MICRO-8 COMPUTER USER GROUP NEWSLETTER
HAL SINGER & JOHN CRAIG -- EDITORS
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

AUGUST 3, 1975
VOLUME 1, #9

NO FIELD SEEMS TO CHANGE AS RAPIDLY AS THIS HOBBY COMPUTER THING. SOME BOMBSHELLS ARE ABOUT TO HIT THE HOBBY MARKET. LOOK FOR:

1) BILL GODBOUT'S COMPANY WILL ANNOUNCE TWO KITS ON SEPTEMBER 1:

A) A PACE 16 BIT SYSTEM WITH 1 OR 2 K OF MEMORY AND A COMPLETE LINE OF PERIPHERALS WITH A VERY LOW TARGET PRICE. A DETAILED INFORMATION PACKAGE IS BEING PREPARED AND WILL BE AVAILABLE SOON FOR A VERY LOW PRICE AND SHOULD BE VERY INFORMATIVE. (THE PACE IS ABOUT 90% LIKE A DATA GENERAL NOVA AND THERE ARE SOME THAT HAVE HOPES THAT NOVA SOFTWARE CAN BE MODIFIED TO BE USEABLE BUT THAT MAY BE A LITTLE OPTIMISTIC.)

B) AN MSI-11 KIT FOR UNDER $1000. THIS IS A MICROPROGRAMMED CPU USING TTL LOGIC WHICH EMULATES THE FULL PDP-11/40 INSTRUCTION SET.

BILL IS RELUCTANT TO DO MUCH ADVERTISING OR PASS OUT INFORMATION UNTIL THEY ARE READY TO DELIVER IN VOLUME TO TRY TO AVOID PROBLEMS THAT HAVE PLAGUED EVERY OTHER KIT COMPUTER OFFERING SO FAR BUT EVERY INDICATION IS THAT WHEN THEY ARE READY TO GO, YOU WILL BE ABLE TO OBTAIN TREMENDOUS SYSTEMS FOR AN AFFORDABLE PRICE.

2) JOHN BURGOON OF SOLID STATE MUSIC IS FIRMING UP PLANS FOR A "SUPER 8080 SYSTEM" WITH A BETTER DESIGN AND LOWER COST THAN ANYTHING SEEN YET. THIS IS A VERY EARLY LEAK SO DON'T BE UPSET IF INFORMATION IS UNAVAILABLE FOR ANOTHER MONTH OR SO.

3) EVERYONE HAS HIGH HOPES FOR THE M6800 SYSTEM ANNOUNCED BY SPHERE. THEIR ADVERTISING LITERATURE INDICATES THAT THEY DO REALIZE THE PROBLEMS OF STARTING OUT A LOW BUDGET OPERATION BUT THEY SEEM TO INTEND TO DO EVERYTHING POSSIBLE TO DELIVER HARDWARE AND SOFTWARE AS SPECIFIED ON TIME. THEIR INTRODUCTORY PRICES ARE SUPERB BUT MAKE SURE YOU USE MASTERCHARGE. DON'T GAMBLE THAT KIND OF MONEY ON GOOD ADVERTISING LITERATURE.

4) PROCESSOR TECHNOLOGY IS DELIVERING THEIR ADVERTISED ITEMS "OFF THE SHELF" WITH NOTHING BUT RAVE REPORTS. THEY ARE OFFERING 8080 SOFTWARE FOR LESS THAT COPYING COST. SOON SOFTWARE WILL BE AVAILABLE ON MASK PROGRAMMED ROMS VERY CHEAP. THEY ARE WORKING ON LOW COST CASSETTE AND DISK SYSTEMS AND OTHER ALTAIR PERIPHERALS AS FAST AS THEY POSSIBLY CAN.

5) MOS TECHNOLOGY REPORTEDLY ANNOUNCED PIN COMPATIBLE NEARLY IDENTICAL M6800 CPU CHIPS FOR $20 IN QUANTITIES OF ONE! (SEE ELECTRONICS, END OF JULY ISSUE.) IT ISN'T TOTALLY CLEAR HOW IDENTICAL THEY REALLY ARE BUT THAT MEANS THAT OTHER MANUFACTURERS WILL PROBABLY BE SHOOTING FOR THAT PRICE LEVEL WHICH MEANS WE CAN EXPECT TO SEE $24.95 8080'S, $15.95 8008'S & PACE, F8, AND OTHER CPU'S FOR ABOUT THE SAME PRICE. I'VE HEARD FROM SEVERAL SOURCES THAT THE EXPECTED PRICE OF AN M6800 IN A YEAR WILL BE ABOUT $10. IT SEEMS NOW THAT THE MOST IMPORTANT PRIORITY IS TO LINE UP SUPPLIERS FOR THE SUPPORT CHIPS NECESSARY TO IMPLEMENT 5-6 CHIP CPU SYSTEMS.

6) BASIC'S KEEP SHOWING UP. MITS HAS DELIVERED AT LEAST ONE COPY OF 4K BASIC (NO REPORT YET ON HOW WELL IT RUNS) AND THEIR 8K BASIC IS RUNNING WELL ON THE 8080. PROCESSOR TECHNOLOGY WILL SOON RELEASE LISTINGS OF AN 8080 BASIC AND WILL PROBABLY SUPPLY IT IN ROM. ANOTHER 8080 BASIC I S RUNNING BUT NO INFORMATION CAN BE RELEASED ON IT. THE DIGITAL GROUP IS STELL TALKING ABOUT 8008 & 8080 BASICS BUT NOTHING IS AVAILABLE YET. THE MOST IMPORTANT PIECE OF SOFTWARE REIGHT NOW FOR MANY OF US IS AN 8008 BASIC. THERE ARE A LOT OF 8008 MACHINES AROUND AND THOSE OF US WITH THEM D ON'T REALLY WANT TO BE LEFT OUT OF THE ACTION.

7) A NEW COMPANY IS STARTING THAT HOPES TO HAVE 8008/8080 VERSIONS OF FOCAL FOR ALL OF YOU FOCAL FREAKS THAT DID YOUR WORK ON DEC MACHINES.

8) FOR THE ALTAIR OWNERS, WOULD YOU BELIEVE AN 8K MEMORY MODULE FOR UNDER $200! I WANT TO DO SOME MORE CHECKING BEFORE I MENTION WHO HAS IT AND WHEN IT WILL BE AVAILABLE.

ALSO FOR ALTAIR OWNERS, JOHN BURGOON OF SOLID STATE MUSIC HAS SOME REALLY BEAUTIFUL BOARDS AVAILABLE FOR I/O CONSTRUCTION. CONTACT HIM A T 1222 CAROLYN DRIVE, SANTA CLARA, CA 95050 296-7330. MARK-8 OWNERS, D ON'T FORGET HIS 4K 2102 BOARD PLAIN OR STUFFED. REPORTS ARE THAT THE QUALITY IS SUPERB.

9) RUMORS FLOATING AROUND INDICATE THAT BYTE HAS ALREADY RECEIVED OVER 20,000 SUBSCRIPTIONS AND ADVERTISING RATES ARE UP TO $1500 A PAGE. THE F IRST ISSUE IS BACK FROM THE PRINTER AND WILL HAVE ABOUT 94 PAGES WITH MORE ADVERTISING THAN ANYTHING ELSE BUT LET'S REALLY SUPPORT THEM. IF IT TURNS OUT AS GOOD AS "73" MAGAZINE IT SHOULD BE AN INVALUABLE AID TO THE HOBBY EFFORT.

10) CURRENT RUMORS INDICATE THAT ONE CAN EXPECT DUAL FLOPPY DISK DRIVE U NITS SOON FOR UNDER $1000. LET'S HOPE IT'S REAL SOON.

11) EVEN MARTIN REASEARCH HAS HAD TROUBLE DELIVERING ALTHOUGH THINGS ARE COMING THRU NOW. IT WAS FRUSTRATING TO RECEIVE THE UNIT WITHOUT EVEN A PIECE OF PAPER TELLING WHICH KEYS ARE WHICH. DOCUMENTATION IS ARRIVING NOW AND THEY PROMISE MUCH MORE DETAILED DOCUMENTATION SOON. MANUALS, 4K M EMORY BOARDS, EXTRA 2112 MEMORY CHIPS, AND I/O BOARDS ARE STILL BACK-O RDERED. IT IS A NEAT LITTLE MACHINE, ALL UNITS ARE BEING SUPPLIED AS-S EMBLED AND TESTED TEMPORARILY (RICHARD LERSETH WAS EXTREMELY UNHAPPY TO RECEIVE HIS ASSEMBLED. HE WAS REALLY LOOKING FORWARD TO SOLDERING.), THE KEYBOARD MONITOR SUPPLIED WITH IT READS A CALCULATOR KEYBOARD SO YOU CAN LOAD AND RUN PROGRAMS WITHOUT ANY PERIPHERALS, AND ITS STILL THE LOWEST COST FACTORY PREPARED KIT AVAILABLE. IT WILL SURE BE NICE TO GET THE FULL DOCUMENTATION PACKAGE THOUGH.

12) SCELBI CONTINUES TO ADD TO THEIR LEGION OF SATISFIED OWNERS. THEIR MACHINE MAY NOT BE THE CHEAPEST OR THE PRETTIEST BUT IT IS EASY TO ASSEMBLE, DOES EXACTLY WHAT IT IS SUPPOSE TO, DELIVERY IS ON TIME, AND SUPPORT IS SUPERB. THEIR PROGRAMMING MANUALS CONTINUE TO EARN ABSOLUTE-LY RAVE REVUES!!

13) ROBERT SWARTZ HAS DELIVERED OVER 45 OF THE MIL MOD-8 DOCUMENTATION PACKAGES MENTIONED IN NL #7. HE HAS HIS OWN MACHINE MODIFIED FOR AN 8080 AND IS RUNNING MONITOR-80 ON IT. HE WILL SOON HAVE A FULL DOCUMENTATION PACKAGE PUT TOGETHER FOR THESE 8080 MODIFICATIONS.

THIS IS THE NINTH ISSUE OF VOLUME 1 WHICH WILL CONCLUDE WITH #12. WE WILL THEN BE FACED WITH ANOTHER DECISION AS TO WHAT TO DO NEXT. IT IS QUITE POSSIBLE THAT A NEWSLETTER TYPE PUBLICATION WILL NO LONGER BE NECESSARY WITH ALL OF THE COMMERCIAL VENTURES THAT ARE NOW OPERATING. BUT, ONE CAN ARGUE THAT A STRICTLY NON-BUSINESS TYPE PUBLICATIONS IS NECESSARY TO PROVIDE A FORUM FOR HOBBYISTS THAT NEED TO THROW ROCKS AT COMMERCIAL TYPE BUSINESS VENTURES.

WE WOULD LIKE YOUR ADVICE. PLEASE WRITE AND LET US KNOW WHAT YOU WANT TO SEE HAPPEN IN THE FUTURE.

IN NL'S 10, 11, & 12 YOU CAN EXPECT TO SEE A COMPLETE ROSTER OF ALL PEOPLE THAT HAVE CONTACTED US (ABOUT 1200+) ARRANGED IN BOTH ALPHA-BETICAL AND ZIP CODE ORDER. IF YOU DO NOT WANT YOUR NAME AND ADDRESS TO APPEAR, PLEASE SEND US A POSTCARD SO STATING IMMEDIATELY. IF ALL YOU ARE WORRIED ABOUT IS RECEIVING SOME JUNK MAIL, PLEASE REMEMBER THAT THEY STILL MAKE GARBAGE CANS AND THE BENEFITS OF GETTING TOGETHER WITH OTHER FELLOW HOBBYISTS FAR OUTWEIGH THE CONVENIENCE OF A LITTLE JUNK

I'M AFRAID THAT TELEPHONE CALLS TO CABRILLO HIGH SCHOOL REGARDING USER GROUP ACTIVITIES HAVE COMPLETELY SWAMPED OUT THE SECRETARIES TIME. I'M USUALLY UNAVAILABLE DURING THE SUMMER AND DURING THE SCHOOL YEAR I AM IN CLASS FROM 8:00 UNTIL 2:30 AND CANNOT BE REACHED. I REALIZE THAT IT IS MUCH MORE CONVENIENT TO DO BUSINESS BY PHONE (OH, WHAT I WOULDN'T DO FOR A WATS LINE) BUT I MUST ASK THAT PARTICIPANTS LIMIT CALLS TO THE SCHOOL TO URGENT ONES ONLY. MY HOME PHONE (805-735-1596) WILL ONLY BE ANSWERED BY ME AND YOU ARE WELCOME TO CALL EARLY OR LATE. I MAY IMPLEMENT A RECORDED MESSAGE UNIT SO HANG UP WITHIN A MINUTE IF YOU GET THE RECORDED MESSAGE SO YOU WILL NOT BE CHARGED FOR THE CALL. JOHN CRAIG WILL SOON BE WORKING IN TOWN AND WILL HAVE A PHONE AT WHICH HE CAN BE REACHED DURING THE DAY. THANKS.

Theodore E.P. Sallume

Theodore E. P. Sallume
945 Via Fargo
Santa Maria, CA., 93454
A.C. 805-937-4541

Dear Hal
You often talk about how we must "write-off" the money we send off to a supplier. Diamond merchants have found a way to solve this problem. They send the goods on consignment to the the buyers bank and for a fee the bank holds the goods until it receives payment. While this method is not practical for us, Master Charge has many of the same features including the cost.

A dealer can know in 10 minutes if your MC is good, this compares with 10 days for a check, however it will cost him 3%. Besides faster service, MC provides safty for your money as most banks when asked will back charge all payments for the goods not received. Check with your bank in advance. BankAmericard would not give me that assurance over the phone. I have used this method on MC.

IMPORTANT NOTICE TO CUSTOMERS

New Legislation for Your Protection

The Song-Beverly Credit Card Act of 1971 (section 1747.90 of the California Civil Code) provides in part that the Bank's right to recover any credit extended to you for a purchase from a retailer through use of your MASTER CHARGE Card is subject to any defenses you may have as a buyer against the retailer as to such purchase, IF ALL OF THE FOLLOWING OCCUR:

(1) The purchase price of the item as to which you assert a defense exceeds fifty dollars ($50.00);

(2) The purchase was made in California;

(3) You have made a written demand on the retailer with respect to the purchase and have attempted in good faith to obtain reasonable satisfaction from him; and

(4) You give written notice to the Bank, naming the retailer and specifying the date of the purchase, the goods or services purchased and their cost, the nature of your defense (i.e., why you are dissatisfied) and any steps you have taken in attempting to obtain satisfaction and resolve the dispute.

