MICRO-8 COMPUTER USER GROUP NEWSLETTER APRIL 15, 1975
HAL SINGER & JOHN CRAIG - EDITORS VOLUME 1, NUMBER 6
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436
PHONE (805) 733-3501 (1:40 TO 4:30 PST)
(805) 735-1596 (EVENINGS)

STATUS OF MICROSYSTEMS INTERNATIONAL

WE'VE SAID BEFORE THAT INFORMATION CHANGES FAST IN THIS FIELD. NO SOONER HAD THE LAST ISSUE OF THE NL BEEN MAILED OUT THEN MICROSYSTEMS INTERNATIONAL ANNOUNCED THEIR BANKRUPTCY. IT WAS A BIG COMPLICATED DEAL INVOLVING CONGLOMORATE CORPORATE MANIPULATION, LOSS TO THE CANADIAN GOVERNMENT OF MILLIONS OF DOLLARS, AND LOSS TO US OF OUR PRICE COMPETITIVE 2ND SOURCE FOR 8008 AND 8080 MICROCOMPUTER CHIPS AS WELL AS THE MONITOR-8 PROM, RAMS AND OTHER THINGS. IT TOOK EVERYONE BY SURPRISE. MAURY GOLDBERG OF MINI MICRO MART HAD MANY OF HIS ANNOUNCED PLANS AFFECTED. PRESENT STATUS SEEMS TO BE ABOUT AS FOLLOWS: MONITOR-8 ROMS WILL NOT BE AVAILABLE. MAURY GOLDBERG MAY GET A FEW BUT YOU'LL HAVE TO CONTACT HIM FOR THE PRESENT STATUS. THE 8080 MOD-8 BOARDS ARE UNAVAILABLE BUT TWO SOURCES ARE WORKING ON DEVELOPING THEIR OWN 8080 BOARDS FOR THE MOD-8. ALL MOD-8 BOARDS ARE AVAILABLE FROM SPACE CIRCUITS BUT ONE OF THEM THAT USED A SPECIAL SINGLE SOURCE MIL 256 X 4 RAM WILL BE OF NO USE TO ANYONE. MONITOR-80, THE 8080 VERSION OF THE MONITOR-8 DOES NOT EXIST ACCORDING TO OUR BEST INFORMATION. MF8008 INFORMATION BOOKS WERE ORDERED DESTROYED BY MIL BUT SOME HAVE BEEN SALVAGED AND AN ANNOUNCEMENT WILL SOON BE MADE REGARDING THEIR AVAILABILITY. DOCUMENTATION IS STILL AVAILABLE FOR THE MOD-8 CASSETTE CIRCUIT BUT IT WILL PROBABLY NOT PROVE TO BE THE MOST POPULAR UNIT WITH THE MONITOR-8 ROM UNAVAILABLE. SOME MIL STUFF IS STILL AVAILABLE BUT TO OUR KNOWLEDGE, THEY ARE NOT DUMPING STUFF IN SUCH A WAY THAT WE CAN BENEFIT GREATLY FROM IT EXCEPT THRU SPECIAL DEALS FROM SOME OF OUR SUPPLIERS. SO MUCH FOR THAT.

DEALING WITH SUPPLIERS

IN OUR ENTHUSIASM TO GET A MACHINE RUNNING MOST OF US ARE EAGER TO MAIL AWAY LARGE CHECKS TO VIRTUALLY UNKNOWN COMPANIES. ONE HAS TO LOOK BACK ONLY A FEW MONTHS TO SEE HOW ONE OPERATOR GOT TO PEOPLE FOR $500,000 THIS WAY. WHEN YOU SEND OFF A CHECK, KISS IT GOODBY, BECAUSE YOU MAY NEVER SEE THAT MONEY AGAIN. YOUR ONLY PROTECTION IS TO DEAL WITH COMPANIES THAT HAVE AN ESTABLISHED REPUTATION. A FAVORITE GIMMICK IS TO AGREE TO SUPPLY SOMETHING AND SIT ON THE MONEY FOR MANY MONTHS BEFORE DELIVERING. INFORMATION YOU SEE IN THE NEWSLETTER IS FOR YOUR INFORMATION ONLY AND AN EFFORT IS BEING MADE TO KEEP YOU CURRENT ON OTHER PARTICIPANT'S EXPERIENCE WITH ALL SUPPLIERS BUT IT IS UP TO YOU TO VERIFY A COMPANY'S INTEGRITY AND ABILITY TO DELIVER. CAREFULL CLARIFICATION BY MAIL REGARDING DELIVERY TIMES IS ESSENTIAL. ENCLOSE A SELF-ADDRESSED STAMPED-ENVELOPE (SASE) FOR THE REPLY - POSTAGE CAN EAT A SUPPLIER ALIVE SENDING OUT REPLIES AND ADDRESSING ENVELOPES IS A VERY TIME CONSUMING AFFAIR. LET US KNOW IF YOU RUN INTO ANY TROUBLE SO WE CAN WARN OTHERS.

CURRENT NEWSLETTER STATUS

RESPONSE TO OUR $6.00 FOR 6 ISSUE CHARGE FOR MEMBERSHIP HAS BEEN GRATIFYING. NEARLY 300 PEOPLE HAVE SUBSCRIBED PUTTING US NEAR THE BREAKEVEN POINT FOR 6 32 TO 48 PAGE NEWSLETTERS. AS NEW ORDERS COME IN WE WILL BE ABLE TO INCREASE THE SIZE OF THE NEWSLETTER IF YOU CONTINUE TO SEND IN NEWS THAT CAN BE PUBLISHED.

THIRD CLASS MAIL IS RIDICULOUSLY SLOW - OVER A MONTH IN MANY CASES - SO ALL FUTURE NL'S WILL BE SENT FIRST CLASS. THIS ONE'S SIZE WAS DETERMINED BY THE NUMBER OF PAGES THAT COULD BE SENT ON A 20 CENT STAMP.

I MUST APOLOGIZE FOR THE REPEATED MENTION OF CAMERA READY COPY IN THE LAST NEWSLETTER AND THE ATTEMPT TO BRIBE PEOPLE INTO SENDING INFO IN BY OFFERING REPRINTS OF USEFUL INFORMATION. THE MAIN PROBLEM WAS IN NOT EXPLAINING WHAT CAMERA READY COPY IS. THAT SIMPLY MEANS THAT INFORMATION IS TYPED ON 8 1/2 X 11 WHITE PAPER USING A NEW "BLACK" TYPEWRITER RIBBON (NO EZI ERASE PAPER PLEASE). SCHEMATICS SHOULD BE DRAWN NEATLY IN SOFT PENCIL OR BLACK INK. WHEN INFORMATION IS PROVIDED THIS WAY IT IS A SIMPLE MATTER TO CUT AND PAST IT IN THE APPROPRIATE ORDER SO IT CAN BE PHOTOGRAPHED TO MAKE OFFSET MASTERS. THIS SAVES RE-TYPING AND REDRAWING AND WILL ALLOW US TO PRODUCE MANY MORE PAGES OF MATERIAL. MANY OF THE ITEMS IN THIS NL WERE PROVIDED IN "CAMERA READY" FORM.

IT IS RAPIDLY REACHING THE POINT WHERE WE CAN AFFORD TO PRINT THE ITEMS THAT HAVE BEEN TOO BIG TO INCLUDE IN PAST NEWSLETTERS. MANY ITEMS WERE MENTIONED IN THIS NL AND ARE AVAILABLE FOR A SASE AND A COUPLE OF STAMPS TO PAY FOR THE DUPLICATING COSTS.

AN EFFORT HAS BEEN MADE TO INCLUDE ANY INFORMATION THAT WAS SENT IN THAT WOULD BE OF INTEREST TO OTHERS. A SCAN THROUGH ALL OF OUR MAIL (IN FOLDERS THAT STACK NEARLY 3 FEET HIGH), WILL BE MADE TO SEE IF ANY-THING WAS OVERLOOKED. YOU CAN HELP BY TELLING US IF WE LEFT OUT SOME MATERIAL THAT YOU SENT IN THAT SHOULD HAVE BEEN INCLUDED.

MANY PARTICPANTS SAY THAT THEY DO NOT HAVE ANYTHING TO CONTRI-BUTE. IF YOU HAVE YET TO TELL US WHO YOU ARE AND WHY YOU ARE INTERESTED IN MICROCOMPUTERS YOU DO HAVE SOMETHING WORTHWHILE TO CONTRIBUTE.

MANY HAVE WRITTEN AND TELEPHONED ASKING FOR SPECIAL ITEMS. FOR VARIOUS REASONS YOU MAY HAVE BEEN NEGLECTED OR OVERLOOKED. PLEASE TRY US AGAIN.

JOE CIMMINO WILL SOON UPDATE OUR MAILING LIST. HE DEFINITELY WANTS YOU TO LET HIM KNOW IF YOU DO NOT WANT YOUR TELEPHONE NUMBER LIST-

ED. IF YOU HAVE A NEED FOR ADHESIVE MAILING LABELS OF OUR MIST OF PARTICIPANTS, CONTACT HIM. NL #7 WILL CONTAIN A COMPLETE ADDRESS LIST OF EVERYONE THAT HAS CONTACTED US.

LAST MINUTE INFORMATION

WE JUST RECEIVED A CATALOG FROM CYBERTRONIC SYSTEMS, PO BOX 18065, LOUISVILLE, KY 40218 ADVERTISING 8008'S @ $29.95, 4K X 8 2102 MEMORY BOARDS FOR $170.00, UNIVAC SERIES 70 MAG TAPE DRIVES FOR $350.--, AND OTHER VERY INTERESTING INFORMATION. NOTHING IS KNOWN ABOUT THEIR RE-LIABILITY OR INTEGRITY. SEND A SASE FOR THEIR CATALOG.

OFFSET COPIES OF NEWSLETTERS 1 THRU 4 & 5 IF YOU HAVEN'T GOT IT

OFFSET COPIES OF NEWSLETTERS 1 THRU 4 SHOULD BE BACK FROM THE PRINTER IN ABOUT THREE WEEKS. THE PRICE WILL BE $3.50, POSTPAID, FIRST CLASS MAIL. IF YOU ALREADY SENT $3.50, YOURS WILL BE SENT OUT AS SONN AS THEY ARE RECEIVED. IF YOU ARE INTERESTED AND HAVEN'T ORDERED YET, SEND A CHECK FOR $3.50 MADE OUT TO THE CABRILLO HIGH SCHOOL COMPUTER CENTER.

