feeling as when going to the Tivoli-Gardens in Copenhagen: Americans everywhere ! For a while, I was disappointed that maybe no "foreigners" had this great hobby of Micro-8 - until now, I realize that I could contribute by writing myself.

Having gone through the big problems of getting the neccessary parts (we don't have as many possibilities to buy as you have) I have succeeded in getting my Mark-8 running perfectly with 5 K memory.

Further I have built a TVT-1 and bought a teletype with reader and puncher. For the time being I work on connecting them and making the lay-out for 4 K 1702. When this is done I plan to make new I/O boards and cassette interface.

With regard to software, my intensions are to have monitor-8 placed in the 1702, after which I shall go further into Basic.

This depends, however, on my finding of a non resident type to reach higher speeds. When this is done I plan to start working on a circuit analyzer program.

I sure am sorry to hear that you intend to lay down the newsletter by the end of this year, as I feel it has given birth to many a great idea - and why give up such an initiative ? I just hope you will change your mind about it as the World needs to get some fun on a non-profit basis.

With best regards, May 31, 1976
Mogens Pelle
Birkhøjterrasserne 416C
3520 Farum - DENMARK

Thanks for the prompt response to my request for back issues of the NL. I have been totally absorbed with them since their arrival. Wrote to the Digital Group, received a flyer which went into some detail on what they had coming up but didn't see anything about cassette interface or 8K memory board I thought they carried.

On another matter, my 8008 still isn't up and running properly yet. I have tracked it down to a TII coming out of the processor chip but don't know why. Have been doing some reading about the 6502 and that looks like it would be much simpler to get on-line. But I'll keep plugging along on it and hope to correct the problem.

Jim DePoy
604 Royal Palm Drive
Virginia Beach, VA 23452
(804) 486-7342

Wishing you the best,
Jim DePoy

Recently there has been a lot of discussion about mag tape recording standards, and out of that discussion came the new "Kansas City" standard, and the hardware featured in Byte magazine in March. Unfortunately, there hasn't been very much said about the data format to be used with the new standard. I don't think many people realize that the data format is just as important as the hardware, if we are really going to be able to freely interchange taped programs sometime in the future.

If your tape Dump routine uses a leader of ∅s, and doesn't specify the area in memory the program occupies, and my cassette loader is looking for a leader of all ones, and expects to find the load limits specified on the tape, you and I are going to have a hard time ex-changing programs without changing our load and dump routines to fit each other. This could get sticky, especially since my routines are in PROM, and I don't really want to reprogram them, even if you have the greatest software in the world on your tapes.

I'm sure all the Mark-8 owners remember the many discussions on standardization of I/O port assignments, etc.; let's avoid doing that now by deciding on a definite data format before everyone gets his "Kansas City" interface on-line.

I'd like to suggest the following as a place to start:

1. A leader of between 60-100 bytes of all ∅s. This would last 3-5 seconds at 300 baud per second. That gives plenty of time for the AGC to lock up, and also enough time for me to start the cassette read routine in my monitor program.

2. A "377" byte would show the end of the leader and trigger the software to look for the first data bits. I chose "377" because it is a relatively unused code for addressing purposes.

3. The next four bytes on the tape would be the low and high start address and the low and high stop address, specifying where in memory the taped data is to be loaded.

4. Data bytes follow.

5. After the last data byte there would again be one "377" byte. This provides an immediate check on the program length. If the last address has been loaded and the next byte is other than a "377", an error has occured.

6. After the "377" would be the checksum byte. The cassette write routine calculates the checksum by adding each data byte in the accumulator, ignoring any overflow, and writing the checksum byte on the tape. The read routine calculates the checksum in the same way, and compares the two. This method is not as error free as the cyclic redundancy check used by the TCH routines, but it uses much less software. The low speed of the interface and its inherent reliability should eliminate most load errors.

7. After the checksum would come a trailer of 25-50 bytes of all "∅", which only separate one program from the next. Length of the trailer is really unimportant.

This format doesn't use blocks of data, again because of the low speed of the inter-face. Using a block format means increasing the amount of time it takes to load a program into memory.

I believe the software for this format could be relatively short, especially if the interface uses a UART and perhaps interrupts instead of timing loops for reading the tape.

I'm sure there will be other suggestions for data format. All I want to do is start the discussion now, so we can all start exchanging taped programs sooner.