If your defense is a valid one, following these procedures means that you may be relieved of part or all of your repayment obligation to the Bank as to the disputed purchase.

MASTER CHARGE Billing Errors

The new law also provides that if we, the card issuer, should make a billing error on your MASTER CHARGE account, we must correct it no later than 60 days from the date you mail to us written notice of the error. In the event of any such error, please provide full details of the problem in writing to the address noted on your regular MASTER CHARGE statement, or to Wells Fargo Bank, N.A., Credit Card Department, P. O. Box 44081, San Francisco, California 94144.

SINCE 1852 WELLS FARGO BANK, N.A.

MC 1008 (3-72)

P. S. Wells Fargo has indicated to me that there are similar federal laws which also apply and that the bank which carries the merchant's Master Charge is responsible if the merchant goes under. The only requirement for becoming a Master Charge merchant is to be on good terms with your bank. They think 3% is a lot for cashing a check so you might want to be a MC merchant your self if you start selling surplus and deal only with merchants who honer MC. Remember the costs. TEPS

Stephen L. Diamond
311 Carl Street
San Francisco, CA 94117

June 22, 1975

Dear Hal:

Several months ago, I sent you a package containing the self-addressed, stamped envelopes sent to me by individuals interested in the Mark-8 user's group, details on my M6800 microcomputer development project, a long letter, and $5.00 to cover your costs in sending me future newsletters. I also sent tentative suggestions on an 8080/M6800 processor link, and mentioned some tentative plans for software to be implemented on the M6800 and a potential PDP-8 and PDP-15 style FORTRAN cross-assembler for the M6800 family. I'm sorry you didn't receive it.

Since then, I've started design and coding on a multi-programming real-time operating system for the M6800, with multiple software priority levels, deferred scheduling, and supporting multiple peripherals such as cassette, TTY, and punched tape to begin with. I'm planning on adding an A/D and D/A interface with possible DMA for high sampling rates. If you're not too familiar with the MC6800 CPU, let me mention a few features. The MC6800 is an 8-bit machine, with an architecture and instruction set very very similar to that of a PDP-11. With a 1 microsecond cycle time, most instructions take 2 or 3 microseconds to complete, although some register functions can be completed in 1 cycle. It supports vectored interrupts, and has a mask instruction as well as a non-maskable interrupt input for high priority access. It can be run in a single-instruction mode for console debugging, and all peripherals and memory interface with the CPU on a single 8-bit bidirectional data-buss, just like a Unibus. The memory address buss is 16-bits wide for 64K address space for memory and peripherals. Motorola offers an evaluation kit, consisting of the Programming and Applications manuals ($50 worth), the MC6800 CPU, two 128 x 8 RAMS, two 16-bit parallel I/O interfaces, one serial port, and a ROM containing loading, I/O, and debugging firmware, all for $300.00. With the addition of some TTY drivers and a single +5 supply, the system is runnable using the sort of-DDT like firmware ROM to examine and load memory locations, load papertape programs, print registers, control interrupts, and so forth! Truly a third-generation microprocessor, and the CPU costs about the same as the 8080, at least from the prices I've seen in 73 Magazine. Also, AMI (I think) is an authorized second source, and offering chips made from the same masks at lower cost.

We're planning to make available a ROM containing the real-time operating system, including centralized, device-independent I/O and more flexible debug facilities as soon as I've completed the software. With the low-cost vendor-programmed ROMs available, such a operating system would facilitate much M6800 development, I feel.

Well, Hal, that about wraps up my microcomputer activities for now. As I mentioned in my last letter, I have one unopened Mark-8 pc board set and a TV Typewriter (earlier version) for sale, and offers are solicited. I'll keep you informed on the real-time system for the M6800, and send a schematic of the hardware configuration when we've laid out the pc boards (I'll send a layout too). Please keep me informed on 8008 and 8080 developments; I'll try to answer anyone's questions on M6800 family hardware and software.

Sincerely,

Steve Diamond

Stephen L. Diamond

Dear Hal,

Hope the enclosed is sufficient information on the Stampit-Etchit kit for the next newsletter. From the time I received my package from the Digital Group to when I had the the cassette interface board made and all parts plugged and soldered was only two hours. The Stampit-Etchit kit sure beats blindly drilling holes and then point to point wiring! I forgot to mention that M-Tech will take phone orders for both Mastercharge or Bank Americard.

I still haven't received my Suding TV typewriter unit eventhough I sent them a check over two months ago and received a card that it would be shipped on 1 June. I sure hope they haven't given up the ghost before even publishing one Newsletter. Keep up the good work. The Micro 8 Newsletter seems to be the only continuing source of information.

Sincerely,

Lee S. Mairs

Stampit-Etchit Kit

For all of you without the elaborate camera equipment necessary to copy the printed circuit art layouts accompanying the various Mark 8 changes and enhancements, M-Tech Engineering, Inc., Box C, Springfield, Virginia 22151, has developed an elaborate set of rubber stamps for designing and fabrication of prototype printed circuit boards. The basic SE-2 kit contains eight stamps for the most commonly encountered components, resist ink, stamp pad, resist pen, and even a plastic bag to hold the board while etching. A few hints for successful board production may be in order. First, tender loving care in stamping the component stamps results in sharp edge definition. Too much pressure may blot the ink. Secondly, read the instructions included with the kit! There are many fine hints noted, such as going over connecting lines with the resist pen twice to prevent etch through. Lastly, watch the board while it is being etched. As soon as the unwanted copper has been removed, take the board out of the etchant bath. The concentration of the various etching materials varys even among manufactures. For example, two bottles of Ferric Chloride obtained from Radio Shack varied by three minutes (ten minutes for the first board and thirteen minutes for the second) in the time necessary to etch identical boards for the Suding cassette interface.

M-Tech Engineering, Inc. is owned by two guys who have also become Mark 8 devotees. While trying to obtain components for their own installations they ran across some 256X1 UA3656D RAMS that are pin for pin equivalents to the 1101 RAMS called for in the original Mark 8 construction. They have a limited supply that they will sell for $1.30 each. If you want a full boards worth (1K of memory), you can get 32 devices for $38.40.

Although M-Tech is primarily noted for its VHF power amplifiers, they are taking a long hard look at the computer hobbyist market, specifically peripherals for the Altair and the Mark 8 units.

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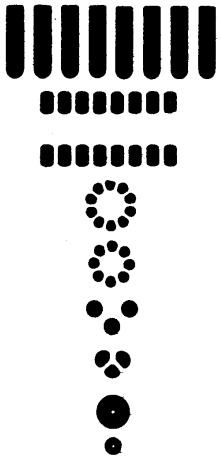
Simple as A.B.C.

A. Stamp Components on P.C. Board. **B.** Use Pen to Interconnect Lines. **C.** Etch Board.

SE-2 KIT CONTAINS:



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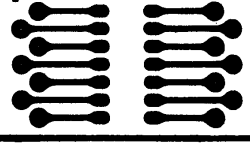
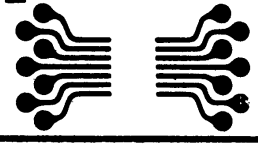
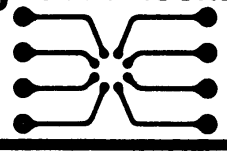


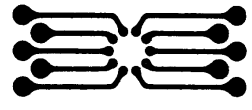
#2 FLAT PACK



#3 8-PIN ROUND



#4 10-PIN ROUND



M-TECH ENGINEERING
BOX C
SPRINGFIELD, VIRGINIA 22151
703/354-0573

WILLIAM E. SEVERANCE, JR.

TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

July 12, 1975

Dear Hal or John,

I've enjoyed the last two newsletters greatly but am sorry that I won't be able to contribute much material while my real estate business is keeping me busy day and night this summer.

In regards to my Octal Keyboard Loader circuit printed in NL #7, I've sent out 37 copies of the PC board layouts. If any one else should want one, please send a full size SASE with 20¢ postage. With 6 Xerox sheets in each, plus the extra postage I've had to put on, I've spent about $14 sending them out. Oh well, I'm highly pleased with the response. Two corrections in the circuit printed in the NL should be mentioned. 1) Eliminate the 50 mfd capacitor from KP to ground. 2) Change the .001 mfd capacitor from KP to the set pin of the 7474 to 100 pf. I've found the loader to make entering data and addresses by hand both easy and rapid.

While a leg injury kept me from showing property for a few days, I finally completed the Digital Group's modifications to the front panel controls and am pleased with them. I highly recommend against the use of 7-segment octal displays for address or memory data readout as it obscures the interpretation of bit patterns somewhat. Finally, I've also completed my I/O port expansion, 8k of pluggable 2102 RAM boards, AC power switching, and have stuffed everything into an attractive cabinet. Sure beats wires hanging over everything! Enclosed is a brief description of my I/O expansion and patch panel which I find very convenient. If any one wants more information, I'll write it up, but would now rather spend my time developing software -- something I couldn't do until my hardware was completed.

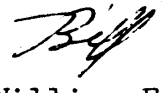
After months (or so it seems), Mini Micro Mart finally shipped my Suding Calculator Interface kit sans any promised software. Other ordered items have not yet appeared much to my rising anger with them as a supplier. As far as the Calculator Interface goes, the PC board had all the IC pin holes drilled too small (no real problem to redrill, however), was not plated through (would have been nice to allow the use of sockets), and several resistors were missing while several others were present in an excess number. Construction was not difficult even with the minimal diagrams supplied. With the information supplied in the Digital Group's preliminary write up, I have been able to write service routines for the calculator but would sure like to have seen Dr. Suding's software, particularly in regards to how he intends to store numbers in memory. Although transfers between computer and calculator are very slow and cumbersome, the interface seems worth the price and

while providing a floating point package also provides for all the common transcendental functions and then some. Being a great advocate of reverse polish notation, especially when writing an expression evaluator, I now wish I had opted to purchase the alternative calculator IC for RPN. I'm working now on a program to calculate and print out loan amortization tables but don't know when I'll get it finished.

Final topic -- have you seen the brochure put out by Sphere Corp. concerning their Motorola MC6800 based computer system? Having been quite impressed and perhaps a bit sceptical of the "how can they offer so much for the price" problem, I gave Sphere's president Michael Wise a call. He seemed very willing to answer my questions, was honest in his comparison of the MC6800 CPU with the LSI-11, and did not try to push me to purchase until I was convinced that the Sphere I system was what it was meant to be. Their extended BASIC looks good and, I believe, is ready now as is their disk operating system. Presently, I am looking for a larger system with disk and line printer to use in my real estate business for mailing lists, cross matching of prospects and listings, data storage, etc. The LSI-11 appears to be the most advanced processor in my price range in respect to its instruction set, general purpose accumulators, and many addressing modes. However, I'm afraid that it will be difficult to get a system running around it, especially with my limited knowledge of hardware and the cost will no doubt run quite high. Perhaps someone will develop a complete package around it, but when? Right now, the Sphere System 4 with CPU, 20k memory, keyboard and CRT display, cassette interface, built in TV monitor, 110 cps line printer, 2 (not one) IBM floppy disks, extended BASIC, a DOS, ROM for console control, editor, assembler, and what ever else I've forgotten for $5453 in kit form looks beautiful, if everything is as offered. For this, I think I'd be willing to settle for the slightly less capabilities of the MC6800 chip in regards to addressing and accumulators. If anyone has any thoughts or information on Sphere, please write or call me!!!!

Out of time for now -- I'll try to really hit the software in the coming weeks and get some camera ready copy to you for future NL's.

Sincerely,



William E. Severance, Jr.

P. S. In giving my address, note that the abbreviation for Maine is ME not MN (that's Minnesota). Every request for the Keyboard Loader circuit was addressed wrong. Thank God and the P. O. for zip codes!

WILLIAM E. SEVERANCE, JR.

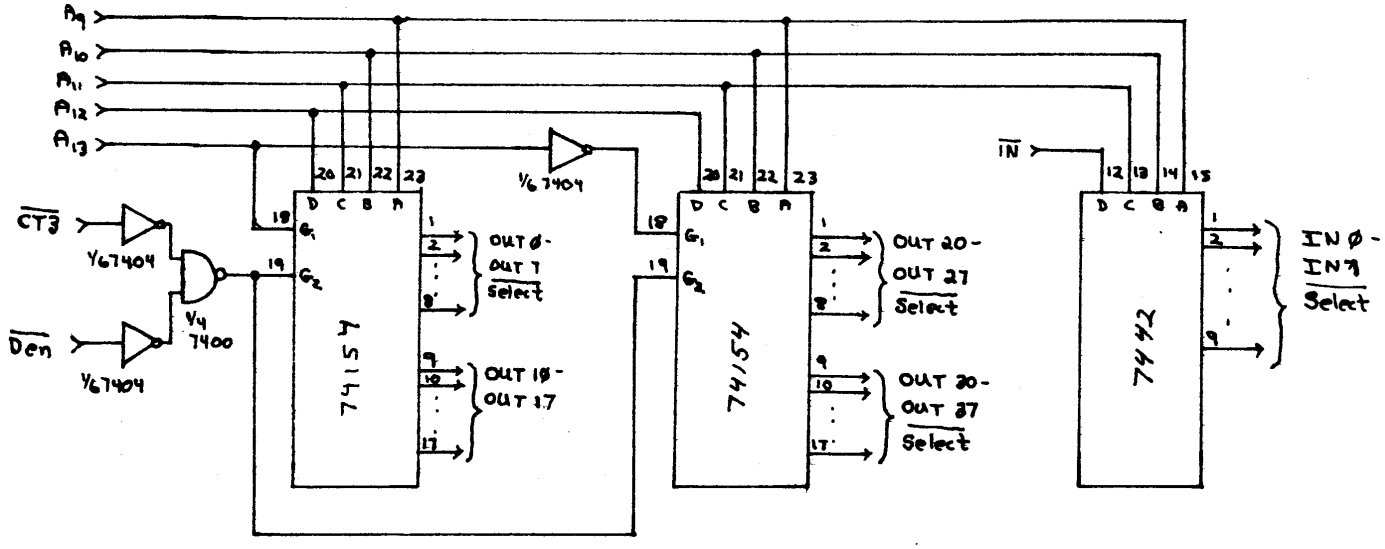
TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

MARK 8 I/O EXPANSION

The following is a brief description of the modifications I've made to my Mark 8 to provide full decoding of the device codes and convenient connection of peripheral devices.

I. The following circuit decodes the 01 RRM MM1 input and output instructions to provide 8 input, 24 regular output and 8 special output ports which transfer data from the accumulator to an output device on state t3 of an IN0-IN7 instruction.