THE CABRILLO HIGH SCHOOL COMPUTER CENTER'S LINE PRINTER FINALLY ARRIVES!

OUR CENTRONICS 508 INCREMENTAL PRINTER FINALLY ARRIVED AFTER ONLY FIVE MONTHS OF AGONIZING WAITING. IT MAY EVEN BE WORTH THE LONG WAIT. IT TAKES THE PLACE OF THE TELETYPE AND ACCEPTS CHARACTERS AT 120 CHARACTERS PER SECOND, HAS COMPLETE VERTICAL FORMAT CONTROL, UPPER AND LOWER CASE, ELONGATED CHARACTER CAPABILITY, AND MANY OTHER BELLS AND WHISTLES. NOTHING ATTACHES TO A COMPUTER WITHOUT A LITTLE PAIN AND WE STILL HAVEN'T GOT IT WORKING AT FULL SPEED. IT SEEMS THAT THEY SENT IT SET UP FOR A SERIAL INTERFACE INSTEAD OF A PARALLEL ONE EVEN THOUGH THE PARALLEL INTERFACE WAS INCLUDED. SINCE OUR CURRENTLY USED SOFTWARE IS TOO DUMB TO INSERT LINE FEED FILL CHARACTERS, WE CAN ONLY OPERATE IT AT A SERIAL RATE OF 30 CPS. SINCE ITS BUFFERED WITH A 132 CHARACTER BUFFER, IT RUNS NEARLY AT FULL SPEED ON SHORT LINES. I HOPE TO HAVE THE PARALLEL INTER-FACE RUNNING BEFORE LONG.

I HAVE BEEN USING OUR TEXT EDITOR TO PREPARE THE NEWSLETTER COPY AND HAD TO TRY IT TO SEE WHAT KIND OF OFFSET COPY IT MAKES. HOPE IT COMES OUT OK.

THANKS, HOPE TO HEAR FROM YOU SOON.

HAL SINGER & JOHN CRAIG

RESULTS OBTAINED FROM STANDARDIZATION PROPOSAL

THE FOLLOWING I/O STANDARDIZATION SCHEME WAS SENT OUT TO ABOUT 50 PEOPLE AND THEY WERE ASKED TO RESPOND TO IT. A SHORTENED AND SLIGHTLY UPDATED VERSION OF THE PROPOSAL, A REVIEW OF THE LETTERS RECEIVED, AND MY CONCLUSIONS FOLLOW:

REQUEST FOR REVIEW OF STANDARDIZATION SCHEME

EVERYONE TALKS ABOUT STANDARDIZATION BUT NO ONLY WILL PROPOSE ANYTHING SO I'M GOING TO. ISN'T THAT BRAVE! PLEASE READ OVER THE MATERIAL CAREFULLY AND "THROW ROCKS AT IT". BE SURE TO OFFER POSITIVE SUGGESTIONS WHERE YOU DON'T AGREE.

DESIGN PHILOSOPHY

THIS IS TO BE AN EXTREMELY LOW COST EXPERIMENTER'S SYSTEM (UNDER $500) USING HOMEMADE EASILY CONSTRUCTED PERIPHERALS. IT IS EXPECTED THAT THE CPU BE SOME VERSION OF THE 8008 (PROBABLY A MARK-8). IF POSSIBLE, ALL PERIPHERALS SHOULD BE USEABLE ON AN 8080 SYSTEM (I.E. ALTAIR 8800) WITH MINIMAL HARDWARE AND SOFTWARE CHANGES. AT LEAST 1K OF MEMORY SHOULD BE AVAILABLE.

A COMPUTER'S USEFULLNESS IS DEPENDENT ON NUMEROUS PERIPHERALS. THE HOBBYIST CAN BARELY AFFORD A SYSTEM AT ALL SO PERIPHERALS MUST BE EXTREMELY CHEAP AND EASILY CONSTRUCTED. THIS WILL BE A PROPOSAL FOR POSSIBLE PERIPHERALS, DEVICE CODES AND A DESCRIPTION WHERE POSSIBLE. NO ONE WILL HAVE THEM ALL. IT IS DESIGNED AS A SHOPPING LIST FOR THE HOBBYIST MUCH AS THE PDP-8 HANDBOOK IS. IT IS NOT INTENDED TO BE A CONSTRUCTION PLAN FOR ANYTHING. IF WE CAN AGREE ON A STANDARDIZATION SCHEME, PEOPLE CAN START PRODUCING DETAILED PERIPHERAL CONSTRUCTION PLANS. I HOPE THAT IT WILL ELICITE A GREAT DEAL OF DISCUSSION, COUNTER PROPOSALS DETECTION OF ERRORS, ETC. SO A HARDWARE STANDARDIZATION SCHEME WILL EXIST THAT EVERYONE CAN LIVE WITH.

DISCUSSION OF POSSIBLE PERIPHERALS

1. FOUR TERMINAL DEVICES ARE PRESENTLY FEASIBLE.
   - A. ASR33 AND KSR33 TTY'S (FOR THE RICH GUYS)
   - B. 5 LEVEL (BAUDOT) TTY'S (BTTY) (ROBERT COOK HAS SEVERAL 100 OF THESE HE WILL OFFER FOR SALE SOON.)
   - C. TV TYPEWRITER (TVT-1) OR SWTP TVT (TVT-2) AND KEYBOARD
   - D. DR. SUDING'S 128 CHARACTER TVT AND KEYBOARD (MISSING SOME OF THE FEATURES OF THE SWTP ONE BUT MUCH CHEAPER TO BUILD AND THE 128 CHARACTER SET IS NICE. HIS 16 LINE BY 64 CHARACTER ONE SHOULD BE THE IDEAL TERMINAL.

   THE TYPICAL HOBBYIST WILL PROBABLY USE ONE OF THE TVT'S AS THE SYSTEM TERMINAL WITH A BTTY AS THE HARD COPY DEVICE. SOME MAY WANT TO RUN THE BTTY ONLY WHILE THE RICH GUYS WILL USE AN ASR33.

   IT WOULD BE CONVENIENT TO HAVE A SWITCH TO CONVERT FROM A UART TYPE OF TERMINAL INTERFACE TO A SERIAL PULSE SYNTHESIS TYPE.

   BAUDOT TO ASCII AND VICE VERSA CODE CONVERSIONS IN SOFTWARE OR HARDWARE MUST BE FIGURED OUT ALSO.

   THOSE WITH ONLY 1 TERMINAL DEVICE WILL CONNECT IT AS A UART PARALLEL OR AS A SERIAL SYNTHESIS TTY UNIT. WITH MORE THAN ONE DEVICE, IT MAY BE DESIRABLE TO ALLOW CODE SWITCHING SO THAT THEY CAN BE USED IN DIFFERENT COMBINATIONS WITHOUT CHANGING SOFTWARE.

2. PROM FOR KEYBOARD MONITOR

   THE PAGE 0 OF MEMORY SHOULD BE SWITCH SELECTABLE SO THAT IT CAN EITHER BE 256 WORDS OF RAM OR A PROM LOADED WITH THE LAWRENCE LIVERMORE LABS OR THE DIGITAL EQUIPMENT CORP. OCTAL DEBUGGING TECHNIQUE PROGRAM. WITH THIS TYPE OF PROGRAM, SIMPLY TOUCHING THE INTERRUPT BUTTON GIVES YOU COMPLETE TERMINAL DEVICE KEYBOARD CONTROL OF THE COMPUTER ALLOWING LOADING AND EXAMINING OF MEMORY LOCATIONS, READING A TAPE, AND STARTING PROGRAMS RUNNING AT A GIVEN MEMORY LOCATION. COST - ABOUT $30.

3. CASSETTE TAPE INTERFACE

   AN INTERFACE FOR LOADING AND DUMPING MEMORY FROM A CHEAP HOBBY QUALITY TAPE RECORDER IS NECESSARY. AT LEAST SIX CIRCUITS ARE NOW KNOWN THAT WORK. THE CASSETTE LOAD AND DUMP ROUTINES CAN BE PUT IN PROM. COST - ABOUT $15 PLUS A $30 ELCHEAPO CASSETE RECORDER PLUS THE COST OF PROMS FOR LOAD AND DUMP ROUTINES.

4. HAND OPERATED PAPER TAPE READER

THIS WILL BE A LITTLE UNIT THAT YOU FEED THE TAPE INTO AND PULL THRU BY HAND AT WHATEVER SPEED YOU WANT. IF YOUR AMBITIOUS, YOU CAN ADD A MOTOR. COST - ABOUT $25, ANOTHER $15 IF YOU WANT A MOTOR.

5. PAPER TAPE PUNCH

SOME PEOPLE WILL HAVE ASR33 TTY'S TO MAKE 8 LEVEL PAPER TAPE. BOB COOK'S BAUDOT CREED TTY'S HAVE A 5 LEVEL PAPER TAPE PUNCH. YOU MAY BE LUCKY ENOUGH TO FIND A SURPLUS PAPER TAPE PUNCH CHEAP. IT'S NEARLY IMPOSSIBLE TO BUILD ONE EASILY AND CHEAPLY. (MOST PROGRAMS WILL BE SAVED ON CASSETTE ANYWAY.)

6. DROP THRU MARK SENSE CARD READER

THIS UNIT WOULD HAVE A SLOT IN THE TOP AND YOU SIMPLY DROP THE CARDS THRU ONE-BY-ONE AND IT READS THEM AND STACKS THEM. COST - ABOUT $50.

7. CARD PUNCH

YOU MAY BE ABLE TO FIND AN OBSOLETE IBM KEYPUNCH THAT CAN BE INTERFACED. IT WOULD BE HARD BUT POSSIBLE TO PRODUCE A UNIT THAT WOULD TYPE MARKS ON A CARD. TOUGH BUT POSSIBLE.

8. OSCILLOSCOPE DRIVER AND LIGHT PEN

A MINIMAL SYSTEM CAN BE BUILT FOR $20 AND A SCOPE THAT IS DC COUPLED ON BOTH THE X AND Y. AN ELABORATE VERSION IS DESCRIBED IN ISSUES 1 THRU 3 OF THE COMPUTER HOBBYIST. COST - $50 FOR HARDWARE PLUS A SURPLUS RADAR SCOPE UNIT.