Samuel H. Daniel
402 Juniper
Vandenberg AFB, Ca 93437

Page 9   Thanks,

Editor
Micro 8 computer Newsletter   April 26, 1976
Cabrillo Computer Center
4350 Constellation Rd.
Lompoc California.   93436

Dear Sir:

Western Data Systems has a new microcomputer. The 370/02A.
It uses the Mos Technology 6502mp and is the most versatile of
the low price/performance microcomputers that are available.
The high operating speed (twice the cycle speed of the 6800, and
five times that of the 8080) makes the 370/02A the ideal choice
of the computer hobbyest and industrial user alike.

The single 13.75"X11.5" P.C.B. contains memory, I/O ports,
a L.E.D. data and address display, and more, much more. It con-
sists of all circuitry needed to be a stand alone microcomputer
or a stand alone microcontroller for even such high devices as
disc peripherals.

Designed with identical drive capabilities around the Altair
8800-100 pin tri-state bus, the 370/02A is plug in compatable with
the long list of Altair peripherals. And thats not all.
The 370/02A Bare Bones kit is at the lowest price ever. For an
introductory offer we are selling the kit for $79.95, which
includes 370/02A P.C.B., 26 switches, wooden stand, and complete
documentation. Or the complete kit for just $169.95, which includes
370/02A P.C.B., 26 keyswitches, wooden stand, complete set of I.C.s,
500ns memory, resistors, capacitors, L.E.D., 1 mhz 6502mp, and
complete documentaion.

We think that Micro readers would be interested in reading
about this new dynamic microcomputer. We would be very interested
in writing an article for Micro 8 about the 370/02A.

We would also appreciate some information such as price and
availability on advertising our products in Micro 8. Your prompt
attention to this letter would be greatfully appreciated.

        Western Data Systems   Sincerely yours
        3650 Charles St./Suite Z
        Santa Clara, CA 95050
                                                Cindy A. Indihar
esg   (Marketing Manager)

Cindy A. Indihar, Marketing Manager
Western Data Systems
3650 Charles St./Suite Z   3 May 1976
Santa Clara, CA 95050

Dear Cindy Indihar:

Thank you for the product release information on your 370/02A
PCB and computer kit. From your brief description, it appears that
your company has produced a product tailor made to the hobbyist's
current needs. Making the unit ALTAIR bus compatible is a partic-
ularly shrewd design feature.

I would be interested in purchasing a unit for school evalua-
tion but would appreciate slightly more detailed technical information
and delivery details before writing out a check.

I would be delighted to print an informative writeup on the
system. Paid advertising is not accepted for the Micro-8 Newsletter
but truly informative articles are nearly always printed without
cost. I hope you will be willing to submit such a technically
informative article.

Thank you very much for your letter. Hope to hear from you
soon.

                        Sincerely,

                        Harold L. Singer
                        Micro-8 Newsletter Editor

IBM 1052-2 (I/O) $850; 1053-2 (R/O) $580; you pay shipping;
these are heavy-duty Selectrics; IBM Maintenance eligible; top
condition-used by my hospital in research project less than 100
hrs; full set of manuals; WM. J. SCHENKER, M.D., 2086 Essenay,
Walnut Creek, 94596; 415/939-6295.

                                                May 20, 1976

Thank you for your letter and for your

interest in Western Data Systems.

Enclosed is the article which you requested.

Also I am enclosing a picture of the 370/02A to

give you a better look at how dynamic this new

product is.   We have decided to use the name

DATA HANDLER for the computer instead of the

technical name 370/02A.

I will send you complete information on delivery

and purchasing as soon as we get it back from the

printer. If you have any questions please feel

free to call me at anytime.

                                Sincerely

                                Cindy A. Indihar
                                (Marketing Manager)