Note: $\overline{CT3} = \overline{T3} + (\overline{Sync} \cdot \phi_2) = \overline{T3 \cdot (\overline{Sync}\,\phi_2)}$

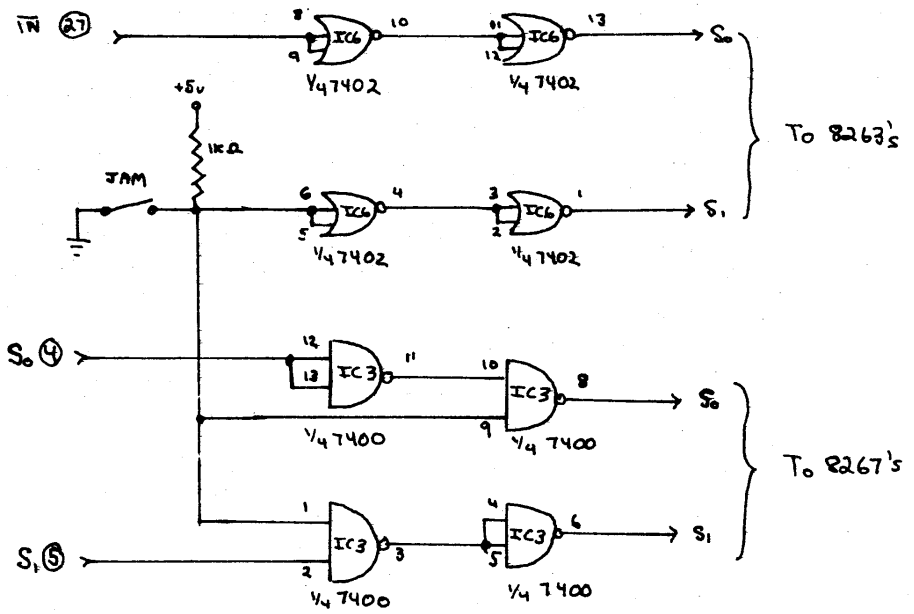
This is easily derived on the CPU board by NAND ing the outputs of IC17 (pin 3) and IC19 (pin 8).

The idea of using IN0-IN7 to also do output should be credited to MP Publishing Co. ECS-5 presentation.

II. Now that we have the port select lines (all active low, by the way) what is the best way to present them to the outside world? For convenience when it comes to changing device assignments and quickly connecting new devices, I've built the following patch board with 40-16 pin DIP IC sockets, 16-DM8095 tri state AND gates, 2-7404 inverters, and 8- 7437 Quad 2-input NAND Buffers, and what seemed like several miles of wire. A PC board would have been nice, but expensive to produce. The IC sockets can be easily attached to 0.1" perfboard with hot melt glue.

Finally, if you're with me so far, modifications should be made to the Mark 8 input MUX board as follows:

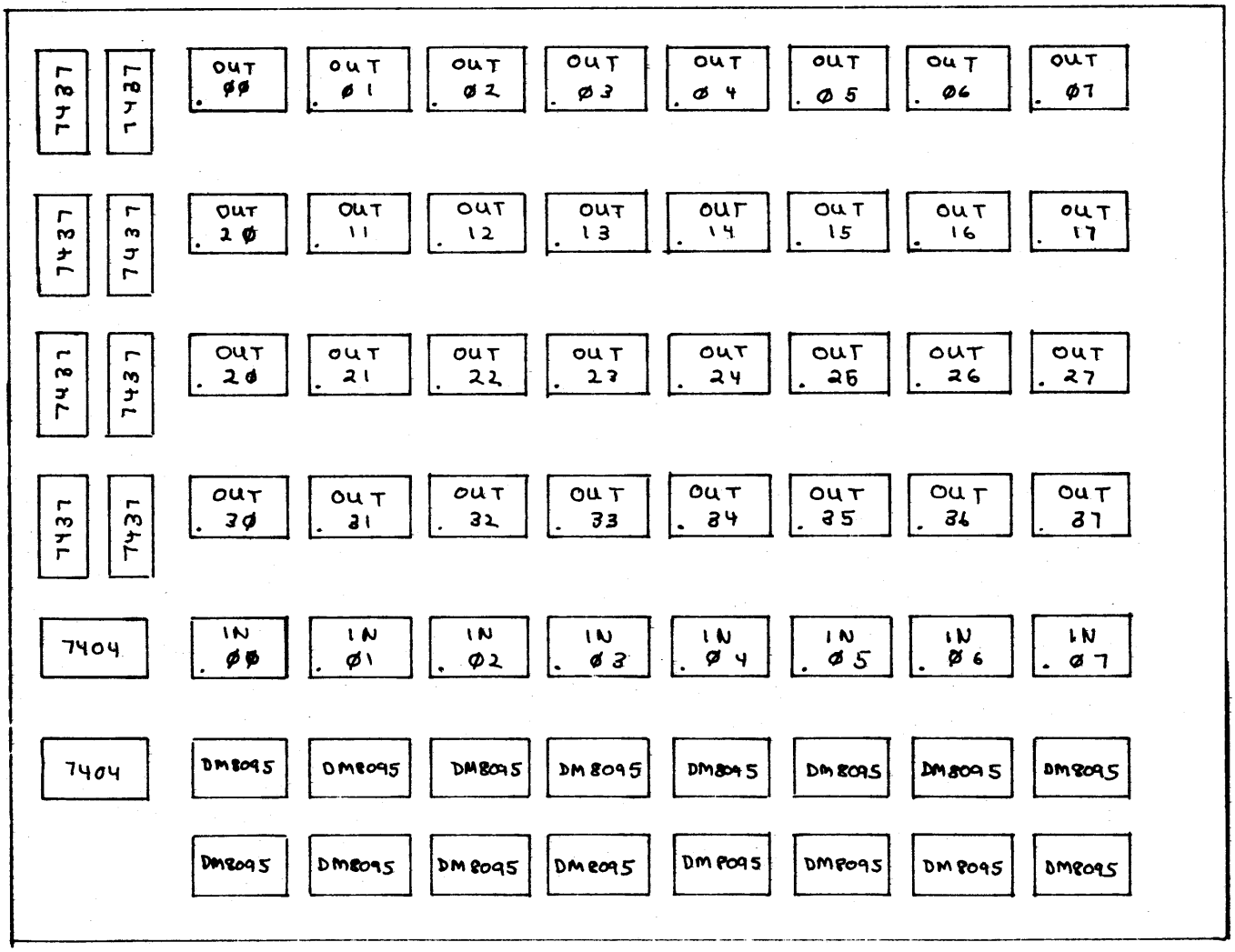
1) Remove the old 7442 decoder
2) Rewire the existing 7400 and 7402 gates as follows:



These changes will allow all input instructions IN0-IN7 to select former Mark 8 input port 0. Former Mark 8 input port 1 will be selected when the JAM switch is closed, thus allowing the permanent connection of my octal keyboard loader to this port. The interrupt instruction switches remain as is, selected only under CPU control.

Thus, ends this brief (???) description. Write or call for further information or answers to questions.

I/O Patch Panel for the Mark 8



WILLIAM E. SEVERANCE, JR.

TELEPHONE
207 925-2271

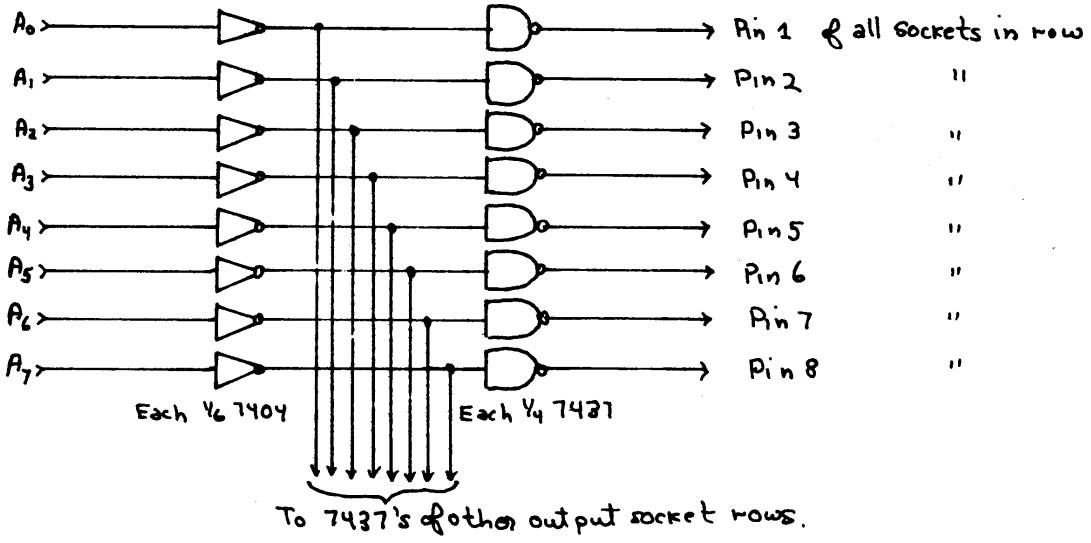
MAIN STREET
CENTER LOVELL, MAINE 04016

Oh yes, I forgot to mention that connections to the I/O patch panel are made with 16 pin dip plugs (James Electronics has nice ones) attached to 16 conductor ribbon cable. I've used up to 6' runs to the TVT and Calculator interface with no drive problems.

Each output port socket has the following pin designations:

1-Data Bus Out 0	16-Ground
2-Data Bus Out 1	15- +5volts
3-Data Bus Out 2	14- -12volts
4-Data Bus Out 3	13- +12volts
5-Data Bus Out 4	12-Output Port Select Strobe (from above decoder)
6-Data Bus Out 5	11-Interrupt Request (Channel 0-7)
7-Data Bus Out 6	10-
8-Data Bus Out 7	9-

Each row of output port sockets is buffered by the 7437 NAND gates as follows:



Each input port socket has the following pin designations:

1-Data in 0	16-Ground
2-Data in 1	15- +5volts
3-Data in 2	14- -12volts
4-Data in 3	13- +12volts
5-Data in 4	12-Input Port Select Strobe (from above decoder)
6-Data in 5	11-Interrupt Request (Channel 0-7)
7-Data in 6	10-
8-Data in 7	9-

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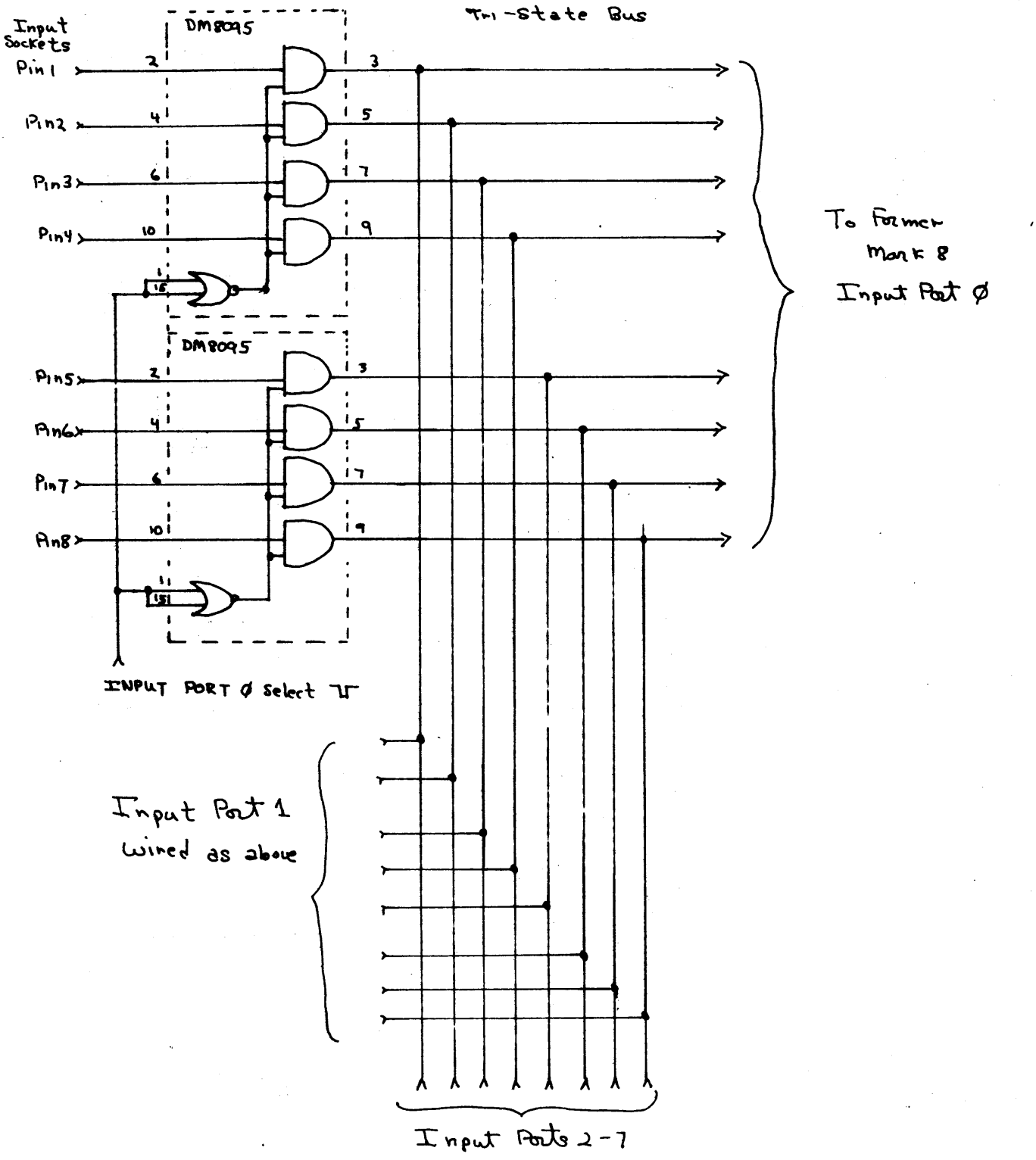
The input ports are wired using the DM8095's as follows:



Pa

MICHAEL CHRISTOFFER

4139 12th NE
NO. 400

SEATTLE, WASH. 98105

Dear Mr. Singer,

As many in the microcomputer community know, a good number of µc/software oriented publications exist in the public domain. During the course of my library search a listing of some documents has been compiled. I would like to share this listing with others in the community. Please publish this list if it seems of significance.

A warning about these documents must be stated. The National Technical Information Service (NTIS) makes these publications available in a printed or microfiche format. Abstracts must be reviewed for each of these publications before being ordered. A number of the publications have been inspected at a major University and found to be merely nothing more than summary reports for projects, ie-lacking in great hardware or software substantive content.