9. SWITCH RELAY INTERFACE

THIS IS A SET OF 8 RELAYS THAT CAN BE SELECTIVELY SET OR CLEARED FROM AN OUTPUT PORT AND USED TO CONTROL WHATEVER YOU WANT AND 8 EXTERNAL SWITCH SETABLE FLIPFLOPS WHOSE CONDITION CAN BE READ BY AN INPUT PORT. COST - ABOUT $25.

10. MULTICHANNEL ANALOG TO DIGITAL CONVERTER

JAMES FRY SUPPLIED AN 8 BIT A TO D CONVERTER CIRCUIT THAT CAN BE BUILT FOR ABOUT $15 PLUS THE COST OF THE INPUT MULIPLEXOR. COST - UNDER $25. (SEE NL #5)

11. DIGITAL TO ANALOG CONVERTER

AS MANY OF THESE AS DESIRED CAN BE INCLUDED. COST - UNDER $15 PER CHANNEL.

12. CALCULATOR INTERFACE

DR. SUDING HAS A SCIENTIFIC CALCULATOR INTERFACE WITH SR-50 ARITHMETIC CAPABILITY AVAILABLE THAT CAN BE BUILT FOR UNDER $80. MR. TITUS WILL SOON HAVE A CALCULATOR INTERFACE CONSTRUCTION ARTICLE IN R-E USING A TI CHIP.

13. PROM PROGRAMMER

BOTH INTEL AND MIL HAVE PUBLISHED CIRCUITS FOR PROM PROGRAMMERS. COST - ABOUT $60.

14. X-Y PLOTTER

THIS WILL BE EASY IF CHEAP STEPPING MOTORS CAN BE FOUND, A LITTLE TOUGHER IF A SERVO SYSTEM NEEDS TO BE BUILT. TOUGH BUT QUITE POSSIBLE. COST - UNDER $100.

15. DIGITIZER

THIS COULD BE SET UP SO THAT MOVING A STYLUS TO A PARTICULAR LOCATION MOVES BY WAY OF STRINGS, THE X AND Y AXIS TEN TURN POTS, WHICH COULD BE READ BY TWO ANALOG TO DIGITAL CHANNELS WHEN THE DIGITIZER BUTTON IS PUSHED. COST - UNDER $35.

16 IC TESTER

SOMEONE WILL HAVE TO WORK THIS ONE OUT IN DETAIL. COST - ?

17. FLOPPY DISK

THE COMPUTER HOBBYIST GROUP AND MITS HAVE FLOPPY'S RUNNING. RUMOR HAS IT THAT HELMERS OF MP PUBLISHING IS THINKING OF ORGANIZING A GROUP PURCHASE BUT HE REFUSES TO ANSWER LETTERS. COST - ?

18. PROGRAMMABLE REAL TIME CLOCK

THIS WOULD BE A SIMPLE COUNTER THAT CAN BE LOADED UNDER PROGRAM CONTROL AND WILL COUNT USING THE CPU CLOCK AND SET A FLAG AND OR INTERRUPT THE COMPUTER WHEN COUNT REACHES ZERO.

19. TV GRAPHICS TERMINAL

DR. SUDING IS TALKING ABOUT A SHIFT REGISTER UNIT THAT WOULD TURN A TV INTO A 128 X 128 DOT GRAPHICS UNIT WITH A LIGHT PEN.

20 CAN YOU ADD TO THE LIST?

I/O PORT ASSIGNMENTS

AT FIRST ONE WOULD THINK THAT THE 8008 IS LIMITED WITH ONLY 8 INPUT PORTS. HOWEVER, THE ACCUMULATOR IS SENT OUT ON AN INPUT CYCLE DURING T1 OF MEM CYCLE 2 AND IS LATCHED INTO IC8 AND 9 IN THE MARK-8. BY SIMPLY LOADING THE A REGISTER IMMEDIATE AND DOING AN INPUT INSTRUCTION AND DECODING THE VALUE FROM IC8 AND 9, ANY OF THE INPUT PORTS CAN BE MULTIPLEXED FOR 256 POSSIBLE DEVICES. I PROPOSE THAT INPUT PORT 7 BE MULTIPLEXED, WITH 0 THRU 6 RESERVED FOR COMMON DEVICES FOR WHICH YOU DON'T WANT TO GO TO THIS EXTRA TROUBLE.

WITH ONLY 24 OUTPUT PORTS, CAREFULL PLANNING WILL BE NECESSARY TO AVOID USING THEM UP. THESE CAN BE EXPANDED ALSO BUT IT IS MORE OF A HASSLE. MULTIPLEXED INPUT PORTS CAN BE USED FOR CONTROL FUNCTIONS WHERE NO DATA NEEDS TO BE SENT OUT.

THE FOLLOWING CONSIDERATIONS WENT INTO CHOOSING THE SPECIFIED I/O PORT ASSIGNMENTS:

1) OLD INTEL DEVELOPED PROGRAMS (AS WELL AS MIL, PROLOG, AND OTHERS) USE A SERIAL SYNTHESIS TTY CONNECTED TO IP0 BIT P, OP12 BIT 0, OP13 BIT 0, AND THE INT LINE. (OP12 IS OUTPUT PORT 2)
2) LAWRENCE LIVERMORE LABS USES A PARALLEL UART TTY DESIGN USING IP2, OP15, AND IP3 AS A FLAG REGISTER.
3) LAWRENCE LIVERMORE LABS USES A KEYBOARD INTERFACE USING IP4 WITH BIT 7 AS A FLAG.
4) DR. SUDING'S CASSETTE INTERFACE PRESENTLY USES IP1 BIT 0 AND OP11 BIT 0.
5) DR. SUDING'S TVT PRESENTLY USES OP16.

INPUT PORT ASSIGNMENTS

IN0 SERIAL TTY BIT 0. BITS 1-7 USED FOR INT PURPOSES FOR THOSE THAT CARE.
IN1 FLAG PORT (SEE FLAG PORT ASSIGNMENT SECTION)
IN2 TTY READ DATA (UART PARALLEL INTERFACE)
IN3 FLAG PORT (SEE FLAG PORT ASSIGNMENT SECTION)
IN4 KEYBOARD 0-6 DATA BIT 7 KEYPRESSED FLAG.
IN5 & 6 RESERVED FOR FLOPPY DISK
IN7 MULTIPLEXED INPUT PORT WITH ASSIGNMENTS AS FOLLOWS:

MULTIPLEXED INPUT PORT 7

IN7 0-7	PAPER TAPE READER
10-17	PAPER TAPE PUNCH
20-27	MARK SENSE CARD READER
30-37	CARD PUNCH
40-47	OSCILLOSCOPE DRIVER
50-57	SWITCH RELAY INTERFACE
60-67	A-D CONVERTER
70-77	D-A CONVERTER
100-107	MORE D-A CONVERTERS
110-117	CALCULATOR INTERFACE
120-127	PROM PROGRAMMER
130-137	X-Y PLOTTER
140-147	DIGITIZER
150-157	IC TESTER
160-167	FLOPPY DISK
170-177	REAL TIME CLOCK

NOTE THAT AT LEAST 8 CODES ARE RESERVED FOR EACH DEVICE WHICH CAN INCLUDE CONTROL OF THE DEVICE.

OUTPUT PORT ASSIGNMENTS

OP10	INT CONTROL
11	CONTROL PORT
12	CONTROL PORT
13	CONTROL PORT
14	PAPER TAPE PUNCH
15	CARD PUNCH
16	DR. SUDING'S TVT
17	TTY SEND DATA UART PARALLEL
20	
21	FANCY GRAPHICS DISPLAY
22	
23	
24	SET RELAYS
25	SELECTIVELY CLEAR SW REG.
26 - 27	CALCULATOR
31-32	IC TESTER
34-35	FLOPPY DISK
36-37	IC TESTER

INPUT FLAG PORT ASSIGNMENTS

IN0 FLAG AND INTERRUPT
BIT 7 - 1 RESERVED FOR INTERRUPT CONTROL FOR THOSE WHO NEED IT.
BIT 0 SERIAL TTY FLAG

IN1 FLAG PORT ONE
BIT 7 - 1 PRESENTLY UNASSIGNED OR FOR PARALLEL CASSETTE
BIT 0 DR. SUDINGS'S CASSSETTE TAPE IN

OUPUT CONTROL PORT ASSIGNMENTS

OUT 11 CONTROL PORT 1
BIT 7 - 1 PRESENTLY UNASSIGNED OR RESERVED FOR PARALLEL CASSET
BIT 0 DR. SUDING'S CASSETTE OUT

OUT 12 CONTROL PORT 2
BITS 7 - 2 UNASSIGNED
BIT 1 PTR READ CHARACTER (IF MOTOR CONTROLLED)
BIT 0 SERIAL TTY OUT

IN3 FLAG PORT 3

BIT 7	KEYBOARD KEYPRESSED FLAG
6	TVT DATA RECEIVED FLAG
2-5	UNASSIGNED
1	PARALLEL TTY SEND DONE FLAG
0	PARALLEL TTY WORD RECEIVED FLAG

OUT 13 CONTROL PORT 3

BIT 7 THRU 1	UNASSIGNED
BIT 0	SERIAL OR PARALLEL TTY TAPE READER CONTROL

THE STANDARDIZATION REPORT WAS SENT OUT JAN 10, 1975. IN THE FOUR MONTHS SINCE, MUCH HAS HAPPENED THAT HAS A BEARING ON PROPOSALS MADE.
1) ADDITIONAL SYSTEMS (I.E. INTELLEC-8 AND DEC'S MPS MODULES, ETC. HAVE BEEN INTRODUCED THAT WRECK HAVOC WITH PREMISES BEHIND WHICH PORT ASSIGNMENTS WERE MADE.
2) THE MIL MONITOR HAS COME AND GONE. BOB COOK HAS WRITTEN A KEYBOARD MONITOR THAT IS DIRECTLY USEABLE WITH HIS CREED TTY'S. TERRY RITTER HAS HIS EXECUTIVE MONITOR (FOR BAUDOT TTY) RUNNING.
3) 2102 MEMORY, 1702A PROM'S, 5202 AND 5203 PROM'S HAVE COME DOWN TREMENDOUSLY IN PRICE MAKING LARGE MODIFIABLE KEYBOARD MONITORS PRACTICAL.