                THE DATA HANDLER
                    FROM
              WESTERN DATA SYSTEMS
        Western Data Systems has just introduced a new
microcomputer called THE DATA HANDLER.
It combines the Mos Technology 6502 microprocessor
with the latest state of the art technology producing
a high performance microcomputer at a price anyone
can afford.
        The high speed operating capabilities of the Data
Handler are enabled by the use of an easy to use full
function hardware controlled front panel, a large
ground plane area (to minimize noise at high operating
speeds) on the P.C.B. and 2102 type RAMS.
        Slower accessing memories (EPROMS and ROMS) may
be used, although this will reduce the cycle speed to
within the limits of other microcomputer kits.
        The single 12.75"X10.5" P.C.B. can directly add-
ress 65K of memory and contains 1K bytes of static
ram of the board with complete address decoding.
        It also consists of all circuitry needed to be a
stand alone microcomputer or a stand alone microcontroller
for even such high speed devices as disk peripherals.
        THE DATA HANDLER is designed with identical drive
capabilities around the 8800 Altair, 100 pin tri-state
bus. It's plug in compatable with the long list of
Altair peripherals, and even the 8800 C.P.U. board
will plug right in. Expandability can be achieved in a
manner identical to the 8800 Altair by using the mother
board.
        And thats not all, there is more. The Data Handler
has dual interrupt lines (one maskable), slow down
circuitry for slow memories, DMA (direct memory access)
circuitry, and DMA acknowledge control. It also contains
one 8 bit parallel input port, one 8 bit parallel output
port, seperate IO address control and memory control
lines, single voltage (+5v@'1.8A) and cycle times to 250ns.
        It has front panel control with the use of keyboard
switches which provide the following hardware functions:

        A. Single cycle operation.
        B. Single instruction operation.
        C. Memory examine (left incremental)
        D. Memory deposit (left incremental)
        E. Initialization.
        F. Halt.
        G. Run.
        H. Hex data and address entry.

For an introductory offer the DATA HANDLER is

selling for an unbelievable price of $79.95.

This is the BARE BONES kit it includes, the Data

Handler P.C.B., 26 Keyboard switches, P.C.B. stand,

and complete documentation.

The complete kit is also available from Western

Data Systems for the low price of $169.95.

The complete kit contains all I.C.'s, 500ns memory,

resistors, capacitors, L.E.D.'s, 1 mhz 6502mp, every-

thing needed to build a complete microcomputer.

For complete information on ordering,

    wite to Western Data Systems
            3650 Charles St./Suite Z
            Santa Clara, Calif.   95050

(Introductory offer expires August 31,1976.)

Bruce Ehresman, 16681 Bartlett Ln., #2, Hunting-
to Beach, CA 92647 sent a postcard saying a
questionaire would arrive that would help him
gauge the impact of a new, innovative product
on the hobby enthusiast's market. No survey
yet and no indication as to the remarkable new
product.

To: All you contributors to INTERFACE

Please forgive this form-type letter, but there are so many of
you (thank heavens), that writing each individually is impossible.

Thought I'd clue you into the latest deadlines and magazine scam.

We just got the June (Star Trek) issue off to the typesetters, and
it will be back for proofing on Sunday, May 9th. I know it's short
notice, but all authors will probably want to proof their own
stories, so we hope to see you here Sunday around 1:30 pm.

Our July issue will be devoted to hardware. We'll be telling the
hobbyist what's available, especially if he's not a hardware type,
where to buy it, how to select peripherals, what we know about
several manufacturers, their product and their backup service.

For the July issue, we'll probably want to have people really
organize the material we're now accumulating, for information
charts, product reviews, etc. If you're interested in contri-
buting, let me know.

The copy deadline is July 17th. PLEASE DON'T WAIT UNTIL THE MAY
MEETING to turn in your copy...it's much too late to get in.

We're doing everything we can to beat the post office rap...it's
their fault the magazine is late. The only way we can get past
that is to get the magazine printed earlier. That means getting
the copy typeset earlier. So we need your help by getting your
stories and articles on time.

Thanks for your past help...without it there wouldn't be an
INTERFACE. Looking forward to working with you on the July
issue.

                                Sincerely,

FOR SALE:

1. **ALTAIR 8800:** new kit, original cost $439, plus $8 shippage. Opened and inspected for damage, other wise untouched. Sell for $400 with all documentation. Will ship.

2. **MIL MOD - 8:** debugged and running with MONITOR-8! Boards include: CPU, TTY, BUFFER, 2k - PROM without the PROM's, 2k RAM with 2k 650 ns. 2102's, INPUT, OUTPUT, 4k ROM/PROM/RAM board, con- taining a 2k MONITOR-8 ROM, with room for 1k each of PROM and RAM, BACKPLANE - MOTHER board, completed, able to program 1702/1702A's. Documentation includes: MIL applications manual MF 8008, R.E. Mark - 8 manual, INTEL users manual MCS - 8, MOD - 8 and MOD - 80 documentation packages from R. Schwartz, Chicago, giving details of easy conversion to 8080 cpu. Sell for $300. Will ship. All IC's socketed

3. **CASSETTE INTERFACE,** from Digital Group, works well with MIL MOD - 8 system. Cost $25. Will sell for $20. Includes documentation and plug for board.