Some of the documents are quite good; however, considering the wide interest range of individuals in the µc community, none will be recommended. Most of the publications are from AEC & NASA but available from NTIS. NTIS ordering information is available with the abstracts when reviewed.

The intent of this submission is to give interested individuals a start in the search for information in their interest available in the public domain. This list is by no means complete. If others in the community locate references to other public domain documents, these can be submitted directly to me. A list will be compiled and made available to µC readers v.i.a. Micro-8 group newletter or others.

Respectfully,

Michael Christoffer

REPORT #	TITLE
UCID-16281	ADAPTING A MINICOMPUTER PROGRAMMING SYSTEM TO THE INTEL MCS-4 and MCS-8 MICROCOMPUTER SYSTEMS. Peterson, R.L. (California Univ., Livermore Lawrence Radiation Lab). July, 1972.
UCID-16351	SIMULATOR PROGRAM FOR THE INTEL MCS-8008 CPU. Magnuson, W. Jr. (California Univ., Livermore. Lawrence Radiation Lab.) March, 1973.
UCID-16341	STORES STOCK MICROCOMPUTER SYSTEM: THE MCS-8, 8-bit PROCESSOR CONTROLLER. Fisher, E; Spann,J; Olken, H.; Goodman,r.; et-al (California Univ. Livermore, Lawrence Radiation Lab) July, 1973

AD-765680 A HELICOPTER FLIGHT PERFORMANCE SYSTEM USING AN LSI MICROPROCESSOR. Eloe, E.E. (Naval Postgraduate School, Monterey, Calif.) June, 1973

AD-771382 MICROPROCESSOR DEVELOPMENTS FOR PROJECT 2175. Keele, R.V., et-al (Naval Electronics Lab Center, San Diego, Calif.) Aug., 1973.

UCID-16350 PL/M: A HIGH LEVEL LANGUAGE FOR THE INTEL Mcs-8 , 8008 CPU. Magnuson, W.G., Jr., et-al, (California Univ; Livermore, Lawrence Radiation Lab) August, 1973.

BNWL-1795 MICROPROCESSOR SAMPLED DATA PROCESS CONTROLLER. Seim, T.A. (Battele Pacific Northwest Labs, Richland, Wash.) November, 1973.

UCID-16507 OCTAL DEBUGGING PROGRAM (ODT) FOR THE MCS-8 COMPUTER. Fisher, E. et-al. (California Univ., Livermore Lawrence Radiation Lab.) November, 1973.

PB-197995 AN INTRODUCTION TO THE DIRECT EMULTATION OF CONTROL STRUCTURES BY A PARALLEL MICROCOMPUTER. Lesser, V.R. (Stanford Univ., Stanfor, Calif.) Jan., 1 71.

PB-235 874/5GI A BASIC LANGUAGE INTERPRETER FOR THE INTEL 8008 Microprocessor. Weaver, A.C. et-al (Illinois Univ., Urbana. Dept. of Computer Science) June, 1974.

also UIUCDS-R-74-658

PB-235-773/9GA A TEXT EDITOR DESIGN. Kai, J.M. (Illinois Univ, Urbana, Dept of Computer Science.) July, 1974.

CAPE-2367 THE MCS-8 CONTROL PROCESSOR, May, 1973.

DP-135 DESK-TOP MICROCOMPUTER (8008Design). Byrd, J.S. (DuPont de Nemours, E. I. and Co.) August, 1974.

AD-786 598 MICROCOMPUTER CONTROL OF INDUSTRIAL PROCESS. Hearn, D.W. et-al (Florida Univ. Gainesville Dept of Industrial and Sys etc.) August, 1974.

AD-783 868 DESIGN STUDY OF AN AVIONICS NAVIGATION MICRO COMPUTER. McCracken, W.L. (Naval Postgraduate School, Monterey, Calif.) June, 1974

AD-782 844 PORTABLE VAPOR SURVEILLANCE SYSTEM. Arnold, J.T. et-al (Varian Associates, Palo Alto, Calif.) June, 1974.

AD/A-006 119/2GA USE OF A UP IN A SUPERVISORY CONTROL APPLICATION December, 1974. (John Hopkins University).

NTIS/PS-75/251/9GA MICROCOMPUTERS: A BIBLIOGRAPHY WITH ABSTRACTS. (NTIS) Jan., 1975

AD-784 881/5gI CHESS GAME PROBLEM SOLVING: THE DEVELOPMENT OF A TACTICS ANALYZER. November, 1974.

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GEORGE FISCHER
72 SOUTH RAILROAD AVENUE
STATEN ISLAND, N.Y.
10305

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Volume 1

DON H. MORRISON, 32200 ARLINGTON, BIRMINGHAM, MICH. 48009, 313-642-0175

SOME PROS AND CONS ON MITS AND THE ALTAIR 8800 COMPUTER

I RECEIVED MY BASIC ALTAIR IN LATE APRIL AND HAD IT ASSEMBLED AND RUNNING IN ABOUT THREE WEEKS. THE QUALITY OF THE PARTS WAS GOOD ALTHOUGH I HAVE NO WAY OF CHECKING THE TIMINGS OF THE MEMORY AND CPU CHIPS. THEY DID CARRY THE INTEL NAME AND I HAVE HAD NO PROBLEMS WITH THEM. MITS REPLACED THREE MISSING AND ONE DEFECTIVE PART BY RETURN MAIL WHEN REQUESTED. I WISH THEY WOULD ANSWER QUESTIONS THAT FAST! I RECEIVED A 4K DYNAMIC MEMORY KIT 55 DAYS AFTER ORDERING WHEN THEY WERE PROMISING 60 DAYS. I WAS ABLE TO ASSEMBLE IT, TEST IT, AND START USING IT IN ONE WEEK-END. IT REQUIRES A MODIFICATION TO THE FRONT PANEL PC BOARD TO CHANGE THE TIMING ON THE DEPOSIT AND DEPOSIT NEXT FUNCTIONS TO HANDLE THE REFRESH CYCLE OF THE DYNAMIC MEMORY. CAPACITOR C7 MUST BE CHANGED FROM .001 uf to .0047 uf TO INCREASE THE DELAY TIME. I AM SATISFIED WITH THE HARDWARE I HAVE RECEIVED AND THEY DO DELIVER WHEN THEY PROMISED ALTHOUGH IT IS SLOWER THAN I WOULD LIKE.

I HAVE NOT BEEN ABLE TO GET ANSWERS TO QUESTIONS FROM MITS AND HAVE NOT RECEIVED EITHER THE USERS GROUP INFORMATION OR DOCUMENTATION UPDATES WHICH I PAID FOR. I HAVE FOUND A NUMBER OF ERRORS IN THE DOCUMENTATION BUT HAVE NOT RECEIVED A SINGLE UPDATE ALTHOUGH I HAVE ADVISED THEM OF SEVERAL ERRORS AND A NUMBER OF UNCLEAR AREAS. AN ALTERNATE SOUCE OF HARDWARE INFORMATION IS THE INTELLEC 8/MCS80 HARDWARE REFERENCE MANUAL FROM INTEL FOR $5.00. IT CONTAINS COMPLETE INFORMATION ON THE 8080 CHIP INCLUDING TIMINGS AND HAS SCHEMATICS FOR MEMORY, I/O INTERFACE, AND PROM PROGRAMMER BOARDS. MITS HAS AT BEST A NAIVE PROGRAMMING STAFF AND THE PROGRAMMING DOCUMENTATION FOR MACHINE LANGUAGE PROGRAMMING LEAVES ME COLD. THEIR RECOMMENDATION TO CONTINUALLY LOOP THROUGH A PROGRAM UNTIL YOU STOP LEAVES YOU IN THE MIDDLE OF THE PROGRAM WITH INDETERMINATE RESULTS UNLESS YOU SINGLE STEP TO THE END. IT IS A SIMPLE MATTER TO PUT IN A JUMP INSTRUCTION AT THE END WHICH BRANCHES TO ITSELF. E.G. AT OCTAL POSITION 040 ENTER 303 THEN 040 THEN 000. OR YOU CAN ENABLE INTERRUPTS AND THEN USE THE HALT INSTRUCTION ALTHOUGH THIS MAY HAVE AN OCCASIONAL GLITCH.

THE MINI-MICRO-MART 9101 MEMORIES WORK FINE ON THE 1K STATIC MEMORY BOARD. I RECEIVED THE FIRST TWO WITHIN 10 DAYS BUT HAVE HAD FOUR MORE ORDERED FOR TWO MONTHS. THEY DON'T APPEAR TO BE SHIPPING TO ANYONE AT THIS TIME. MITS MAY BE SLOW AND EXPENSIVE BUT AT LEAST THEY SHIP AS PROMISED.

ON THE SUBJECT OF SOFTWARE PRICES FROM MITS I AM MORE CONCERNED ABOUT THE QUALITY OF THE PRODUCT THAN THE PRICE. I MANAGE A SYSTEMS AND PROGRAMMING GROUP AND OUR INTERNAL COSTS ARE ABOUT $100 A DAY PER PERSON FOR SALARIES AND BENEFITS AND WHEN WE HIRE OUTSIDE COMPANIES IT TYPICALLY RUNS BETWEEN $150 AND $200 PER DAY. YOU WILL HAVE A SUBSTANTIAL INVESTMENT TO PUT TOGETHER A GOOD BASIC SYSTEM. I AM INTERESTED IN THE DIGITAL GROUPS PROGRESS IN THIS AREA OR AS AN ALTERNATIVE WE MIGHT BE ABLE TO DEVELOP A PACKAGE OURSELVES IF ENOUGH NL READERS WERE WILLING TO PARTICIPATE. SURE WOULD BE NICE IF MITS WOULD TELL YOU MORE ABOUT THEIR PRODUCTS BEFORE YOU BUY THEM. DOES ANYONE HAVE THEIR EXTENDED BASIC?

OTHER ITEMS OF INTEREST

JAMES, DIGIKEY, AND BABYLON HAVE BEEN EXCELLENT SUPPLIERS. SOLID STATE SYSTEMS, INC. HAS FURNISHED EXCELLENT QUALITY BUT PRICES ARE A LITTLE HIGH UNLESS YOU CAN CATCH ONE OF THEIR SALES. JUST RECEIVED THE SUDING TVY KIT FROM THE DIGITAL GROUP AND IT LOOKS GOOD. HAVE ORDERED THEIR 8080 PACKAGE BUT HAVE NOT RECEIVED IT YET. HAVE RECEIVED NO INFORMATION FROM EITHER THE COMPUTER HOBBYIST OR THE PEOPLES COMPUTER COMPANY SINCE SENDING IN SUBSCRIPTIONS ALMOST TWO MONTHS AGO.

I have also had problems with delivery from Mini-Micro-Mart on a keyboard and on 9101 memory IC's. James, Digikey and Babylon have been excellent. I am in the process of modifying the 28 volt keyboard from Babylon (TRW touch-tone type) to a 5 volt octal/binary input device. I just received the Suding TVY kit and was impressed with the quality. I bought several of the Intel Manuals and found two to be exceptionally good for 8080 owners. The INTELLEC 8/MCS80 Hardware reference Manual gives you most of the information you can't get from MITS including schematics for memory boards, interfaces, and PROM boards and programmer. The 8080 Assembler Language Manual looks like an excellent book on programming at first glance. They are $5.00 @ and were shipped almost by return mail from Intel.

Don H. Morrison

Don H. Morrison
313-642-0175

10 Jul 75

Lee C. Hanson
1514 Fremont Ave.
Cheyenne, Wy 82001

I ordered one of the CREED TTY's and when it arrived it was missing the two rear feet. I asked for replacements and they came with no problems. (Wish Mini Micro Mart was run the same way). I'm having a problem with the TTY though, it executes and punches a CR itself. It doesn't care if I'm in the middle of a word, it does it anyway. I wrote to Wilcox Ent. about it and XXXX I'll let you know the kind of responce I recieve. I would like you to pass it along that they have helped me so far just as they said they would.

You know I've been working on getting my Mark-8 running for almost ten months now and I think I'm going to get all the bugs out in the next couple of weeks, Thanks to your NL I've gotten good bug reports and many sources for individual help. I believe my problems have all been bad IC's (IEU). I now recommend JAMES. Thank you for taking the time to put out such a fine NL.

Sincerly,

Lee C Hanson

LEE C. HANSON

3112 Lois Place
Highland, Indiana 46322

6/29/75

Gentlemen:

You will find enclosed two drawings of an I/O scheme I have designed, built and implemented on my Altair 8800. It decodes Device addresses 0 thru 4 and routes the input and output strobes from the computer to the proper devices. Device 0 is used for data ready flags from external devices. The flags are interrogated by software instructions and also reset by software instructions. Only two flag circuits are shown and 6 more of the same can be wired into the Tri-state buss drivers on Dev. 0.