OPINIONS OF THOSE THAT SENT RESPONSES TO THE STANDARDIZATION REQUEST.

RESPONSE TO THE PROPOSAL WAS NOT AS GREAT AS WAS HOPED FOR BUT THOSE REPLYING DID MAKE EXCELLENT POINTS. THESE COMMENTS FOLLOW:

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO, CA 92027 SUGGESTS THAT IT IS OVERLY AMBITIOUS TO ASSIGN I/O PORTS FOR EQUIPMENT WHICH MOST PEOPLE HAVE NOT USED. SINCE CASSETTES ARE NOT RANDOM MEMORIES, HE THINKS TWO UNITS WHOULD BE APPROPRIATE AND WANTS A STANDARD CASSETTE FORMAT. HE POINTS OUT THE OMISSION OF A REAL TIME CLOCK (SINCE ADDED TO THE LIST) AND SUGGESTS THAT THOSE PEOPLE INTERESTED IN GAMES WILL NEED A RANDOM NUMBER GENERATOR WHICH SHOULD BE DONE WITH HARDWARE RATHER THAN SOFTWARE BECAUSE IT USES TOO MUCH MEMORY WITH SOFTWARE. HE SAYS THAT ONE REASON THAT WE HAVE HAD NO PROPOSALS FOR I/O STANDARDIZATION IS THAT PEOPLE AREN'T FAR ENOUGH ALONG AND THAT A GOOD STANDARD CASSETTE FORMAT WILL BENEFIT EVERYONE.

DALE BERGGREN, 9207 S.W. 43RD AVE., PORTLAND, OR 97219 HAS OPINIONS ALSO BASED ON BIG COMPUTER EXPERIENCE. HIS SUGGESTIONS: 1) SWITCH OR JUMPER SELECTION OF PERIPHERAL PORTS. 2) MAKE HARDWARE DO THE WORK AND KEEP SOFTWARE SIMPLE. AVOID SOFTWARE TIMING LOOPS, KEEP PERIPHERALS ASYNCHRONOUS AND AVOID CPU WAIT ON PERIPHERALS. 3) KEEP CONVERSIONS EXTERNAL TO THE CPU (EXCEPT POSSIBLY BAUDOT/ASCII). USE CONTROLLERS FOR INTERFACING DEVICES SO ONE SOFTWARE ROUTINE CAN BE USED FOR SEVERAL DEVICES BY CHANGING DEVICE ADDRESSES. 4) TRY TO KEEP THE "STANDARD" DEVICES ON REGULAR I/O PORTS AND KEEP THE SPECIAL ONES ON MULTIPLEXED PORTS. 5) TRY TO PUT INPUT AND OUTPUT FOR EACH DEVICE ON LIKE NUMBERED I/O PORTS AND RESERVE PORT NUMBERS TO CORRESPONED TO INTERRUPT NUMBERS. HE FAVORS SCRAPING THE PORT SCHEME ALTOGETHER AND IMPLEMENTING A DEVICE NUMBERED UNIVERSAL BUS IDEA. CONTACT HIM IF YOUR INTERESTED IN PURSUING THIS LINE OF ATTACK. 6) TRY TO DEFINE STANDARDS RATHER THAN TRY TO REACH AGREEMENT ON HARDWARE DESIGN, I.E. 800 BPI, PHASE ENCODED, RS232C, ETC.

ROBERT SWARTZ, 195 IVY LAND, HIGHLAND PARK, IL 60035 DOSEN'T LIKE THE PORT ASSIGNMENTS SINCE THEY DON'T MATCH UP WITH THE INTELLEC-8 OR MIL'S MOD-8. (I THINK THE TTY ASSIGNMENTS ARE THE SAME AS FOR THE MIL MOD-8.) THE UPWARD COMPATIBILITY OF THE MOD-8 TO 8080'S AND THE 2K MONITOR-8 ROM ARE IMPORTANT REASONS TO RETAIN MOD-8 PORT CONFIGURATIONS. A CHEAP PROM PROGRAMMER IS AVAILABLE ON THE MIL MOD-8 BACKPLANE ($22 PLUS $40 TO STUFF IT). THE MOD-8 USES OUT10 0-7, OUT 11 0-7, OUT13 1&2, INP1 0-7 FOR FOR THE PROM PROGRAMMER AND OUT12 BIT 0 FOR TTY OUT, OUT13 B0 FOR TTY READER CONTROL AND INP3 BIT0 FOR TTY SERIAL IN. HE THINKS A STANDARD SYSTEM SHOULD FEATURE 1) 8008 TO 8080 UPWARD COMPATIBILITY. 2) GOOD MECHANICAL CONSTRUCTION WITH BOARD EDGE CONNECTORS. 3) A GOOD BUFFERED BUS DESIGN. & 4) SYSTEM SETUP THAT DOES NOT REQUIRE A SCOPE.
(NOTE BOB'S POINTS WERE MADE LONG BEFORE MIL'S BANKRUPTCY.)

CPT. MACK L. WARD, 17 NUMBER ST., FT. BRAGG, NC 28307 SAYS HE IS COMPLETELY SATISFIED WITH THE PROPOSAL AS IT IS.

WILLIAM SEVERENCE, CENTER LOVELL, MN 04016, (207)925-2271 SAYS THAT MUCH OF HIS THINKING IS GEARED TO LARGE MACHINES BECAUSE OF PAST EXPERIENCE. HE EXPECTS TO DO EXTENSIVE SOFTWARE DEVELOPMENT INVOLVING MUCH FILE I/O AND IS IN FAVOR OF AS ADVANCED AN I/O STRUCTURE AS POSSIBLE, WITH AS MUCH WORK DONE BY HARDWARE AS POSSIBLE SUCH AS SERIAL TO PARALLEL CONVERSION. HE AGREES WITH MULTIPLEXING PORT SEVEN AND WANTS DEVICE ACTIVITY HANDLED BY A PRIORITY INTERRUPT SYSTEM USING PORT 0 AS DESCRIBED IN MP PUBLISHING'S ECS-5 ARTICLE. HE IS IN FAVOR OF USING THE MP PUBLISHING TECHNIQUE OF SENDING OUT A CONTROL WORD AND INPUTTING A STATUS WORD IN A SINGLE INSTRUCTION. HE ALSO THINKS THAT A STANDARD CASSETTE FORMAT IS THE MOST DIFFICULT BUT MOST IMPORTANT STANDARD TO AGREE ON AND INSISTS ON USING A UART HARDWARE IMPLEMENTATION. AGAIN HE IS IMPRESSED WITH THE ECS-6 AND ECS-7 TAPE CONTROLLER. HE SUGGESTS A BLOCKED TAPE FORMAT OF 256 WORDS WITH AUTOMATIC MOTOR CONTROL. THE IN4 BIT 7 KEYPRESSED FLAG AND IN3 BIT 7 FLAGS ARE REDUNDANT. INO COULD ALSO OUTPUT AN INTERRUPT CONTROL WORD MAKING OUT10 UNNECESSARY AND ALLOWING ITS USE FOR THE LED DISPLAY REGISTER. HE FAVORS USE OF PROM'S FOR A BOOTSTRAP CASSETTE LOADER AND AN ODT WHICH WOULD BE NICE BUT NOT NECESSARY IF YOU HAVE AN OCTAL KEYBOARD ENTRY SYSTEM. HE MENTIONS THAT SOFTWARE FORMAT STANDARDIZATION IS AS IMPORTANT AS HARDWARE AND THAT INTEL'S FORMAT BE FOLLOWED EXACTLY. HE SUGGESTS OCTAL FOR ALL NUMBERS EVEN THOUGH HEX MIGHT BE LESS AWKWARD FOR 8 BIT WORDS SINCE HE INTENSLY DISLIKES HEX NOTATION.

TERRY RITTER, 2524B GLEN SPRINGS WAY, AUSTIN, TX (512) 441-0036 SAYS THAT US STANDARDIZERS ARE ONLY A SMALL PORTION OF THE 8008 OWNERS. MOST HAVE THE INTEL PORT CONFIGURATION WIRED IN AND MOST DO NOT HAVE THE TV TYPEWRITER. IT IS THUS REASONABLE TO PLACE THE EXPECTED SMALL SYSTEM USES ON THESE PORTS: INPUT PORTS 0--ASCII KEYBOARD 1--CASSETTE OUTPUT PORTS 0--DISPLAY 1--CASSETTE 2--VIDEO 3--SPARE 4--TTY. MORE STANDARDIZATION THAN ABOVE MIGHT DO MORE HARM THAN GOOD. TWO VERY POWERFUL HARDWARE ADDITIONS, A PUSH/POP STACK, AND PROGRAM COUNTER ACCESS MIGHT BE INCLUDED AND USE FOUR INPUT PORTS BETWEEN THEM BUT PROVIDE THE ONLY KNOWN MEANS FOR PROVIDING THE 8008 WITH TRUE INTTERRUP AND MACHINE-LANGUAGE TRACE CAPABILITIES. IT IS IMPOSSIBLE TO HARD STANDARDIZE ANY DEVELOPING SYSTEM WITHOUT RESTRICTING ENGINEERING OPTIONS. FOR EXAMPLE, THE AFSK (RTTY) CASSETTE STORAGE SYSTEM MAY BECOME WIDELY USED YET ALTERNATE SYSTEMS WILL SOON APPEAR WITH MUCH GREATER STORAGE RATES, AND WE WILL AGAIN HAVE STANDARDIZATION PROBLEMS. IF POSSIBLE, MULTIPLE OPTIONS SHOULD BE COMPLETELY SPECIFIED, RATHER THAN STANDARDIZED.