4. **CREED TTY:** from R. Cook, Chicago. With documentation. Cost $125. Sell for $100. You ship.

5. **TVT - 1 and KBD - 1:** Radio Elect. TVT - 1 debugged and running with a modified UART board, such that it simulates a KSR - 33! 32 character, by 16 lines. Keyboard modified to give proper strobe delay. Works well with MIL MOD - 8 system for I/O device. With documentation. Sell for $120. Will ship.

Will sell above # 2 - 3 - 4 - 5 for $500
Money order please. SASE for further information.

Richard F. Schultz
611 N. Dexter
Lansing, Michigan 48910
517 - 393 - 9438

UNIVERSITY of PENNSYLVANIA
PHILADELPHIA 19174

DEPARTMENT OF MATHEMATICS El   May 3, 1976

S. A. Cochran, Jr., Esq.
P.O. Box 607
Tyler, Texas 75701

Dear Mr. Cochran:

I saw your letter to the Micro-8 Newsletter concerning the Burroughs typewriter. I am unable to satisfy your desire for a manual since I do not have one, but I am quite willing to share the results of my experimentation; I have been able to get my unit to work (although I believe that I have not fully fathomed its mysteries).

Not having any information about your equipment, I shall assume that you have both the typewriter and the box of control electronics. (I didn't get the card reader.) After coupling the two units via the cable supplied, one has access only to the 25 pin connector for input-output use.

I tracked the wires in this I/O cable; the results are shown on the attached sheet. The numbers on the extreme right are the pin numbers of the 25-pin connector. Note that #8 (connected to a white wire) goes nowhere!

#2 is serial data out
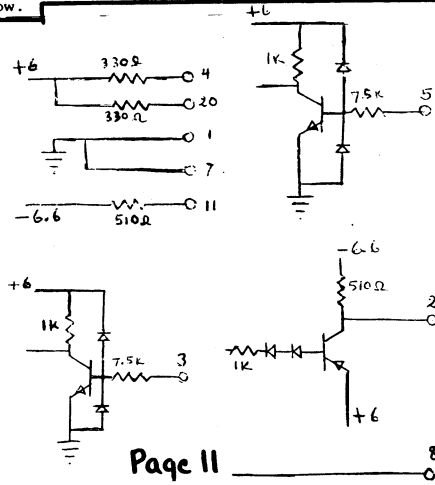#3 is serial data in
#5 is on-line control
The unmarked leads from the transistors disappear into the jungle of IC's.

Data Format: 8 bit Ascii with MSB selected to give even parity. Transmission is serial at 150 Baud — start bit, 8 data bits, 1 stop bit. Furthermore, 1 is positive voltage and 0 is negative. (This is contrary to the RS-232 convention.)
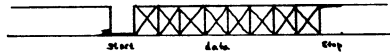
On-line operation: The on-line switch should be on, and #5 should be positive; I permanently connected #5 to #20.

Transmit: Transmission starts by depressing the switch marked 'Transmit'. This produces the following sequence: the keyboard is unlocked, the lights marked 'Transmit' and 'Send' are lit, and the control character STX is sent out from #2. At this point the machine functions as a typewriter in the usual sense while simultaneously transmitting the Ascii codes for the keys. Transmission ends by depressing the switch ETX. This does several things, but the relevant ones are: the code for ETX is sent out from #2 and it is followed by transmission of the system parity. This byte is needed — see below.

On-line operation, receive: This description assumes that one has just completed a transmission from the typewriter. Transmission from the CPU starts with STX. This causes the 'receive' light to go on. Characters can now be sent out to the typewriter; with a system-parity byte being developed. One starts with the system-parity byte which originated from the typewriter, then each character sent from the CPU (not counting the initial STX) is exclusive-ored with the developing system-parity byte. Transmission ends with ETX, followed by the value of the system-parity. If all is well, the typewriter will emit an ACK output to the CPU, and will start to type.

- Apart from STX, ETX, ETB, ACK, the functioning control characters are CR and HT.