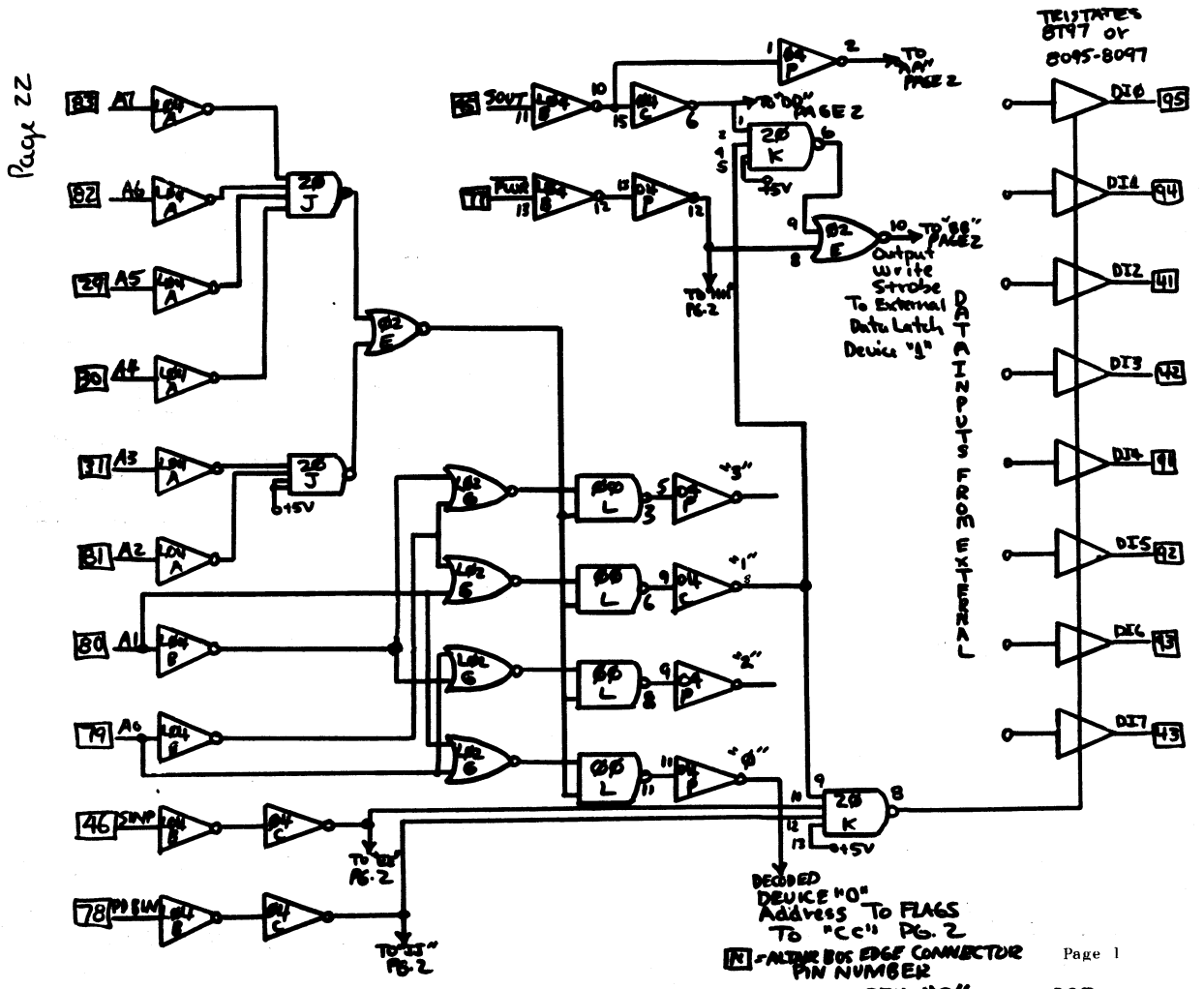
Only one typical write strobe decoder is shown on page one for external devices but two more, for Dev. 2 & 3 can be added. Ic "J" can be changed to L20 and readdressed to any desired slot in the 256 I/O addresses.

External data latches can be connected in parallel to the outputs. A decoded write strobe goes to each 8 bit latch(74100). These can be used to operate relays or what have you.

Only one Processor Data Bus Input strobe is shown decoded. Again any number of decoders can be implemented, one for each input device.

If you etch yourself a 100 pin plug from doublesided board you can build your I/O's on Vector pre-etched cards that plug into a 44 pin Vector edge connector. Install several of them in a homemade or other cage and wire them parallel. Assign transition pin numbers, wire the cage to the 100 pin plug you etched and plug into the Altair Bus. These Vector cards aren't cheap but you have the advantage of not having to etch complicated boards as they can be wired point to point. Use Molex pins for your IC's and do not break off the carriers until you have finished soldering and are ready to install the IC's. Feel free to change the circuits around to suit yourself but interface with the 8800 bus with low power loads only.

William D. Thomas



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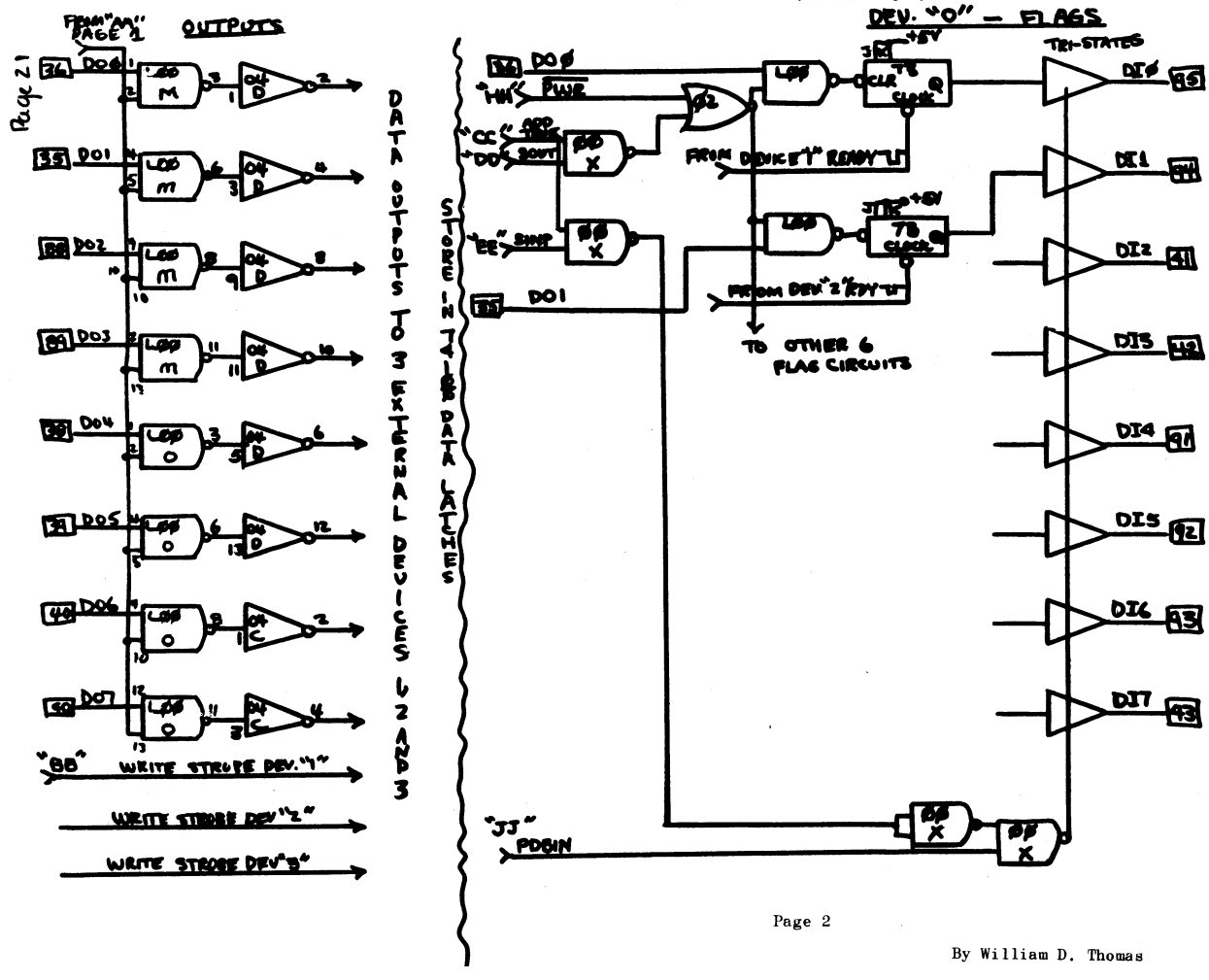

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By William D. Thomas

26 March 1975
P. O. Box 217
Quechee, VT 05059

I received the latest newsletter, and it was great. I hope that the next one lets us out in the boonies know what has been decided for the future.

I received a copy of the Microsystems International MF8008 Applications Manual and was impressed with Monitor 8. I have started getting ideas on how to expand it and what to add.

I'm now trying to form a library of software, collecting all samples of programs and routines for the 8008 and (hopefully) the 8080. From the last newsletter, I understand that you have copies of several different software examples available. For example - Paul Farr's modifications for TVT, and Terry Ritter's executive monitor system. I would like to obtain copies of any and all available software to add to the library, including routines, programs, assemblers, monitors, editors, cross assemblers, simulators, compilers, etc. As I have access (limited, but...) to the Dartmouth College Timesharing System, I will be able to help develop software for the group. With luck, and a good varied collection, I'd like to help the group by providing copies of software to members for the cost of postage and reproduction. I really would like to get active in the software portion - collecting, distributing, developing, and... writing:

You require a SASE for information and a "camera ready article". Well, I'm the "dummy" that "is going to suggest using hexadecimal notation for the 8008 or 8080". My contributions are first a hexadecimal dump routine that dumps a 4 character address, 2 spaces, and 2 character data word per word of memory for each line outputed. You supply the ending and starting address in register pairs D&E and H&L, respecively. The second contribution is a table giving the decimal, octal, hexadecimal, mnemonic, and description of all the 8080 instructions (comparable to Adam Trent's for the 8008, I presume - which, by the way, can be found in Intel's MCS-8 User's Manual)

I hope that these are satisfactory, as I haven't got a system to write about yet, only the 8008 chip and a dream.

I suggested this in my last letter, but I'd like to ask about it again. The suggestion was this - that the Group, as a whole, buy the cross assembler, simulator, and PL/M compiler packages from Intel to help in software development. What I'd like to know is if you think it is good idea.

My enthusiasm in the software side of the Group is pretty obvious. As I have no Mark-8 or other hardware to build and work with, I end up concentrating my energies in the programming end of things. My ideas for my own future system include a lot of complicated system software (a timesharing system, would you believe!). Hence, my clammering for software already written.

So, after my immense request, I hope that I haven't wasted your time. I would like to start the group's software library or help with it if it is already started elsewhere.

For all the trouble I may have caused, and for just being a part of the group - please find enclosed the following:

A copy of my hexadecimal dump routine
A copy of the 8080 Instruction set
A check for the amount of $6.00 for the next 6 issues

I hope that I have included everything. I'm anxiously waiting for the next issue of the newsletter.

Thanks for the help....

I am,
very respectfully yours,

Sid Maxwell

HEXADECIMAL DUMP SUBROUTINE:

note: This routine assumes that registers D and E contain the address of the last word to be dumped, and registers H and L the first. Note also that the output is only and OUT instruction due to the varied output formats - this must be changed for each individual case....

```
0000  C5       START:  MOV  A,H    ;move high add of data to A...
0002  460037            CALL HIGH   ;  and output high order char
0005  C5                MOV  A,H    ;move high address again...
0006  460040            CALL LOW    ;  and output low order char
0009  C6                MOV  A,L    ;move low add of data to A...
000A  460037            CALL HIGH   ;  and output high order char
000D  C6                MOV  A,L    ;move low address again...
000E  460040            CALL LOW    ;  and output low order char
0011  0620              MVI  A,20   ;load A with a " ", 20 hex...
0013  XX                OUT  EXP    ;  and output to port EXP...
0014  XX                OUT  EXP    ;    twice for two blanks
0015  D7                MOV  C,M    ;now bring data word (H & L add)...
0016  C2                MOV  A,C    ;  to C and then to A (saved in C)
0017  46004B            CALL HIGH2  ;output high order character
001A  C2                MOV  A,C    ;load data word again and...
001B  460040            CALL LOW    ;  output low order character
001E  060D              MVI  A,0D   ;load A with a CR, 0D hex...
0020  XX                OUT  EXP    ;  and output to port EXP
0021  060A              MVI  A,0A   ;load A with a LF, 0A hex...
0023  XX                OUT  EXP    ;  and output to port EXP
0024  C5                MOV  A,H    ;load A with high add of data...
0025  BB                CMP  D      ;  and compare with high add of last
0026  40002F            JNC  OK     ;if present add is less, OK
0029  C6                MOV  A,L    ;otherwise, load L to A and...
002A  BC                CMP  E      ;  compare with E (low add's)
002B  40002F            JNC  OK     ;if we still have more, OK
002E  07                RET         ;otherwise, we're done
002F  30       OK:      INR  L      ;if we're not done, incr add...
0030  480000            JNZ  START  ;
0033  28                INR  H      ;
0034  440000            JMP  START  ;  and go back for next add and data
0037  2430     HIGH:    ANI  30     ;mask out top 2 signif bit of high add
0038  1A                RAR         ;rotate to...
0039  1A                RAR         ;  move bits...
003A  1A                RAR         ;    down to the...
003B  1A                RAR         ;      lowest position
003C  460040            CALL LOW    ;now output this "low order" char
003F  07                RET         ;done
0040  240F     LOW:     ANI  0F     ;mask out low order 4 bits...
0041  3C0A              CPI  0A     ;  and see if less than 10 decimal
0042  600047            JC   ALPHA  ;if not, will be an A-F (hex alpha char)
0045  243F              ANI  3F     ;otherwise, is numeric, so add prefix
0046  XX                OUT  EXP    ;  for numeric ASCII, and output
0047  1C09     ALPHA:   SBI  09     ;if alpha, sud 9 dec to shift down...
0048  244F              ANI  4F     ;  and add ASCII capitals' prefix...
0049  XX                OUT  EXP    ;    and output to port EXP
004A  07                RET         ;done
004B  24F0     HIGH2:   ANI  F0     ;for data, mask out top 4 bits
004D  1A                RAR         ;rotate to...
004E  1A                RAR         ;  move bits...
004F  1A                RAR         ;    down to the...
0050  1A                RAR         ;      lowest position
0051  460040            CALL LOW    ;now output this "low order" char
0054  07                RET         ;done
                        END
```

8080 Machine Instruction Codes:
note - only the first word of multiple word instructions is presented

DEC	OCTAL	HEX	MNEMONIC	COMMENT
000	000	00	NOP	No-Operation
1	001	01	LXI B	Load immediate register pair B-C
2	002	02	STAX B	Store A indirect
3	003	03	INX B	Increment B & C registers
4	004	04	INR B	Increment register B
5	005	05	DCR B	Decrement register B
6	006	06	MVI B	Move immediate to B
7	007	07	RLC	Rotate A left
8	010	08	---	
9	011	09	DAD B	Add B & C to H & L
10	012	0A	LDAX B	Load A indirect
11	013	0B	DCX B	Decrement B & C
12	014	0C	INR C	Increment register C
13	015	0D	DCR C	Decrement register C
14	016	0E	MVI C	Move immediate to C
15	017	0F	RRC	Rotate A right
16	020	10	---	
17	021	11	LXI D	Load immediate reister pair D-E
18	022	12	STAX D	Store A indirect
19	023	13	INX D	Increment D & E registers
20	024	14	INR D	Increment register D
21	025	15	DCR D	Decrement register D
22	026	16	MVI D	Move immediate to D
23	027	17	RAL	Rotate A left through carry
24	030	18	---	
25	031	19	DAD D	Add D & E to H & L
26	032	1A	LDAX D	Load A indirect
27	033	1B	DCX D	Decrement D & E
28	034	1C	INR E	Increment register E
29	035	1D	DCR E	Decrement register E
30	036	1E	MVI E	Move immediate to E
31	037	1F	RAR	Rotate A right through carry
32	040	20	---	
33	041	21	LXI H	Load immediate register pair H-L
34	042	22	SHLD	Store H & L direct
35	043	23	INX H	Increment H & L registers
36	044	24	INR H	Increment register H
37	045	25	DCR H	Decrement register H
38	046	26	MVI H	Move immediate to H
39	047	27	DAA	Decimal adjust A
40	050	28	---	
41	051	29	DAD H	Add H & L to H & L
42	052	2A	LHLD	Load H & L direct
43	053	2B	DCX H	Decrement H & L
44	054	2C	INR L	Increment register L
45	055	2D	DCR L	Decrement register L
46	056	2E	MVI L	Move immediate to L
47	057	2F	CMA	Compliment A
48	060	30	---	