J. PAUL FARR, 3723 JACKSTADT, SAN PEDRO, CA 90731 OBJECTS TO THE LARGE NUMBER OF PORTS DEDICATED TO SERIAL DATA DEVICES, WITH AN ATTENDENT SOFTWARE SERIAL TO PARALLEL CONVERSION. IT SEEMS THAT WITH A PROCESSOR AS SLOW AS THE 8008 AND WITH THE LIMITED MEMORY MOST OF US CAN AFFORD, THAT SERIAL DATA HANDLING BY THE CPU SHOULD BE AVOIDED AS MUCH AS POSSIBLE. HE LIKES THE IDEA OF USING THE 8-INPUT PORT MODIFICATION SUGGESTED BY MR. TITUS IN R-E WITH PORT IN-7 BEING USED AS A BUS. WE MAY WANT TO BE A LITTLE MORE JUDICIOUS IN ALLOCATING INPUT PORTS IN-0 THRU IN-6 AS THESE ARE ADDRESSED BY THE SIMPLE ONE BYTE INP INSTRUCTION. MAYBE ONE OR TWO CAN BE USED FOR FLAGS, ONE FOR KEYBOARD, AND TWO OR THREE FOR BULK DATA AND PROGRAM STORAGE ON TAPE OR DISK. ON THE ASSIGNMENT OF OUTPUT PORTS, WE MAY WANT TO THINK IN TERMS OF MAKING 2 OF THE 24 PORTS INTO AN OUTPUT BUS, ONE PORT THE ACTUAL 8 BIT OUTPUT AND THE OTHER PORT AN 8 BIT DEVICE SELECT (256 POSSIBLE). HE SAYS THAT DON TARBELL HAS CAUTIONED HIM AGAINST NOT ALLOWING FOR ENOUGH OUTPUT CONTROL PORTS. DISK DRIVES AND OTHER PERIPHERALS REQUIRE QUITE A FEW BITS OF CONTROL, EVEN AUTOMATIC CONTROL OF A CASSETTE OR TWO CAN USE UP HALF OF AN OUTPUT PORT. HE AGREES WITH THE IDEA THAT LOTS OF PERIPHERALS ARE NEAT BUT DOESN'T NECESSARILY THINK NUMEROUS PERIPHERALS ARE REALLY NECESSARY. DR. SUDING HAS DONE ONE HECK OF A LOT OF WORK WITH NEARLY NONE AND NOT TOO MUCH MEMORY EITHER. PAUL IS USING THE 256 WORD ODT IN PAGE 0 AND THINKS THIS IS A FANTASTIC TOOL FOR PROGRAM DEVELOPMENT AND GENERAL MARK-8 OPERATION FROM THE KEYBOARD. HE WOULD LIKE TO SEE THIS PROGRAM BECOME THE STANDARD SOFTWARE COMPONENT OF ALL USER GROUP MACHINES.

LAURENCE PLATE JR., 2320 SKYLINE WAY, SANTA BARBARA, CA 93109 SAYS THE KEYPRESSED FLAG SHOULD BE ASSIGNED ELSEWHERE AND IN4 BIT 7 RESERVED FOR PARITY AS HE HAS HAD EXPERIENCES WITH PARITY PROBLEMS IN THE PAST AND WANTS TO RETAIN THE PARITY BIT FOR HIS TVT WHICH WILL EVENTUALLY CONTAIN PARITY BIT LOGIC. THE INPUT PORT ASSIGNMENTS SEEM TO BE CROWDED, HENCE IT MAY BE WISE TO ADD ONE OR TWO MORE PORTS TO BE MULTIPLEXED AND ASSIGN THE FLOPPY DISK TO THAT PORT AND LET THE REST OF THE ASSIGNMENTS STAND FOR FUTURE NEEDS. HE SAYS THAT NATIONAL HAS A ROM CHIP THAT DOES BAUDOT TO ASCII CONVERSIONS (MM5220BL) AND TWO NEW CHIPS WHICH DO ASCII TO BAUDOT (MM3501TL AND MM5221TM). LARRY SAYS THAT HE ONCE DESIGNED A PAPER TAPE READER THAT USED A BLOCK OF ALUMINUM DRILLED FOR PHOTO CELLS AND THE SPROKET HOLE WAS USED TO TRIGGER RECEIVING OF THE DATA. HE SAYS WE NEED A MEMORY STANDARDIZATION SCHEME AND A NEW MEMORY LOGIC DESIGN TO ALLOW FOR 16K MEMORY. HE IS CONVERTING TO PLUGGABLE BOARDS AND SUPPLIED A CAREFULLY DRAWN TABLE OF THE MARK-8 BUS SIGNALS BOTH SOURCE AND DESTINATION WHICH WILL BE INCLUDED IN THE NEXT NEWSLETTER.

THE DIGITAL GROUP HAS PROBABLY DONE MORE FOR SYSTEM STANDARDIZATION THAN ANYONE BY PUBLISHING DR. SUDING'S MARK-8 MODIFICATIONS AND HIS CASSETTE TAPE RECORDER CIRCUIT. THEY HAD TO LOSE A BUNDLE ON THEIR $7.50 DOCUMENTATION PACKAGE. IF YOU HAVE SEEN IT, YOU KNOW WHAT I'M TALKING ABOUT. IN ANY CASE THIS IS ONE EXAMPLE OF WHAT THEY INTEND TO CONTINUE DOING IN THE FUTURE. THEY ASKED THAT WE INCLUDE THE LOAD AND DUMP ROUTINES FOR DR. SUDING'S CASSETTE CIRCUIT THAT WAS INCLUDED IN THE LAST NEWSLETTER. THEY NOTE THAT THE 5 VOLT ZENER WAS SHOWN BACKWARDS IN THE NEWSLETTER COPY OF THE CIRCUIT.

PROGRAM: CASSETTE DUMPER FOR COLD START - SHORT FORM

OCTAL ADDRESS	OCTAL CODE	OPERATION	OCTAL ADDRESS	OCTAL CODE	OPERATION
003000	056	Load H with 000	003030	016	Load B with 040
003001	000		003031	040	
003002	066	Load L with 000	003032	011	Decrement B
003003	000		003033	110	Jump not zero
003004	026	Load C with 010	003034	032	
003005	010		003035	003	
003006	036	Load D with 000	003036	021	Decrement C
003007	000		003037	110	Jump not zero
003010	103	Input 1	003040	024	
003011	044	AND A with 001	003041	003	
003012	001		003042	373	Store D in mem
003013	110	Jump if not zero	003043	060	Increment L
003014	010		003044	110	Jump not zero
003015	003		003045	004	
003016	016	Load B with 060	003046	003	
003017	060		003047	050	Increment H
003020	011	Decrement B	003050	305	Load A with H
003021	110	Jump not zero	003051	074	Compare A with 004
003022	020		003052	004	
003023	003		003053	110	Jump not equal
003024	103	Input 1	003054	004	
003025	203	Add D to A	003055	003	
003026	012	Shift right	003056	000	Halt
003027	330	Load D with A			

COMMENTS: This routine is hand keyed into the upper portion of the 1K 8008 microprocessor when power is first applied. The program deserializes the output of the cassette, and loads the 8-bit bytes into memory starting at byte Ø. The speed is approximately 40 bytes/second (1K in 25 sec.)

Begin this program by doing a Restart 025 while the cassette is playing the constant tone leader prior to the data portion. The timing constants at 003017 and 003031 assume the 20μs cycle time of the Mark-8 (use of a 4Mhz crystal).

PROGRAM: CASSETTE LOADER (loads storage contents onto cassette)- SHORT FORM

OCTAL ADDRESS	OCTAL CODE	OPERATION
003200	006	Load A with 001
003201	001	
003202	123	Out 1
003203	125	Out 2
003204	026	Load C with 377
003205	377	
003206	016	Load B with 377
003207	377	
003210	011	Decrement B
003211	110	Jump not zero
003212	210	
003213	003	
003214	021	Decrement C
003215	110	Jump not zero
003216	206	
003217	003	
003220	056	Load H with 000
003221	000	
003222	066	Load L with 000
003223	000	
003224	036	Load D with 003*
003225	003*	
003226	046	Load E with 377
003227	377	
003230	026	Load C with 011
003231	011	
003232	302	Load A with C
003233	022	Rotate left thru car.
003234	307	Load A from memory
003235	022	Rotate left thru car.
003236	123	Out 1
003237	016	Load B with 040
003240	040	
003241	011	Decrement B
003242	110	Jump not equal
003243	241	
003244	003	
003245	032	Rotate rht thru car.
003246	021	Decrement C
003247	110	Jump not zero
003250	236	
003251	003	
003252	006	Load A with 001
003253	001	
003254	123	Out 1
003255	016	Load B with 100
003256	100	
003257	011	Decrement B
003260	110	Jump not zero
003261	257	
003262	003	
003263	305	Load A with H
003264	273	Compare A with D
003265	150	Jump if equal
003266	300	
003267	003	
003270	060	Increment L
003271	110	Jump not zero
003272	230	
003273	003	
003274	050	Increment H
003275	104	Jump unconditional
003276	230	
003277	003	
003300	306	Load A with L
003301	274	Compare A with E
003302	150	Jump if equal
003303	311	
003304	003	
003305	060	Increment L
003306	104	Jump unconditional
003307	230	
003310	003	
003311	026	Load C with 377
003312	377	
003313	016	Load B with 177
003314	177	
003315	011	Decrement B
003316	110	Jump not zero
003317	315	
003320	003	
003321	021	Decrement C
003322	110	Jump not zero
003323	313	
003324	003	
003325	220	Clear A
003326	125	Out 2
003327	000	Halt

COMMENTS: *Set byte 003225 to the address of the highest byte page in your system:

1K = 003 (shown)
1.5K = 005
2K = 007

Begin this program by doing a Restart 015 after having placed the cassette in record and running clear of the leader.