Buffer: The control electronics has a buffer memory of approximately 140 bytes. The message from the CPU to the typewriter is stored in this buffer until the ETX and system-parity arrive, at which time the printer will start. If the message is too long, the procedure is the following: keeping a count of characters, the CPU sends STX, text, ETX, parity not to exceed the buffer size. When ACK is received from the typewriter, one can send the next installment, following the same form STX, text, ETX, parity, but this time setting the starting value of the system-parity to zero. This process can be repeated as often as one wants.

Note that ETB may be used instead of ETX with some minor changes. Also, on my machine sending control characters DC1 or DC2 from CPU to the typewriter has some mysterious effect which I have not yet figured out.

There are some built-in protections against time-wasters! If no action occurs for more than 30 seconds, the error light comes on and everything disconnects. Pressing 'reset' reactivates the machine.

Because of the voltages involved in the Burroughs, I connected my computer (Altair 8800) to the typewriter via 2 opto-couplers.

Please let me know if this information has been of any value to you. If your letter to Hal Singer should cause a manual to appear miraculously, I would very much like to have a copy, and would certainly be willing to pay the cost of Xeroxing.

Sincerely yours,

Oscar Goldman

Oscar Goldman
Professor

Rotterdam April 10, 1976
Dear Hal

I am glad that you received my letter this time . The last time I wrote was when your group was menchend in a PE article. I reed in the back issues that you got a lot of responce that time my letter must have got lost In the pile . I received all the back issues in good orther and had quiet a bit of reading to catch up , reading thru them all I was surpriced that their are so many Mark-8 onwers and people who are building one. If you reed thru the other mag, RE, PE, Byte you would hardly think they still exist I am also currently building one becouse at the moment it is the only one I can afford I have to pay about 25% extra on all part and kits for extra postage and inport deu , at the moment I am still in the proces of gathering the parts. I reed that most people have changed to 2102 memories instead of 1101 that where used in the original one, could any one inform me how to this?The equipment that I have is a TVT-I with at first a SWTP keyboard but as more people found out that it is rather slow and puts out a slash when you the tvt on repeat. I have now a micro switch 558WI-2 keyboard (hall-effect) witch I converted to ASCII code this work much better. My plan are finishing the Mark-8 and converting the TVT to 64 characters per line and using it to put RTTY on screen . I would also like to contact with fellow computer hobbist in europ or the U.S.A. Would you also please not my change of addres :

Hank K Berkhoudt
Hesselkamp 4
Rotterdam 3023
Holland

Home computer terminals feasible by 1985

The computer terminal will not receive widespread acceptance in the home until its price drops to the level of a color-television set—$400 to $500—said Joel Moses of Massachusetts Institute of Technology at the recent convocation celebrating the 100th anniversary of the telephone. A terminal with 32,000 words of memory will cost about $400 by 1985, and by 1995, it will be available with 1 million words of memory for about the same price, he predicted. He based the forecasts on the assumption that semiconductor costs will drop 40% per year.

Another important cost factor will be carrier charges, assuming, of course, that sufficient capacity will be available to handle all of the additional traffic these terminals will produce. Moses says that line costs cannot exceed twice the level of a day's telephone costs in order to minimize communications costs to meet these cost objectives, much of the storage and processing will have to be done by the terminal, especially in view of the limited bit rates of local loops. But even if Moses' predictions come true, IBM Corp. may not sell the terminal, at least not at the outset. Said Bob O. Evans, president of IBM's System Communications division: "We're just looking out for...

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Morrow's Micro-Stuff
Box 6194
Albany, CA   94706
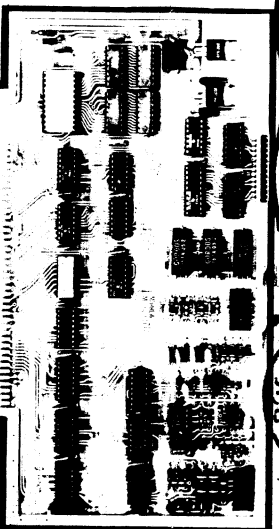
PHOTOGRAPH OF THE CASSETTE INTERFACE BOARD. THE EROM IN THE LOWER LEFT HAND CORNER CONTAINS THE CASSETTE OPERATING EXECUTIVE SOFTWARE. ABOVE IT ARE THE FOUR 4 x 256 RAMS. THE THREE GROUPS MAKE UP THE TOP MIDDLE OF THE BOARD.