DEC	OCTAL	HEX	MNEMONIC		COMMENT
49	061	31	LXI	SP	Load immediate stack pointer
50	062	32	STA		Store A direct
51	063	33	INX	SP	Increment stack pointer
52	064	34	INR	M	Increment memory
53	065	35	DCR	M	Decrement memory
54	066	36	MVI	M	Move immediate to memory
55	067	37	STC		Set carry
56	070	38	---		
57	071	39	DAD	SP	Add stack pointer to H & L
58	072	3A	LDA		Load A direct
59	073	3B	DCX	SP	Decrement stack pointer
60	074	3C	INR	A	Increment register A
61	075	3D	DCR	A	Decrement register A
62	076	3E	MVI	A	Move immediate to A
63	077	3F	CMC		Compliment carry
64	100	40	MOV	B,B	Move B to B
65	101	41	MOV	B,C	Move C to B
66	102	42	MOV	B,D	Move D to B
67	103	43	MOV	B,E	Move E to B
68	104	44	MOV	B,H	Move H to B
69	105	45	MOV	B,L	Move L to B
70	106	46	MOV	B,M	Move memory to B
71	107	47	MOV	B,A	Move A to B
72	110	48	MOV	C,B	Move B to C
73	111	49	MOV	C,C	Move C to C
74	112	4A	MOV	C,D	Move D to C
75	113	4B	MOV	C,E	Move E to C
76	114	4C	MOV	C,H	Move H to C
77	115	4D	MOV	C,L	Move L to C
78	116	4E	MOV	C,M	Move memory to C
79	117	4F	MOV	C,A	Move A to C
80	120	50	MOV	D,B	Move B to D
81	121	51	MOV	D,C	Move C to D
82	122	52	MOV	D,D	Move D to D
83	123	53	MOV	D,E	Move E to D
84	124	54	MOV	D,H	Move H to D
85	125	55	MOV	D,L	Move L to D
86	126	56	MOV	D,M	Move memory to D
87	127	57	MOV	D,A	Move A to D
88	130	58	MOV	E,B	Move B to E
89	131	59	MOV	E,C	Move C to E
90	132	5A	MOV	E,D	Move D to E
91	133	5B	MOV	E,E	Move E to E
92	134	5C	MOV	E,H	Move H to E
93	135	5D	MOV	E,L	Move L to E
94	136	5E	MOV	E,M	Move memory to E
95	137	5F	MOV	E,A	Move A to E
96	140	60	MOV	H,B	Move B to H
97	141	61	MOV	H,C	Move C to H
98	142	62	MOV	H,D	Move D to H
99	143	63	MOV	H,E	Move E to H
100	144	64	MOV	H,H	Move H to H
101	145	65	MOV	H,L	Move L to H

DEC	OCTAL	HEX	MNEMONIC		COMMENT
102	146	66	MOV	H,M	Move memory to H
103	147	67	MOV	H,A	Move A to H
104	150	68	MOV	L,B	Move B to L
105	151	69	MOV	L,C	Move C to L
106	152	6A	MOV	L,D	Move D to L
107	153	6B	MOV	L,E	Move E to L
108	154	6C	MOV	L,H	Move H to L
109	155	6D	MOV	L,L	Move L to L
110	156	6E	MOV	L,M	Move memory to L
111	157	6F	MOV	L,A	Move A to L
112	160	70	MOV	M,B	Move B to memory
113	161	71	MOV	M,C	Move C to memory
114	162	72	MOV	M,D	Move D to memory
115	163	73	MOV	M,E	Move E to memory
116	164	74	MOV	M,H	Move H to memory
117	165	75	MOV	M,L	Move L to memory
118	166	76	HLT		Halt
119	167	77	MOV	M,A	Move A to memory
120	170	78	MOV	A,B	Move B to A
121	171	79	MOV	A,C	Move C to A
122	172	7A	MOV	A,D	Move D to A
123	173	7B	MOV	A,E	Move E to A
124	174	7C	MOV	A,H	Move H to A
125	175	7D	MOV	A,L	Move L to A
126	176	7E	MOV	A,M	Move memory to A
127	177	7F	MOV	A,A	Move A to A
128	200	80	ADD	B	Add B to A
129	201	81	ADD	C	Add C to A
130	202	82	ADD	D	Add D to A
131	203	83	ADD	E	Add E to A
132	204	84	ADD	H	Add H to A
133	205	85	ADD	L	Add L to A
134	206	86	ADD	M	Add memory to A
135	207	87	ADD	A	Add A to A
136	210	88	ADC	B	Add B to A with carry
137	211	89	ADC	C	Add C to A with carry
138	212	8A	ADC	D	Add D to A with carry
139	213	8B	ADC	E	Add E to A with carry
140	214	8C	ADC	H	Add H to A with carry
141	215	8D	ADC	L	Add L to A with carry
142	216	8E	ADC	M	Add memory to A with carry
143	217	8F	ADC	A	Add A to A with carry
144	220	90	SUB	B	Subtract B from A
145	221	91	SUB	C	Subtract C from A
146	222	92	SUB	D	Subtract D from A
147	223	93	SUB	E	Subtract E from A
148	224	94	SUB	H	Subtract H from A
149	225	95	SUB	L	Subtract L from A
150	226	96	SUB	M	Subtract memory from A
151	227	97	SUB	A	Subtract A from A
152	230	98	SBB	B	Subtract B from A with borrow
153	231	99	SBB	C	Subtract C from A with borrow
154	232	9A	SBB	D	Subtract D from A with borrow

DEC	OCTAL	HEX	MNEMONIC	COMMENT
208	320	D0	RNC	Return on no carry
209	321	D1	POP D	Pop register pair D & E off stack
210	322	D2	JNC	Jump on no carry
211	323	D3	OUT	Output
212	324	D4	CNC	Call on no carry
213	325	D5	PUSH D	Push register pair D & E on stack
214	326	D6	SUI	Subtract immediate from A
215	327	D7	RST 2	Restart at position 020 octal
216	330	D8	RC	Return on carry
217	331	D9	---	
218	332	DA	JC	Jump on carry
219	333	DB	IN	Input
220	334	DC	CC	Call on carry
221	335	DD	---	
222	336	DE	SBI	Subtract immediate from A with borrow
223	337	DF	RST 3	Restart at position 030 octal
224	340	E0	RPO	Return on odd parity
225	341	E1	POP H	Pop register pair H & L off stack
226	342	E2	JPO	Jump on odd parity
227	343	E3	XTHL	Exchange top of stack, H & L
228	344	E4	CPO	Call on odd parity
229	345	E5	PUSH H	Push register pair H & L on stack
230	346	E6	ANI	And immediate to A
231	347	E7	RST 4	Restart at position 040 octal
232	350	E8	RPE	Return on even parity
233	351	E9	PCHL	H & L to program counter
234	352	EA	JPE	Jump on even parity
235	353	EB	XCHG	Exchange registers D & E, H & L
236	354	EC	CPE	Call on even parity
237	355	ED	---	
238	356	EE	XRI	Exclusive Or immediate to A
239	357	EF	RST 5	Restart at position 050 octal
240	360	F0	RP	Return on positive
241	361	F1	POP PSW	Pop A and flags off stack
242	362	F2	JP	Jump on positive
243	363	F3	DI	Disable interupt
244	364	F4	CP	Call on positive
245	365	F5	PUSH PSW	Push A and flags on stack
246	366	F6	ORI	Or immediate to A
247	367	F7	RST 6	Restart at position 060 octal
248	370	F8	RM	Return on minus
249	371	F9	SPHL	H & L to stack pointer
250	372	FA	JM	Jump on minus
251	373	FB	EI	Enable interupts
252	374	FC	CM	Call on minus
253	375	FD	---	
254	376	FE	CPI	Compare immediate to A
255	377	FF	RST 7	Restart at position 070 octal

DEC	OCTAL	HEX	MNEMONIC	COMMENT
155	233	9B	SBB E	Subtract E from A with borrow
156	234	9C	SBB H	Subtract H from A with borrow
157	235	9D	SBB L	Subtract L from A with borrow
158	236	9E	SBB M	Subtract memory from A with borrow
159	237	9F	SBB A	Subtract A from A with borrow
160	240	A0	ANA B	And B to A
161	241	A1	ANA C	And C to A
162	242	A2	ANA D	And D to A
163	243	A3	ANA E	And E to A
164	244	A4	ANA H	And H to A
165	245	A5	ANA L	And L to A
166	246	A6	ANA M	And memory to A
167	247	A7	ANA A	And A to A
168	250	A8	XRA B	Exclusive Or B to A
169	251	A9	XRA C	Exclusive Or C to A
170	252	AA	XRA D	Exclusive Or D to A
171	253	AB	XRA E	Exclusive Or E to A
172	254	AC	XRA H	Exclusive Or H to A
173	255	AD	XRA L	Exclusive Or L to A
174	256	AE	XRA M	Exclusive Or memory to A
175	257	AF	XRA A	Exclusive Or A to A
176	260	B0	ORA B	Or B to A
177	261	B1	ORA C	Or C to A
178	262	B2	ORA D	Or D to A
179	263	B3	ORA E	Or E to A
180	264	B4	ORA H	Or H to A
181	265	B5	ORA L	Or L to A
182	266	B6	ORA M	Or memory to A
183	267	B7	ORA A	Or A to A
184	270	B8	CPA B	Compare B to A
185	271	B9	CPA C	Compare C to A
186	272	BA	CPA D	Compare D to A
187	273	BB	CPA E	Compare E to A
188	274	BC	CPA H	Compare H to A
189	275	BD	CPA L	Compare L to A
190	276	BE	CPA M	Compare memory to A
191	277	BF	CPA A	Compare A to A
192	300	C0	RNZ	Return on no zero
193	301	C1	POP B	Pop register pair B & C off stack
194	302	C2	JNZ	Jump on no zero
195	303	C3	JMP	Jump unconditionally
196	304	C4	CNZ	Call on no zero
197	305	C5	PUSH B	Push register pair B & C on stack
198	306	C6	ADI	Add immediate to A
199	307	C7	RST 0	Restart at position 000 octal
200	310	C8	RZ	Return on zero
201	311	C9	RET	Return unconditionally
202	312	CA	JZ	Jump on zero
203	313	CB	---	
204	314	CC	CZ	Call on zero
205	315	CD	CALL	Call unconditionally
206	316	CE	ACI	Add immediate with carry
207	317	CF	RST 1	Restart at position 010 octal

Grant Runyan, 1146 Nirvana Road, Santa Barbara, CA 93101 has the following to say: My TVT-1 is working fine with the R. D. Hogg scrolling. I added the UART and am just about ready to hook it up with a surplus acoustic coupler to have a terminal from our school system's Nova-2.
I finally decided to build a Mark-8 and am assembling the parts. I ordered the circuit boards from Techniques, Inc. on June 15 and received word on July 16 that they were out of stock and could not be delivered until the middle of September. That will give me time to work out an interface with the Flexowriter which I bought. If anyone else is trying to interface a Flexowriter, drop me a line, and let's compare notes.
In searching for a power supply for the Mark-8, I found that both sources listed in PE's booklet are out of business. I was able to find an excellent power supply taken from a keyboard terminal. In fact, it is so good that I bought all that were available and have about 20 for sale. This is a 5 volt supply highly regulated at 6 amps. It also has 200 v., 12 v., and 48 v. It will be easy to convert to obtain -5 v., -12 v., and - 9 volts. I would like to have $25.00 each for these supplies. I will supply schematics and plans for obtaining the other voltages if needed. They weigh about 15 pounds, so the freight will be as high as $5.00 for points on the east coast. Freight in California will be about $1.00, and I will have to charge 6% tax to California addresses.
I have been able to get quite a library of computer information on microfiche film. I bought a little micro reader from National Microsales, 45 Seymour St., Stratford, Conn. 06497, for $25 which is really great. I recommend this instrument very highly for home use and recommend that people send for the flyer on the reader.
Thanks millions for all your work on the newsletter. I would certainly not be able to participate in this fun game without the information from the NL.

Keith L. Kendall
295 E 500 So
Vernal, Utah 84078

July 11, 1975

I have purchased some smoke damaged Beehive monitors & Beehive keyboards. I haven't seen them yet but am informed that they are workable with cleaning. Unfortunately the cases were sold separately to a junk man. The monitors do not have memory or character generators, etc. but have power and deflection circuits.

I paid $25 each for the monitors & $25 each for the keyboards (microswitch, ASCII). If you think anyone would be interested I will check into getting more and a better price. (CENCL: SASE)

Also I have quite a few BASIC language games and will reproduce them for cost. More later. I haven't got anything running yet except a Univac terminal, punch, & reader, & an Altair, and haven't connected them yet. I may just breadboard a 2-port or so interface until the interface that I ordered from Maury Goldberg June 7th comes. When I ordered it he talked like it would be shipped immediately, but although he shipped some of it air mail, I havent yet received the rest. I am pleased with Poly Packs.

Yours,

Keith L Kendall

Keith L. Kendall

James J. Dunion
421 Ridgecrest Road, N. E.
Atlanta, Georgia 30307

ZERO'ING MEMORY IN THE 8080
(I MEAN REALLY ZERO'ING MEMORY)

I was browsing through the Newsletter the other day and came across William Shawcross' program to clear memory (Vol. 1, No. 7, Page 5). I glanced at this with fondness, because the first program I tackled with my "bare bones" Altair was one to clear memory. But even programs this simple can certainly be instructive. For instance, I was horified to see that Mr. Shawcross cheated. I mean, after you stop the program, there's that section of code from 362_8 on up lurking around. Okay, so how can you devise a program that clears every thing, even itself. I discovered that this is no trivial problem. To solve it, I devised a two part program. The first section "builds" a small kernel of code, and then transfers control to it. The kernel then sits there and gobbles up memory (i.e. zero's memory). The trick is, on the last bite, it gobbles itself.