DR. SUDING, C/O DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 RECOMMENDS STANDARDS FOR A FRONT PANEL AND POWER SUPPLY. HE SAYS A MEANINGFULL FRONT PANEL SHOULD HAVE DIGITAL READOUT OF HIGH AND LOW ADDRESS, MEMORY DATA, AND ONE OUTPUT PORT. IT SHOULD HAVE KEYBOARD ENTRY WITH OCTAL DATA ENTRY, INTERRUPT, EXAMINE & DEPOSIT KEYS, A DEPOSIT ENABLE TOGGLE SWITCH, LOAD HIGH, LOAD LOW ADDRESS, RUN AND STOP KEYS, A DIGITAL READ-OUT OF THE OCTAL ENTRY, A POWER SWITCH AND A POWER ON INDICATOR. THE POWER SUPPLY SHOULD BE CAPABLE OF +5 AT LEAST 5 AMPS, -9 V @ 1 AMP MINIMUM, BOTH WITH OVERVOLTAGE PROTECTION, + OR - 12 VOLT SUPPLIES FOR OP AMP USE AND A FAN FOR COOLING. DR. SUDING THINKS THAT TWO PORTS SHOULD BE RESERVED FOR ALL THE MISCELLANEOUS APPLICATIONS. IMPORTANT DEVICES SHOULD RECEIVE PERMANENT ASSIGNMENTS AS FOLLOWS:
1) INPUT KEYBOARD - ASCII, 7 BITS WITH 8TH BIT FOR STROBE, INPUT PORT 0 10 PIN CONNECTOR TO INCLUDE GND & +5 FOR KEYBOARD LOGIC.
2) TV READOUT, BNC CONNECTOR TO VIDEO OUTPUT AND USE OF OUT PORT 6
3) CASSETTE INPUT & OUTPUT, INPUT PORT 1 BIT 0 AND OUTPUT PORT 1 BIT 0, SERIALIZE AND DESERIALIZE UNDER SOFTWARE CONTROL.
4) TTY - IF SERIAL, SHARE PORT 1 WITH CASSETTE, IF PARALLEL, THEN PORT 2 INPUT AND OUTPUT.
5) CALCULATOR INTERFACE, USE INPUT PORT 6 AND OUTPUT PORT 7.
6) MISC. I/O CAN BE RANDOMLY ASSIGNED TO PORTS 3 & 4.
7) GRAPHICS OPERATION (OSCILLOSCOPE, TV VECTOR/RASTER GRAPHICS GENERATOR & LIGHT PEN) ON PORT 5 I/O.
DR. SUDING SUGGESTS FORGETTING PAPER TAPE COMPLETELY & USING CASSETTE AND STAYING AWAY FROM KEY PUNCHES.

RAYMOND G. STEVENS, RGS ELECTRONICS, 3650 CHARLES ST. , SUITEK, SANTA CLARA, CA 95050, (408) 247-0158 SAYS THAT ALL THE MODIFICATIONS TO THE MARK-8 I/O CURRENTLY BEING MADE ARE SLOWLY BUT SURELY MAKING IT MORE LIKE THE RGS 008-A I/O AT THE EXPENSE OF GREAT COMPLICATION AND EXPENSE TO THE EXPERIMENTER. IF HE COULD COUNT ON SELLING ENOUGH UNITS, HE WOULD DEVELOP A CARD THAT WOULD CONVERT THE MARK-8'S PORT STYLE I/O INTO THE 008A'S UNIVERSAL BUS I/O.

J. A. TITUS, TYCHON, INC. , PO BOX 242, BLACKSBURG, VA 24060 (703) 951-9030 THINKS THAT THE ODT SHOULD NOT BE IN THE BASE PAGE SINCE IT WOULD BE IMPOSSIBLE TO DEBUG PROGRAMS USING THIS AREA. IT SHOULD BE PUT UP HIGH IN MEMORY AND A RESTART LOCATION USED TO GET TO IT. A STANDARD-IZED PRIORITY INTERRUPT SCHEME SHOULD BE DEVELOPED. HE HAS CONSTRUCTED A PAPER TAPE READER USING A LEDEX STEPPING SWITCH DRIVE AND H-38 MATCH-STICK TI PHOTODIODES AND WILL PROVIDE A CONSTRUCTION PACKET AS PART OF OUR PROJECT ASSIGNMENT PROGRAM TO BE DESCRIBED LATER. ANYONE DEVELOPING AN INTERFACE DESIGN SHOULD OVER DESIGN IT BY PROVIDING ALL NECESSARY FLAGS AND PULSES THAT COULD BE POSSIBLY NEEDED SO IT CAN BE USED WITH A WIDE VARIETY OF CPU SYSTEMS. EVEN IF ALL THE SIGNALS ARE NOT USED, THEY SHOULD BE AVAILBLE, OR AT LEAST DOCUMENTED. HE SAYS NO ONE HAS MENTIONED USE OF ASYNCHRONOUS COMMUNICATIONS BETWEEN PERIPHERALS AND REMOTE COMPUTERS. THIS IS A USEFUL TECHNIQUE AND SHOULD BE MADE AWARE OF IT IF THEY ARE USING ANY REMOTE SENSORS OR DIGITAL DATA SOURCE. HE ALSO SUGGESTS THAT WE LOOK AT THE STANDARD INTERFACE THAT HEWLETT-PACK-ARD IS TRYING TO GET ADOPTED BY THE ANSI. THIS IS A 16 LINE PARALLEL INTERFACE THAT USES EIGHT LINES FOR ADDRESS AND DATA AND EIGHT LINES FOR FLAGS, ETC. IT WAS REVIEWED IN "ELECTRONICS", NOV 14, 1974, PAGES 95-106. HE SUGGESTS THAT ANY INTERFACE OR DEVICE SUBMITTED FOR USE BY OTHER PARTICIPANTS MUST BE THOROUGHLY TESTED BY ANOTHER INDEPENDENT GROUP SO THAT BAD IDEAS AND MARGINAL DESIGNS DON'T CREEP IN THAT COULD CAUSE A LOT OF DISAPPOINTMENT AMONG USERS, MOST OF WHOM ARE ON A LIMITED HOBBY BUDGET. WHEN APPROVAL IS FINAL, EACH GROUP SHOULD SUBMIT COPY-READY ARTWORK FOR REPRODUCTION.

NAT WADSWORTH, PRESIDENT, SCELBI COMPUTER CONSULTING, INC., 1322 READ-
BOSTON POST ROAD, MILFORD, CT 06460 (203) 874-1573 SAYS THAT TO AT-
TEMPT TO STANDARDIZE ON THE USE OF SELECTED DEVICES FOR SELECTED
PORTS HANDICAPS THE LESS ENDOWED USER, I.E. THOSE WITH LESS OPERATING
I/O PORTS AND ESSENTIALLY NEGATES ONE OF THE POWERFUL ASPECTS OF A
COMPUTER - THE ABILITY TO ACCOMODATE HARDWARE VARIATIONS BY SUBSTI-
TUTING EASILY CHANGED SOFTWARE. INSTEAD OF ATTEMPTING TO STANDARD-
IZE DEVICE ASSIGNMENTS, HE THINKS IT WISER TO STANDARDIZE ON SOFTWARE
PROCEDURES, SUCH AS ESTABLISHING FORMATS FOR SUBROUTINING, SO THAT THE
NUMBER OF ACTUAL SOFTWARE CHANGES (GENERALLY TO SELECT THE APPROPRIATE
I/O PORT CODES) WOULD BE MINIMIZED AND LOCALIZED WITHIN A LARGE PRO-
GRAM. A WELL DESIGNED PROGRAM NEED GENERALLY ONLY CALL ONE OR TWO I/O
SUBROUTINES THAT ACTUALLY CONTAIN PORT DEFINING I/O INSTURCTIONS AND IT
IS A SIMPLE MATTER FOR A USER TO DEFINE THE PORTS FOR THE INDIVIDUAL'S
HARDWARE FACILITY. AN AREA MORE SUITABLE TO STANDARDIZATION WOULD BE
GUIDELINES TO ESTABLISH BIT POSITION ASSIGNMENTS FOR I/O DEVICES, I.E.
A CONVENTION SUCH AS: A) AN OUTPUT DEVICE USING TWO PORTS, ONE FOR
DATA AND ONE FOR CONTROLS, SHOULD HAVE DATA ON THE LOWER VALUE
PORT, CONTROL SIGNALS ON THE NEXT HIGHER PORT. B) AN OUTPUT DEVICE
USING ONE PORT FOR DATA AND CONTROLS SHOULD HAVE CONTROL LINES CONNECT-
ED TO THE MOST SIGNIFICANT BITS, DATA ON THE LEAST SIGNIFICANT BITS.
C) POSSIBLY RECOMMEND BIT ASSIGNMENTS FOR SERIAL I/O DEVICES SUCH AS
B0 FOR OUTPUTTING DATA, B7 FOR INPUTTING DATA. IN GENERAL, WE SHOULD
WORK TOWARDS STANDARDIZATION OF SOFTWARE TECHNIQUES THAT WILL REDUCE THE
WORK INVOLVED IN ADAPTING A PROGRAM TO AN INDIVIDUAL'S PHYSICAL SETUP
WHILE STILL PROVIDING THE INHERANT FLEXIBILITY THAT IS THE GREAT ASSET
OF A COMPUTER WHILE AVOIDING ATTEMPTS TO STANDARDIZE ON PHYSICAL HARD-
WARE WHICH OFTEN NECESSITATES MATERIAL EXPENSE. AS A GENERAL RULE,
A HOBBYIST IS LOOKING TO KEEP FINANCIAL EXPENSE TO A MINIMUM, BUT
CONVERSLY, HAS THE TIME AND INTEREST, TO MAKE SOFTWARE CHANGES WHICH
CAN GET AROUND THE HARDWARE LIMITATIONS. THAT, INDEED, IS ONE REASON
A COMPUTER HOLDS SUCH ATTRACTION!

CONCLUSIONS

IT SEEMS THAT WE ARE INDEED TOO FAR ALONG TO PRODUCE THE "SYSTEM" TYPE OF STANDARDIZATION THAT WOULD HAVE BEEN NICE. EVERY-ONE'S DEVELOPMENT WORK HAS HEADED IN A DIFFERENT DIRECTION AND OUR ONLY HOPE NOW IS TO HOP ONTO SOMEONE'S BANDWAGON THAT HAS DONE IMPORTANT DEVELOPMENT WORK AND USE HIS I/O CONFIGURATION. THE DIGITAL GROUP AND THE COMPUTER HOBBYIST GROUP ARE BOTH COMMITTED TO HIGH QUALITY DESIGN AND DOCUMNENTATION IN THE HOPE OF ATTRACTING A FOLLOWING IN THEIR RESPEC-TIVE DIRECTIONS.