CASSETTE INTERFACE BASIC BOARD
2 EXTRA CASSETTE MACHINE CHANNELS
TTY INTERFACE HARDWARE
I/O PORT HARDWARE

THE KEY TO INEXPENSIVE, MASS STORAGE

IS A CASSETTE MEMORY. You can record up to 90,000 bytes of information on a single C-60 cassette, and you don't have to worry about the turn of your system. It's right there in the cassette. However, not all cassette interfaces are alike.

The Morrow's Micro-Stuff Cassette Interface is a different type of interface. It is NOT a "bare bones" type peripheral. It comes with RAM, EROM, and several options — such as extra cassette channels, or RS-232/TTY Interface. It is fully compatible with the Altair 8800 and IMSAI microcomputers and will work with these machines whether they have a front panel or not. Pop it into the edge connector---then you're ready to go.

THE "CASSETTE OPERATING EXECUTIVE" EROM

Because the Cassette Interface does so much, there are a lot of features we need to cover. Let's start by looking at the EROM we've nicknamed COPE, for Cassette Operating Executive. This EROM stores all the routines you need for cassette interfacing.

1. COPE contains routines which generate bi-phase (1200/2400 Hz; 300 baud) waveforms as well as routines which detect bi-phase waveforms and convert these waveforms to binary information.

2. COPE contains routines which read data from the computer's memory to the Cassette Interface's RAM, and writes out this information, in blocks, on 1, 2, or 3 cassettes (it can also shuttle between these three machines).

3. COPE contains routines which read data from any of the three cassettes into the Interface's RAM, performs error checking on this data (that's a nice touch), strips off formatting and error-checking information, and transfers this data to user memory areas in your microcomputer.

4. COPE contains routines which simulate the function of a UART along with a TTY reader control, so the data can be sent to any RS-232/TTY type device.

5. COPE contains a bootstrap routine which allows a monitor or operating system to be read from cassette. #1 when the computer is first turned on.

DOCUMENTATION

One of the most important aspects of any kit is the documentation...so before we look at the other technical features of the Cassette Interface, let's elaborate on the side you receive that allow you to get this system up and running with a minimum of confusion.

1. Logic print.
2. Parts layout and assembly instructions.
3. 2 separate listings; an assembly language listing of the software routines, along with a general explanation of how the routines work and how they are used.
4. An applications note which guides you to maximum use of the EROM, as well as a detailed description of the function of a UART along with a TTY interface control.

This documentation package is available separately for $4.95 (refundable with order).

THE HARDWARE STORY

The Cassette Interface uses the latest low power Schottky parts available, and puts them all on an industrial-quality plated-through, double-sided board (epoxy glass base). There is on board regulation for +5V, +12V, and -12V. Our three cassette channels are fully loaded board (I/O port) uses a 26 pin flat ribbon connector, with the reliable signal/ground/signal convention.

OTHER FEATURES

Internal data paths are completely isolated from buss data paths.
All I/O devices are totally under software control.
The 8 bit I/O port uses a 26 pin flat ribbon connector, with a nel/ground alternate lead system for high-speed communications.

Both cassette and RS-232/TTY interfaces communicate with the outside world via a 16 pin DIP socket---so you can use low-cost flat cable to connect the board to your favorite devices.

ADDRESS REQUIREMENTS

1024 memory locations are required and must start at a 1K boundary. Unless otherwise specified, the starting address is 8000 (hex); however, when ordering you may specify any starting address desired (the COPE software will be assembled to reflect this requirement).

Four I/O device addresses are required and must start at a device number divisible by 4. Unless specified otherwise the I/O addresses are devices 4, 5, 6, and 7. Again, these can be changed when you order...just let us know.

After you've built the Cassette Interface, all you need to do is load the starting data address, the word count, and a little information into the format area of the RAM, then execute a CALL READ TAPE or CALL WRITE TAPE. Data blocks of up to 65K may be read or written directly using these routines and calling conventions.

SUMMARY

With the on board EROM/RAM and multiple SERIAL/PARALLEL lines available, this is the only board you'll need to add to your Altair 8800/IMSAI for process control applications. The ability to talk to three cassettes allows for sort-and-merge type operations not possible with only one or two cassettes. The board is expandable, so you can add capabilities --- as your needs require.

FINAL COMMENT FROM GEORGE MORROW: "What can I say? This is a marvelous board. Every morning I wake up with a new way of using it."
FOR CURRENT PRICING AND AVAILABLE OPTIONS, SEE OUR FLYER.