The kernel is simplicity itself:

LOC	CODE	OPERATION
000	325	PUSH D
001	351	PCHL

In setting up this kernel, HL is set to 0, so that executing PCHL reactivates the kernel. Also DE is set to 0, so that executing PUSH D "gobbles" the two bytes of memory pointed at by the stack pointer. The only other initialization step is to set the stack pointer to the upper end of memory that is to be cleared. Each time PUSH D is executed, it steps down through memory clearing two bytes at a time. Since the kernel resides at 000-001, the last push operation that is performed wipes out the kernel itself. To avoid the hassle of figuring out what code represents the top part of available memory and loading that valve in the stack pointer, a short cut is just to load 000 000 in the S. P. The kernel

then takes the precaution of clearing every thing, whether memory happens to be there or not. This brings up a good point, it's perfectly acceptable to read and write from memory not physically present on the Altair. If you're writing, the data simply disappears. If you're reading, a 377_8 is returned (i.e. all 1's on the data bus).

Okay, one final problem. After the kernel self-destructs, what's left? Every memory location containing 000. So the processor steps through memory executing 000 which, conveniently is a no operation. Eventually, the processor runs out of memory physically present. When the processor tries to access memory that is not there, a 377 is returned. This turns out to be the code for RST 70 / restart at location 70. Great I thought. The processor will just sit there no-op'ing and looping till I stop it. And so it did. This is, until once I decided to keep the machine running to impress my wife. Then strangely after 1 minute and 35 seconds of running time the stable pattern of lights suddenly changed. What happened? So I tried it again, and sure enough, right on the nose, 1 minute and 35 seconds after starting the program (hah! A whole machine full of no-ops) bombs. Very strange. Hardware bug? Random error? The answer, as I discovered after much thoughtful examination involves careful consideration of exactly what the processor does when it executes the NO-OP machine. I'll send in the answer in my next letter.

LOC	CODE (OCTAL)	OPERATION
000	061	LXI SP, END / set the
001	000	/ stack pointer so that all
002	000	/ of memory will be clear
003	041	LXI H, ZERO / set memory
004	000	/ location pointer to location
005	000	/ zero
006	021	LXI D, ZERO / set register pair
007	000	/ DC to zero - this is the
010	000	/ constant that will be pushed into memory
011	066	MVI, M INST1 / move "PUSH D" to loc. 0
012	325	/ this is the code for "PUSH D"
013	043	INX H / set memory pointer to loc. 2
014	066	MVI M, INST. 2 / move "PCHL" to loc. 1
015	351	/ this is code for "PCHL"
016	053	DCX H / Reset HL to loc. 0
017	351	PCHL

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July 14, 1975

Mr. Hal Singer
Cabrillo Computer Center
4350 Constellation Rd.
Lampoc, CA 93436

Dear Mr. Singer:

A recent issue of the Newsletter featured some comparisons of audio tape interfaces. The SCELBI Audio Tape Interface was one of those mentioned in the discussions. We believe the tone of the discussions might lead some readers to believe that the SCELBI interface was being considered for general use with various microprocessors. We would like, therefore, to point out that the SCELBI interface was designed specifically for the SCELBI Minicomputer. Many of the parameters discussed in the comparisons cannot be properly judged unless one takes account of the following factors.

A.) The relatively large amount of I.C.s used on the transmit side of the SCELBI interface provide functions and capabilities that the units it was compared with did not have.

1. The SCELBI unit incorporates a frequency dividor network so that the computer's master clock may be used to derive the FSK frequencies and completely eliminate transmit frequency adjustments.

2. The SCELBI unit allows start/stop tape motion control by the computer and provides for a delay for the tape unit to reach proper speed before a write operation.

3. The SCELBI unit accepts four bits at a time from the computer to reduce computer processing requirements during a write operation.

4. The SCELBI unit provides a FSK gating function that significantly reduces phase-jitter. A factor that becomes increasingly important as the baud rate increases.

B.) On the receive side, the SCELBI interface is hardly more complicated than Suding's. The basic theory of operation is the same. The SCELBI unit does use an additional I.C. to provide frequency multiplication thus yielding greater bandwidth between the marking and spacing frequencies (to improve the signal/noise ratio between harmonically related signals). Additionally, the SCELBI unit uses an I.C. to generate a minus supply "on-board" which is a feature our designer's elected to include for future developments.

C.) The comparisons of software requirements were hardly representative of similar capabilities. The bytes quoted for SCELBI programs were for routines that included motor start/stop control, "check sum" generation and validation, and error display. More representative figures for minimum read/write capability with the SCELBI unit are on the order of 40 bytes for read and write.

D.) Speed. Over-all through-put with the SCELBI interface is considerably faster than most currently available units.

E.) Compatability - with what? The SCELBI unit is completely compatable with the system for which it was designed. The SCELBI tape unit is used as an integral part of a large array of software that is available for use on SCELBI computers. We did not design it to be compatable with other systems.

In summary, we would like to point out that we think our tape unit is ideal for the system for which it was developed. For those who do not have a SCELBI system, we would not promote our system over any of the other units discussed, and in fact, would recommend those over ours for such applications.

Thank you for your attention.

NW/ab

Nat Wadsworth
President

Radio-Electronics

A GERNSBACK PUBLICATION / 200 PARK AVENUE SOUTH
NEW YORK, N.Y. 10003 / (212) 777-6400

June 19, 1975

Dear Hal:

We're glad to see the success you've been having with the Micro-8 Computer Users Group publication. It is obvious that a lot of work is going into it on your part and an awful lot of benefit is accruing to your subscribers.

We do have several items of interest in progress at Radio-Electronics. While all of them don't directly affect the Micro-8, we just thought you'd like to know about them.

First, there is an article coming up that tells how to interface a programable calculator with the Micro-8. Second, our TV Typewriter II will be expanded with a cursor board and a screen read board. The screen read board should appear in our September, 1975 issue; the cursor board in the October, 1975 issue. We are looking for more articles in the same vein and some of your subscribers certainly have that data available. If they think what they have is suitable for publication in Radio-Electronics, they should get in touch with me. We pay for every article we publish.

We continue to wish you every success with the User Group newsletter and if you feel there is anything we can do to assist, just ask.

Sincerely,

Larry Steckler
Editor

LS:pl

July 7, 1975

Dear TCH and Micro-8 Users Group,

First and foremost i want to congratulate both of you. I think you both have done a fantastic job. TCH is especially to be applauded for their fine series of do-it-yourself type articles and Micro-8 for successfully handling the nearly impossible task of distributing the collective information and opinions from their subscribers.

My only complaint with both publications is that they are so interesting I spend more time reading them than working on my computer.

I have an Altair 8800 with 8¼K of memory, a TTY-28, and a modem. The 8K of memory was purchased from Processor Te chnology Co. , 2465 Fourth Street, Berkeley, CA, 94710. I can recommend them to other Altair users as an excellent supplier of 4K memories and other peripherals. I have on order their 3P+S board (3 parallel and 1 serial I/O interface) a mother-board that will hold up to 16 Altair type boards and their 2K rom board. They are promising almost free software and good documentation. As I said, I'm sold on them for low cost Altair modules.

My TTY is marked TT-47A/UG which seems to be Navy surplus. I have the electrical schmetics if anyone needs one for a SASE.

The modem comes from Bernies Surplus, 20746 Plummer ST., Chatsworth, CA. Bernie sells these modems for about $25. This includes an attractive wooden case, acoustic coupler, modem and documentation.

Future plans include keyboard and TV display (what's the latest on Dr. Sudding's 16x64 character TV display?). I can hardly wait to finish what I have started now so I can build the graphics display as described in TCH by Hal Chamberlin.

I plan on using the TCH cassette interface to maintain compatability with TCH and their future projects. I will probably also use a Tarbell cassette interface for its higher density. Three cassettes will be used to allow sorting to be accomplished with reasonable efficiency.

I definitely want to implement a priority interrupt system and DMA transfer for TV display refresh.

My only problem with the Altair was that the deposit switch would not work most of the time it was pressed. MITS has seen the same problem and recommended the replacement of IC N (74L00) and/or IC G (74123) on the Display Control board. This seemed to help somewhat, but did not completely fix the problem. Finally, after much gnashing of teeth, Don Tarbell came to the rescue and fixed the problem by disconnecting IC G pin 1 from ground and connecting it to pin 13 of IC G. This keeps IC G from extending the width of the MWRITE pulse if it is triggered by switch noise. I haven't contacted MITS about this mod, but it seems to work fine and doesn't seem to affect any other circuits.

Again, my sincerest thanks to you both for your fine publications.

Keep up the good work,

Dave Tritsch

Dave Tritsch
7558 Kester Ave #1
Van Nuys, CA 91405

Hal Singer & John Craig, Editors
Micro-8 Computer User Group News
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

July 28, 1975

Dear Hal & John:

Even though A lot of people must be on vacation, I have already received a goot number of responses from people who are willing and interested in joining a "Buyer's Co-operation" for the LSI-11.

Most of the people were interested in getting the Extended Arithmetic Chip along with the Basic LSI-11. The combination would cost, by quantities of fifty, $736. plus tax, shipping, etc. I am sure that this route would give the most "Bang for the Buck".

I am confident that we're going to get 50 people, but maybe a word in the next newsletter would speed up the process. (I am quite anxious!!!!!)

Very truly yours,

Dick Corner

Dick Corner
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DC/clt

9730 Townline Div.
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V3V 2T2
July 10, 1975

Page

I just received the # 8 issue of the N.L. and enjoyed it as much as ever. I tell you a lot of guys appreciate all the hard work you are doing for them and our new hobby.

I like the format you have decided on for the N.L. I am a bookbinder by trade, and could probably have helped you decide on a layout had I known you were having a problem. However, you have solved it yourselves, to everyones satisfaction, I'm sure.

I like J.A.Boyko's arrangement of the 8008 Instruction set in this issue of the N.L.For those of us with an octal imput keyboard, this should prove very handy. It also shows the numerical relationship between the different instructions in a very clear fashion.

I still do not have my Mark-8 running. Something is wrong with the single-stepping. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx As you can see from the enclosed writeup, I have converted to a plug in bus system. Boy, what a difference in convenience.

I have 1 K of 2102 memory working. I purchased the board from Solid State Music and connot praise them highly enough. I received it in the mail about a week after I had mailed in my order. It is a beautifully designed board, and the etching and plating are top-rate, which is more then I can sayfor the original boards. This board holds 4 K of 2102 RAMS, requires no -9 V supply and much less 5 V current. It also includes all necessary decoding.

By the way, the scematic I received from you for the Precision Electroics Power Supply does not jive at all with the power supply I have. I wonder if maybe theyhad two different models?

As I mentioned above, I am enclosing a write up on the low cost plugable bus system I built. Use it if you have a couple of pages to fill up sometimes. Or feel free to condense it if you wish.

From past issues of the N.L., I see that a lot of other guys have become just as frustrated with the Mark 8 bussing system as I have. After trying for a month to debug my machine, and spending about half of that time debugging the bus, broken wires, bad solder connections,trying to get at one board or enother, etc,I decided to take the time and expense and make up a system where I could just plug the boards in or out.

After finding that there were no 43 pin edge connecters available anywhere in Vancouver or Seattle,(and also hearing that they would cost a small fortune if I could obtain any)I hit apon the following scheme. This method allows one to make up wide, expensive edge connecters from narrow, inexpensive,surplus ones. While it sounds like a Mickey Mouse arrangement,I am more then satisfied with the way mine turned out. For a little bit of work, I have saved a lot of bucks which can be better spent elsewhere. Because I was using 22 pin connecters, I made the bus 44 pins wide, giving me 3 spare wires to use for something else if I wish. The same basic arrangement could be used for any width bus, depending on the number of lines needed or the number of pins in the connecters being used.

The following steps and sketch should explain the scheme.

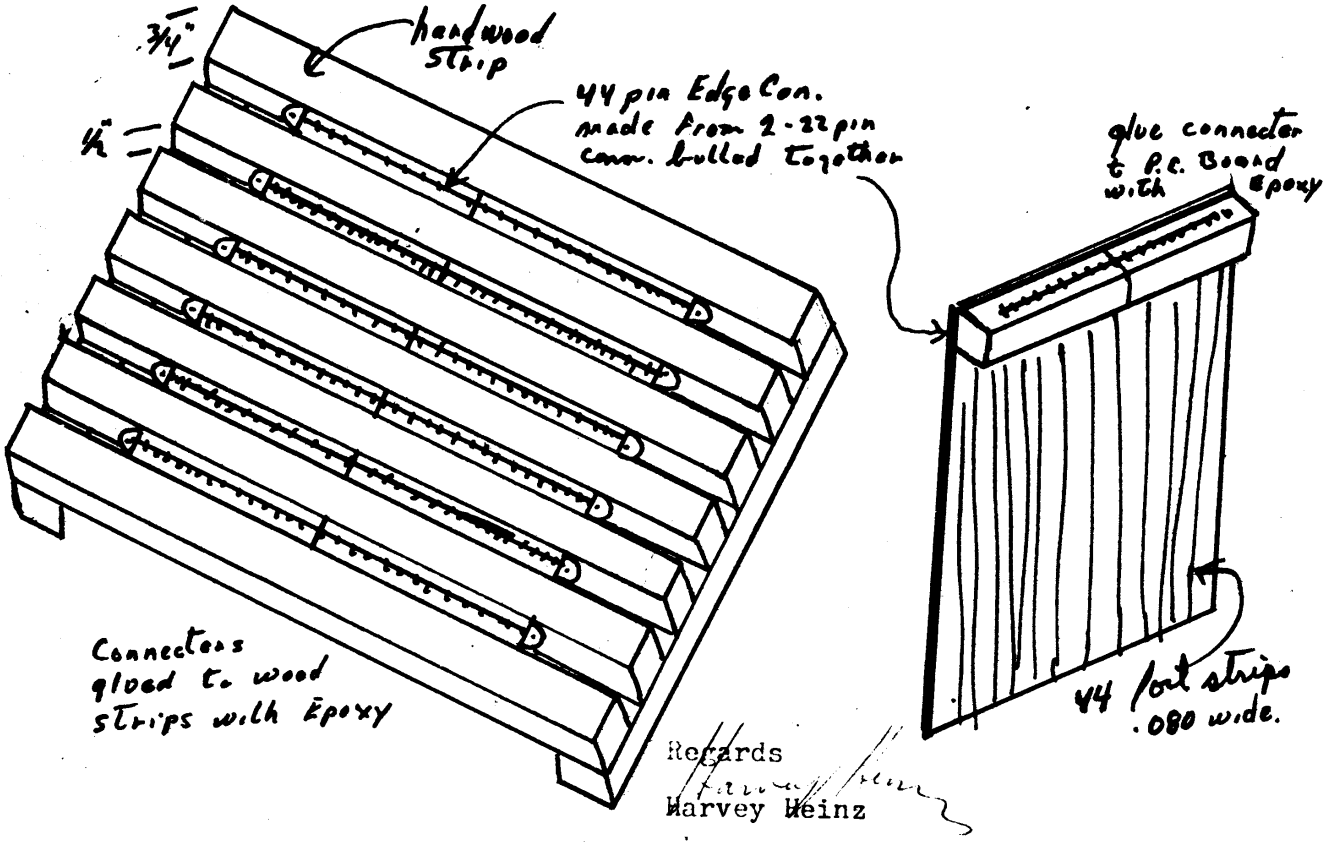
BOARD MODIFICATIONS

1. Prepare artwork 2 x size. I did this by placing a sheet of .005 acetate 15" W. x 13" H over grid paper. I then placed a row of .156 edge connecter pattern (2x size) along the top and bottom edge of the acetate. Then I connected the 2 rows with strips of .160 tape, ending up with 44 strips running from edge to edge of the acetate. Use the grid paper as a guide to insure that the tape strips are absolutely straight.