IT SEEMS THAT THE GOAL OF PRODUCING THE $500 COMPLETE HOBBY COMPUTER SYSTEM IS WHAT WE WOULD LIKE TO STRIVE FOR. AT THE RISK OF HURTING SOME FEELINGS, I THINK WE MUST IGNORE THE DESIRES OF THE "BIG COMPUTER BOYS" THAT WANT TO MAKE AN 8008 INTO AN IBM 370. TO THIS END WE MUST:

1) DO EVERYTHING POSSIBLE WITH SOFTWARE RATHER THAN HARDWARE. MEMORY IS GETTING CHEAPER AND IT IS EASY TO STUFF MEMORY BOARDS. ONCE SOME MEM-ORY IS WORKING, ITS EASY TO LET THE COMPUTER CHECK OTHER MEMORY BOARDS. A HOBBYIST HAS TIME TO MAKE SOFTWARE CHANGES AND DO SOFTWARE DEVELOPMENT (INDEED THAT MUST BE ONE OF THE REASONS HE BUILD THE SYSTEM IN THE FIRST PLACE) BUT HE DOSEN'T NECESSARILY HAVE THE MONEY AND OFTEN TIMES DOES NOT HAVE THE KNOWLEDGE TO GET EXOTIC HARDWARE SCHEMES CONSTRUCTED AND DEBUGGED.

2) INTERRUPTS HAVE NO PLACE IN THE SMALL HOBBY SYSTEM. WITH SMALL MEM-ORY SIZE, THE LACK OF CAPABILITY FOR DOING INTERRUPTS WITHOUT EXTENSIVE HARDWARE ADDITIONS IN AN 8008, AND WITH INEXPERIENCED PROGRAMMERS, IT WILL BE NEARLY IMPOSSIBLE TO ACCOMPLISH ANYTHING WITH INTERRUPTS ANY-WAY. THEY AREN'T REALLY NEEDED, ADD EXTRA EXPENSE, SO WHY TRY TO IN-CLUDE THEM.

3) WITH A GOOD KEYBOARD MONITOR, THE HOBBYIST IS WASTING HIS MONEY AND A GOOD DEAL OF TIME TRYING TO INCLUDE A FRONT PANEL. A PROM WITH A KEYBOARD MONITOR AND AN INTERRUPT PUSHBUTTON ARE ALL THAT IS REALLY NECESSARY.

THE STATUS OF PERIPHERALS TO DATE IS AS FOLLOWS:
1) TERMINALS A) TVT-1 LOTS AROUND, SCROLLING MODS AVAILABLE, ALL ERRORS HAVE BEEN FOUND BUT PROBABLY NOT THE BEST DESIGN TO START NOW. B) TVT-2 NICE DESIGN, FAIR PRICE, KIT AVAILABLE FROM SWTP, PC BOARDS AVAILABLE FROM SWTP, IC PARTS KIT AVAILABLE FROM MINI MICRO MART. C) SUDING 8X32 TVT, $95 KIT AVAILABLE FROM DIGITAL GROUP (SEND SASE FOR DETAILS) D) SUDING 16X64 TVT -- STATUS UNCERTAIN, CONTACT DIGITAL GROUP FOR DETAILS E) CREED TTY'S SEE NL#5
2) KEYBOARD MONITORS A) LAWRENCE LIVERMORE LABS 256 WORD ODT WRITEUP UCID-16507 AVAILABLE FROM US ATOMIC ENERGY COMMISSION, DIV. TECHINICAL INFO., OAK RIDGE, TN. B) MIL MONITOR-8 ROM'S MAY EXIST BUT NOT LIKELY. WRITEUP AVAILABLE IN MIL MF8008 MANUAL BUT THEY ARE TOUGH TO GET. C) BOB COOK HAS A CREED TTY KEYBOARD MONITOR.
3) CASSETTE TAPE UNIT ONLY TWO UNITS APPEAR IN THE RUNNING NOW. AT LEAST SEVEN THAT WORK ARE PRESENTLY AVAILABLE. A) THE SUDING DIGITAL GROUP UNIT IS POPULAR, IS BEING PUSHED HARD AS A STANDARD BY THE DIGITAL GROUP, A PC BOARD IS AVAILABLE FOR $4.00, A PARTS KIT FOR $19.00 AND AN ASSEMBLED AND TESTED UNIT FOR $24.00.
B) THE COMPUTER HOBBYIST GROUP DESCRIBED A CASSETTE UNIT THAT THEY INTEND TO PROMOTE AND SUPPORT IN THE LATEST ISSUE OF THE COMPUTER HOBBYIST. THEY WILL HAVE PC BOARDS, PARTS KITS, AND SOFTWARE AVAILABLE. C) THE MIL CASSETTE STILL LOOKS GOOD BUT WITHOUT MONITOR-8 ROMS, IT WILL NOT BE SUPPORTED. THE NICE PART ABOUT THE CASSETTE PICTURE IS THAT ALL OF THESE INTERFACES ARE CHEAP ENOUGH SO A GUY CAN BUILD ONE OF EACH IF HE WANTS TO.
4. PAPER TAPE READERS - MR. TITUS HAS PROMISED US A WRITEUP ON HIS AND AS SOON AS I GET CAUGHT UP, I'LL WRITE A CONSTRUCTION ARTICLE FOR MINE.
5. PAPER TAPE PUNCH - THE CREED TTY'S INCLUDE A 5 LEVEL PUNCH AND THE CREED MONITOR CONTAINS DUMP AND LOAD ROUTINES.
6 THRU 7 NO NEW INFO.
8. GRAPHICS TERMINALS - SEE THE COMPUTER HOBBYIST, ISSUES 1,2, & 3 FOR COMPLETE CONSTRUCTION INFO ON AN ELABORATE UNIT. DR. SUDING IS GOING TO DEVELOP A RASTER SCAN TV UNIT WITH LIGHT PEN.
9 THRU 11 NO NEW INFO.
12. CALCULATOR INTERFACE - DR. SUDING'S DESIGN IS COMPLETE AND AVAILABLE FROM MINI MICRO MART. SEE BACK OF NL FOR INFORMATION.
13. PROM PROGRAMMER - AN EARLY EDITION OF THE INTEL 8008 DATA BOOK INCLUDED COMPLETE DESIGN INFORMATION FOR A PROM PROGRAMMER. THE MIL MOD-8 BACKPLANE BOARD (STILL AVAILABLE) HAS A PROM PROGRAMMER BUILT IN THAT REQUIRES ABOUT $40.00 IN PARTS.
14 THRU 18 NO NEW INFO.

TO PUT SOME DIRECTION INTO PERIPHERAL DEVELOPMENT IT IS NECESSARY TO "ASSIGN" PROJECTS TO INDIVIDUALS. WE CAN'T REALLY ASSIGN PEOPLE SO WE ARE INSTEAD ASKING THAT YOU VOLUNTEER TO DEVELOP AND PRODUCE A CAREFULLY DOCUMENTED CONSTRUCTION PACKAGE FOR ONE OF THE PERIPHERALS ABOVE. IT MATTERS NOT AT ALL IF SEVERAL PEOPLE ARE WORKING ON THE SAME DEVICE. PERHAPS THEY CAN TEAM UP OR AT LEAST COMMUNICATE AND SHARE IDEAS. THESE PACKAGES WILL BE MADE AVAILABLE AT REPRODUCTION AND MAILING COSTS TO ALL PARTICIPANTS. ONE OF OUR SUPPLIERS CAN HELP MAKE PC BOARDS AND PARTS KITS AVAILABLE.

PLEASE WRITE & INDICATE WHICH PROJECT YOU ARE INTERESTED IN DEVELOPING. THE NEXT NEWSLETTER WILL CONTAIN A LISTING OF PROJECTS AND THOSE COMMITTED TO CONSTRUCTION PROJECT WRITEUPS.

ALTHOUGH WE CERTAINLY WANT TO DEVELOP 8008 PERIPHERALS, THE AREA OF GREATEST NEED IS PROBABLY FOR ALTAIR 8800 PERIPHERALS. THERE ARE AN ENORMOUS NUMBER OF PEOPLE THAT PROBABLY HAVE THE BASIC KIT AND THOUGHT THEY WOULD HAVE A RUNNING COMPUTER THAT WOULD DO SOMETHING USEFUL ONLY TO FIND OUT THAT THEY WOULD HAVE TO SPEND MANY HUNDREDS OF DOLLARS TO OBTAIN PERIPHERAL KITS AND SOFTWARE PACKAGES. ANY HELP WE CAN PROVIDE THESE PEOPLE WILL BE GREATLY APPRECIATED.

AN ALTERNATIVE TO AN 8080 SYSTEM

DR. MARK SEBERN, PROJECT LEADER, ULTRA LOW COST SYSTEMS, RESEARCH AND DEVELOPMENT GROUP, DIGITAL EQUIPMENT CORPORATION (DEC), 146 MAIN STREET, MAYNARD, MA 01754, (617)897-5111 EXT. 4413 (WA9JMS/WA1UOI) HAS BEEN A LONG TIME FOLLOWER OF THE MICRO-8 USER GROUP AND SENT DETAILED INFORMATION ON THE LSI-11. ALTHOUGH HE POINTS OUT THAT ITS NOT QUITE PRICED FOR THE HOBBYIST YET, HE THINKS WE'LL SEE HOW CLOSE THAT DAY REALLY IS. (WOW! WOULDN'T IT BE FUN TO SEE SOME OF THE PROJECTS THEY ARE WORKING ON FOR THE FUTURE IN MAYNARD.)

DEC'S LSI-11 IS A COMPLETELY COMPATIBLE PDP-11 (16 BIT MACHINE WITH AN INCREDIBLY VERSATILE INSTRUCTION SET) WITH 4K OF RAM ON A SINGLE 8.5" BY 10" BOARD. IT INCORPORATES A COMPLETE ASCII CONSOLE (ODT-11, I.E. KEYBOARD MONITOR) IN THE MICROCODE OF THE PROCESSOR WHERE IT CAN'T BE BOMBED, A 16 BIT I/O PORT (DMA PORT), POWER FAIL/AUTO RESTART, REAL TIME CLOCK INPUT, AUTOMATIC PRIORITY INTERRUPT ARBITRATION AND VECTORED INTERRUPT HANDLING AND SELLS FOR $990 FOR ONE, $653 FOR 50-99 AND $634 FOR 100-199. ONE WOULD HAVE TO ADD A BACKPLANE ASSEMBLY ($116 FOR 50-99) AND A POWER SUPPLY (+5 @ 3 AMPS AND +12 AT 1.5 AMPS MINIMUM) AND A TVT AND YOU HAVE A 4K PDP-11 BACKED BY THE DECUS USERS ORGANIZATION (175 PROGRAMS IN THEIR PROGRAM LIBRARY AND GROWING DAILY, FREE MEMBERSHIP, AND REASONABLE PROGRAM ACQUISITION COST) AND WITH RELIABLE SOFTWARE SUPPORT (AT A COST) BY DEC.