One Time Offer $149.00

WELL BYTE MY INTERFACE!

It's about time... finally the same microcomputer kit that is used by the Home-Brew Computer Club in Silicon Valley, Ca. is available to you.

AMI'S EVK 99
(6800 based microcomputer proto kit.)
Expanded EVK 99 Features

- Built-in EPROM Programmer ■ 2048 Bytes EPROM
- 1024 Bytes RAM ■ 58 I/O Lines (parallel)
- 2048 Bytes RAM ■ RS232C Interface (TTY)
- Three types of EPROM
- Provisions to operate for slow memory
- ROM subroutine library
- Single 5V supply except when using EPROM's or RS232 Interface
- Totally Buffered on MPU Lines
- TTY Operating System
- Restart Address Selection ■ Interval Timer

BASIC EVK99 PROTO KIT CONSISTS OF:

(1)	10% x 12 PC Board	(2)	6830 ROM
(1)	6800 CPU	(4)	6810-1 RAM
(1)	6850 ACIA	(1)	Operating Manual with
(1)	6820 PIA		instruction to expand to
			full system.

Note: Photo is of fully expanded system.

$149

ALSO AVAILABLE - AMI Tiny Basic ... a high level interpretive language derived from standard Darmouth Basic. Write for details.

S6800 CPU	$26.95	21L02 (450ns.)	$ 1.95
AMD8800A CPU	$26.95	2102 (500 ns.)	$ 1.79
S6860 Modem	$16.95	9112 256x4 RAM	$ 2.90
S6820 PIA	$11.00	7489 64bit RAM	$ 1.95
S6810-1 RAM	$ 5.25	1702A EPROM	$ 9.95
S6850 ACIA	$ 9.95	5204 EPROM	$23.50
S2350 USRT	$ 7.95	8212 I/O Port	$ 3.75
S1883 UART	$ 5.00	8224 8080 Clock	$ 5.00
S6834-1 EPROM	$22.95	AY51013A UART	$ 5.00
S6800 Prog. Manual	$15.00	4402A Static RAM (4K)	$12.95
S6800 Hardware Man.	$15.00	GI CP1600 bit CPU	$74.95

WE OFFER ONLY PRIME FACTORY WARRANTED PRODUCTS.

Additional IC's are required to implement expanded system.

SEND FOR OUR NEW CATALOGUE
FEATURING ALL
SEMICONDUCTORS
IF YOU DON'T SEE IT HERE ASK...

---

6 TV GAMES ON A CHIP

ONLY PLACE AVAILABLE - IN STOCK
● Unit Qty. $39.95 GI's AY3 8500-1 MOS/LSI Game Chip
● Qty. (5) $35.95 ● Qty. (10) $33.95

KIT NO. 1 PC Board-Gamechip. Instructions and recommended RF Modulator Circuit $49.95

KIT NO. 2 PC Board-Gamechip. Switches, Capacitors, Pots, Speaker, Crystal resistors, XFMR, Bridge and all parts necessary for video out $69.95

KIT NO. 3 Super Pong-The ultimate includes slimline chassis, RF mate Modulator built-in, Battery Operated, Channel select, Partially assembled, Aesthetically Profound $99.95

●HOCKEY ●TENNIS ●HANDBALL ●PRACTICE ●RIFLE SHOOT 1* ●RIFLE SHOOT 2*
*option

FUNCTION GENERATOR KIT		
XR - 2206KA ... 17.50 includes PCB, function generator and assembly instructions		21L02 450 ns FACTORY DIRECT $1.95 ea.
XR - 2206 ...27.50 same as above and includes external components		

TOUCH-TONE MULTITEL KIT	
GI AY59100 push button dialer	
GI AY59200 Repertory dialer	
AY3 9400 Multi frequency generator	
AY59500 CMOS Clock generator	
$50.00	

TOUCHTONE CONVERTER
For Dial Phone Completely tested and assembled
$54.95 each

SEND FOR OUR NEW CATALOGUE ... it contains all popular part types at competitive pricing. We are not a surplus dealer and you appreciate our service when you get to know us.

TERMS: All shipments first class in U.S. on orders under $25.00 add $1.00 for handling. Minimum order $10.00. California Residents add 6% tax.

ADVANCED MICRO COMPUTER PRODUCTS □ P.O.BOX 17329 □ IRVINE, CA 92713

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