2. Reduce the artwork photographically to give a negative 7½ x 6½ in.
3. Make 2 Printed Circuit Boards from this negative.
4. Cut 1 board into 6 strips 7½ x about 1 in. Leave the other board full size to use as a card extender.
5. Make up mother board BEFORE continuing with step 6.
6. Clean excess solder off bus pads on Mark 8 boards. I used Dri-wick for this. Then using epoxy cement, glue a connecter strip on each board by overlapping ½ in. and lining up with the bus pads. Place each board between two 1 by 2's and clamp until dry.
7. Connect #22 bare wire jumpers from top end of connecter strip to to P.C. lead by lap soldering. Take CARE to jumper to correct terminal on leads that emerge from under strip at an angle. To connect to leads that are on reverse side of board, simply drill a hole through bus land on board and solder a jumper through it.

MOTHER BOARD -- six 44 pin edge connecters (plus 1 for extender board)

1. Saw 1 end of 22 pin connecter off just past last terminal, using a fine bladed hack saw. Do the same with 13 other connecters.
2. File the end smoth on 2 of these connecters and butt together. Check for correct terminal spacing, with 1 of the P.C.Board strips and if necessary file until the spacing is correct.
3. Do the same with the six other sets.
4. Insert one of the P.C.Board strips in each connecter set to hold alignment and spacing while gluing.
5. Put a thin layer of epoxy along each side of each edge connecter, being CAREFUL none comes near the contacts. Place between previously prepared hardwood strips about ½" h. x ¾" w. x about 10" long. Clamp entire assembly together until throughly dry.
6. Carefully remove P.C.B. strips. Glue or screw strips across ends of wood strips for additional strength. One source of FREE hardwood strips is your local print shop. Ask for used "cutter strips".
7. Wire bus by connecting like numbered terminal pigtails together with #22 bare wire. Remember, imput bus between Imput Multiplexer Board and CPU Board does NOT connect to other boards.
8. Make up an extra 44 pin connecter set and glue it flush with the top edge of the board you left full size. Solder terminal pigtails to foil strips on board. Use this extender board when servicing your Mark 8 to lift the board you wish to work on, above the other boards in the set while still allowing it to be connected to the bus.



Regards

Harvey Heinz

Page

BIT USERS ASSOCIATION

AN EXCHANGE ASSOCIATION OF USERS OF THE BIT 480 – 483 COMPUTERS
Sole authorized licensee for hardware, software, parts, patent and copy rights

Richard Koplow,
Secretary

A project of the
RESOURCE ACCESS CENTER
P O Box 11201
Minneapolis, Minnesota 55411
Telephone 612 529-9580

Mr Harold L Singer
Cabrillo High School Computer Center
Lompoc, CA 93436

Gentlemen:

I would very much appreciate the addition of this group, in the name and address below last, to the mailing list for your Mark-8 User Group, and would appreciate any back issues of mailings that can be provided.

The Resource Access Center is a group similar to Resource One in California, just getting underway. We are currently using a system of B.I.T. 483 minicomputers, but are expecting to expand to a moderately large computer this spring and will be using the BITs for communication control and microcomputers in peripheral control applications. We are a voluntary group of, primarily students from local colleges and high schools, and workers in the Minneapolis Model City Program projects. We are very fortunate to have among our active engineers several who are very skilled in microprocessor design. One, who is chief microprocessor consultant to a very large local computer manufacturer has a design of his own, built and debugged, using the 8080 (beats Altair by miles, he says) and I can probably get a copy of the plans for you if you are also interested in the 8080 designs.

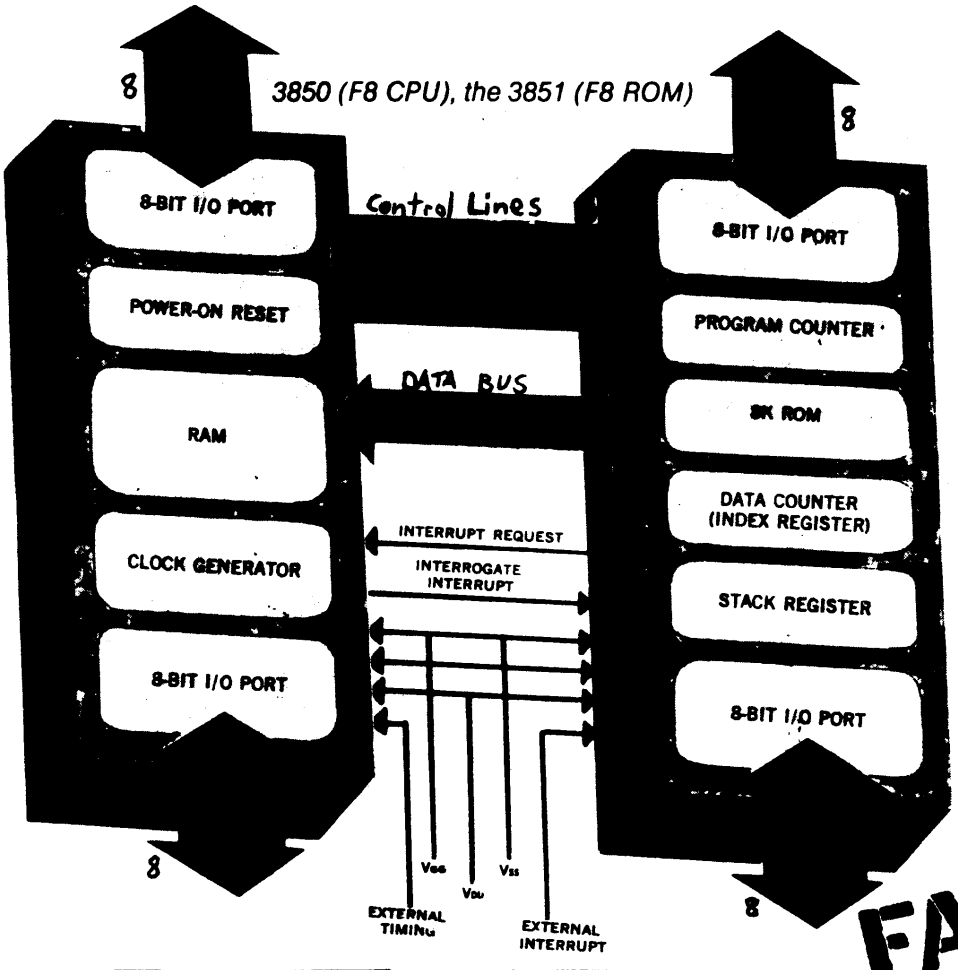
We currently are working on some interesting terminals and will be happy to share the designs. Two, using unmodified TVs, display wide lines of 64 to 80 characters readibly, and another uses the TV for raster scan graphics in 256x200 format. Also improved cassette electronics etc. Layout of the PCs is slow, and anybody interested in sharing this sort of thing should write.
We also bought out the bankrupt BIT computer company, and have all spare parts and new programs, should any of your users' group members happen into one.

Sorry that I can't yet say just what system we will be using soon -- still in negotiations about the donation -- but will keep you informed as to 8008-compatible peripherals & applications.

Richard B. Koplow
RESOURCE ACCESS CENTER
3010 4th Avenue South
Minneapolis, MN 55408

CHARLES FLOTO
267 WILLOW ST
NEW HAVEN CT
06511

a complete 2-chip microprocessor system that's really just 2 chips. easier to handle, much more versatile, and generally less expensive.



THE BASIC F8 SYSTEM AND 5 KEY CHANGES

1. Two 8-bit I/O ports on the CPU chip. And two more on the ROM chip. 32 bidirectional lines in all.
2. 64-bytes of fast RAM scratchpad **built into** the CPU chip.
3. A clock generator and power-on reset **built into** the CPU chip, too.
4. A programmable interval timer **built into** the ROM chip.
5. 60% of the 70 instructions are 1-byte.

Other features and refinements include:
A speedy 2μs minimum instruction execution time.
Direct TTL I/O compatibility.
A typical power dissipation of less than 300 MW per chip.
Local interrupt with automatic address vector.

FAIRCHILD

Semiconductor Specialists INC.

ELECTRONIC NEWS, MONDAY, JULY 14, 1975

The above is a cut-and-paste job from an ad I found interesting. Note the error in the power connection.

After reading about delivery problems with Mini Micro Mart I went ahead and ordered two 8101's figuring: they might do better on a simple IC order; I could afford to wait; 5¢ per word was too good a memory price to pass up. I mailed my order on Saturday and received two 2101's the following Thursday by UPS.

No faults were detected by my test program. It differs from those published in the NL in that after the test byte has been written, read and compared at each aldress the same is done for the complement of the byte.

So now the only question is what is the difference between the "fully interchangable" 2101 and 8101.

Micro-8 Editors

July 8, 1975
2377 Dalworth 157
Grand Prarie, Tx 75050

I missed the point of Jim Callas' letter as I think he missed the point of mine about Altair. Anyway, it did accomplish two things. It got a contribution from him, and another from me.
In lieu of beating a dead horse, I suggest those interested might read The Computer Hobbyist May 1975 editorial. Maybe it may cause more contributions to the NL.
Since MiniMicroMart can't seem to deliver, an alternate source for 8080/Altair equipment is Processor Technology Co. They are offering Altair compatable add-ons with a 6-month guarentee. The Mart owes me an UART ordered on 4/1/75. Considering the date ordered there must be a cosmic joke there somewhere.
For those disappointed with PE and RE, I suggest shifting support to BYTE coming out in August.
As an aside to the publishing world--most if not all magazines publish anywhere from 3 to 6 issues ahead of issue date. What this means is that corrections to articles made via 'Letter-to-Editor' will be that late in getting to the rest of us. Prices quoted and surplus advertised also will be that much out of date.
I don't know if BYTE will have this problem, but it does have a couple things going for it. Its not published in NYC,and if my communications with Carl Helmers are any indication, the editor is a damn nice guy who knows his 8-byters.
Of course, it goes without saying, if you want fast information, k know what's happening and get a lot of information, support of this NL is a must.
I'm willing to loan my template, felt pen, and time to redraw circuits to make them camera ready for the NL for contributions from Texas and surrounds. To speed up the process and save postage, contributors might consider sending them direct to me and I will redraw and relay them to the NL within 24-hours.

Pax,

Bill

Bill Fuller

---

26 July 1975
Ken A. McGinnis
P.O. Box 2078
San Mateo, Ca. 94401

Dear Hal,

How is everything going? Hope you had a good experience at your recent meeting. The Homebrew Computer Club members here really enjoyed having you visit.

Thought I would write to let you know that the Phi-Decks are now $84.50. Shipping as far as Florida is about $3.50 so include at least that much. California residents include 6% tax or your resale number. Delivery is about 3 to 4 weeks. The price will soon be lower and I will continue to refund any overpayments. There are several groups who are almost finished with controllers (and software) which will be low cost. In addition, several dependable people will soon offer CPU boards with the 8080 which will be considerably lower in cost than the Altair. One may be under $350 with 1K of memory on a 4K board which will accept slower 2102's.

Sincerely,

Ken

Jim Garrett
9253 LBJ Freeway, Apt. 204
Dallas, Texas 75231
234-2004 Home (5-9)
271-2561 Ext. 385 (8-4:30)
July 21, 1975

TO: Hal Singer

FROM: Jim Garrett

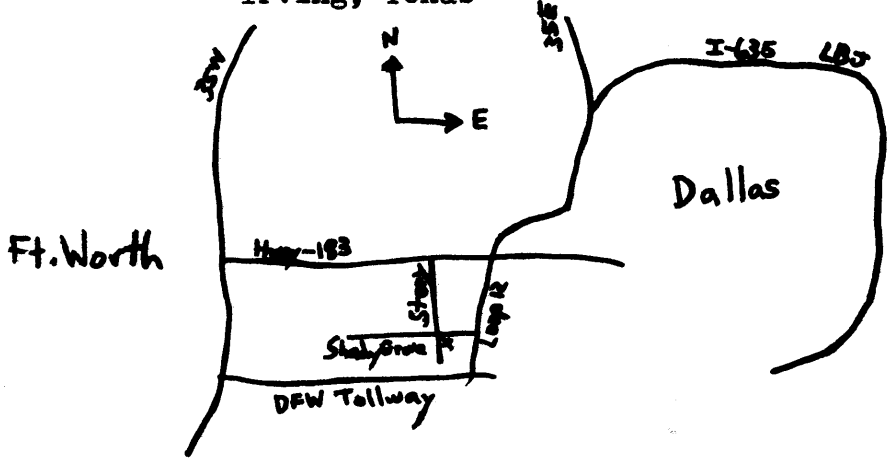
SUBJECT: NORTH TEXAS - DALLAS - FT. WORTH - METROPLEX COMPUTER CLUB MEETING

Lannie Walker, Bill Fuller, and myself are trying to get the amateur computer buffs together in the north Texas area. Our first meeting was a sucess; alot of information and hints were exchanged. In this varied group we have some people with "Homebrews", Altairs, Micro-8's, Mike-2s and other computers.

We would like your help in publicizing our August meeting. Everyone is welcome.

NORTH TEXAS - DALLAS - FT. WORTH - METROPLEX
MEETING

Date: August 18, 1975
Time: 7:00 p.m.
Location: Southwest Branch of the Irving Public Library System
2300 W. Shady Grove
(In shopping center, corner of Shady Grove & Story Rd)
Irving, Texas



If anyone has any questions about the location or how to get there please call me.

Thanks,
Jim
Jim Garrett