COMPARE THAT TO AN ALTAIR 8800. THE BASIC MACHINE IS NOW $550. YOU'D NEED 2 4K MODULES TO EQUAL THE 4K OF 16 BIT WORDS IN THE LSI-11 AT ABOUT $250 EACH. EVEN IF THE OTHER THINGS WERE AVAILABLE YOU'D HAVE ABOUT THE SAME MONEY INVOLVED AND LET'S FACE IT, AN 8080 IS A LONG WAY FROM BEING EQUAL TO A PDP-11.

ALL WE NEED NOW IS FOR SOMEONE TO PUT TOGETHER A PACKAGE AROUND THIS, GET DELIVERY ESTIMATES, AND COLLECT DEPOSITS FOR AT LEAST 50 AND YOU CAN HAVE YOUR VERY OWN PDP-11 FOR UNDER $1000! ADD ANOTHER 4K OF MEMORY AT $413 (FOR 50-99) AND YOU CAN RUN A SUPER BASIC.

WRITE DEC, COMPONENTS GROUP, MR2-2, ONE IRON WAY, MARLBOROUGH, MA 01752 FOR DETAILS OR CALL TOLL FREE, (800)225-9480, 8:30-5:30 EST. (MA RESIDENTS DIAL (617)481-7400).

FLASH: JUST RECEIVED A CALL FROM BOB ALBRECHT OF PEOPLE'S COMPUTER CO. (PCC), PO BOX 310, MENLO PARK, CA 94025. HE SAYS THEIR ORGANIZATION WOULD ENTERTAIN THE IDEA OF ACTING AS THE OEM (ORIGINAL EQUIPMENT MANUFACTURER) TO COLLECT AT LEAST 50 ORDERS TO OBTAIN THE QUANTITY PRICE IF ENOUGH PEOPLE ARE INTERESTED. IF YOU WOULD BE INTERESTED (SERIOUSLY), WRITE BOB AT PCC.

HAPPENINGS AT THE COMPUTER HOBBYIST MAGAZINE WORKSHIP

STEVE STALLINGS AND HAL CHAMBERLIN, COMPUTER HOBBYIST, BOX 295, CARY, NC 27511, (919)467-3145 OR (919)815-7223 (EVENINGS OR WEEKENDS) CALLED AND DESCRIBED YET ANOTHER CASSETTE UNIT THEY HAVE BEEN WORKING ON THAT WILL BE DETAILED IN THEIR MARCH ISSUE. IT'S BIT RATE IS 500 BITS/SEC, BIT ASYNCRONOUS WITH "HANDSHAKING" WITH THE CPU ON BOTH RECORD AND PLAYBACK ALLOWING IT TO WORK WITH ANY CPU CLOCK RATE. MODULATION IS PULSES WHICH ARE USED DIRECTLY REQUIRING NO PHASE LOCKED LOOP OR TUNED FILTERS. IT USES +5 VOLTS ONLY, ABOUT 8 IC PACKAGES, THEY HOPE TO BE ABLE TO SUPPLY A PC BOARD, AND THEY WILL SUPPORT IT WITH HARDWARE AND SOFTWARE AND RELEASE PROGRAMS TO TCH READERS. (AT FIRST WE HAD NONE, NOW WE HAVE SIX OR SEVEN CASSETTE UNITS THAT WORK. WHAT DO WE DO NOW?)

PLEASE SEND $6.00 FOR 12 MONTHLY ISSUES TO THE TCH GUYS. THEY DO A BEAUTIFUL JOB ON THEIR MAGAZINE, SELL IT FOR A BARGAIN PRICE, AND WOULD LIKE TO MAKE SOME MONEY. IF YOU SUPPORT THEM WITH A SUBSCRIPTION, PERHAPS THEY WILL DO A LITTLE BETTER THAN JUST BREAK EVEN.

THEY HOPE TO SEE SOME OF YOU AT THE DAYTON HAMFEST IN APRIL. THEY WILL BE THERE WITH A DEMO SYSTEM TO GENERATE INTEREST IN COMPUTERS AS A HOBBY AMONG THE HAMS.

NEW MEMORY COMPONENT JUST ANNOUNCED BY SIGNETICS

A DATA SHEET FOR A NEW MEMORY COMPONENT THAT WAS JUST ANNOUNCED BY SIGNETICS ON APRIL 1ST WAS SENT IN TO US BY WALTER M. WHITE, 343 S. MADISON AVE., PASEDENA, CA 91101. THE POTENTIAL USE OF THIS DEVICE IN HOBBY SYSTEMS SEEMS OF SUCH IMPORTANCE THAT THE FIRST PAGE OF THE DEVICE DATA SHEET IS INCLUDED IN THE APRIL ISSUE OF THIS NEWSLETTER FOR YOUR INFORMATION. WRITE YOUR LOCAL SIGNETICS DISTRIBUTOR FOR ADDITIONAL INFORMATION AND PRICING.

[illegible] FULLY ENCODED, QUAD-N, RANDOM ACCESS WRITE-ONLY-MEMORY

25120

FINAL SPECIFICATION(10)

DESCRIPTION

The Signetics 25000 Series 9046XN Random Access Write-Only-Memory employs both enhancement and depletion mode P-Channel, N-Channel, and neu(1) channel MOS devices. Although a static device, a single TTL level clock phase is required to drive the on-board multi-port clock generator. Data refresh is accomplished during CB and LH periods(11). Quadri-state outputs (when applicable) allow expansion in many directions, depending on organization.

The static memory cells are operated dynamically to yield extremely low power dissipation. All inputs and outputs are directly TTL compatible when proper interfacing circuitry is employed.

Device construction is more or less S.O.S.(2).

FEATURES

- FULLY ENCODED MULTI-PORT ADDRESSING
- WRITE CYCLE TIME 80nS (MAX. TYPICAL)
- WRITE ACCESS TIME(3)
- POWER DISSIPATION 10uW/BIT TYPICAL
- CELL REFRESH TIME 2mS (MIN. TYPICAL)
- TTL/DTL COMPATIBLE INPUTS(4)
- AVAILABLE OUTPUTS "n"
- CLOCK LINE CAPACITANCE 2pF MAX.(5)
- V_{CC} = +10V
- V_{DD} = OV ± 2%
- V_{FF} = 6.3V_{ac}(6)

APPLICATIONS

DON'T CARE BUFFER STORES
LEAST SIGNIFICANT CONTROL MEMORIES
POST MORTEM MEMORIES (WEAPON SYSTEMS)
ARTIFICIAL MEMORY SYSTEMS
NON-INTELLIGENT MICRO CONTROLLERS
FIRST-IN NEVER-OUT (FINO) ASYNCHRONOUS BUFFERS
OVERFLOW REGISTER (BIT BUCKET)

PROCESS TECHNOLOGY

The use of Signetics unique SEX(7) process yields Vth (var.) and allows the design(8) and production(9) of higher performance MOS circuits than can be obtained by competitor's techniques.

BIPOLAR COMPATIBILITY

All data and clock inputs plus applicable outputs will interface directly or nearly directly with bipolar circuits of suitable characteristics. In any event use 1 amp fuses in all power supply and data lines.

INPUT PROTECTION

All terminals are provided with slip-on latex protectors for the prevention of Voltage Destruction. (PILL packaged devices do not require protection).

SILICON PACKAGING

Low cost silicon DIP packaging is implemented and reliability is assured by the use of a non-hermetic sealing technique which prevents the entrapment of harmful ions, but which allows the free exchange of friendly ions.

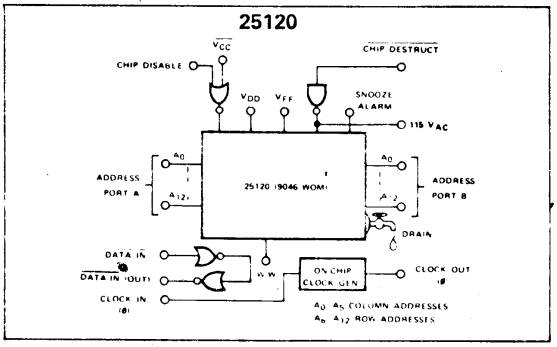
SPECIAL FEATURES

Because of the employment of the Signetics' proprietary Sanderson-Rabbet Channel the 25120 will provide 50% higher speed than you will obtain.

COOLING

The 25120 is easily cooled by employment of a six-foot fan, 1/2" from the package. If the device fails, you have exceeded the ratings. In such cases, more air is recommended.

BLOCK DIAGRAM



PART IDENTIFICATION

TYPE	"n"	TEMP. RANGE	PACKAGE
25120	0	0 to -70°C	Whatever's Right

1. "Neu" channel devices enhance or deplete regardless of gate polarity, either simultaneously or randomly. Sometimes not at all.
2. "S.O.S." copyrighted U.S. Army Commissary, 1940.
3. Not applicable
4. You can somehow drive these inputs from TTL, the method is obvious.
5. Measure at 1 MHz, 25mVac, 1.9pF in series.
6. For the filaments, what else!
7. You have a dirty mind. S.E.X. is Signetics EXtra Secret process. "One Shovel Full to One Shovel Full", patented by Yagura, Kashkooli, Converse and Al. Circa 1921.
8. J. Kane calls it design (we humor him).
9. See "Modern Production Techniques" by T. Arrieta (not yet written).
10. Final until we got a look at some actual parts.
11. Coffee breaks and lunch hours.
12. Due credit to ElMAC for inspiration.

(APRIL FOOL)

8008 ASSEMBLY LANGUAGE REFERENCE CARD

THIS IS A POCKET SIZE CARD CONTAINING THE 8008 INSTRUCTION SET ORGANIZED IN EASY TO USE FASHION WITH HEX CODE EQUIVALENTS & A HEX-ASCII TABLE. ITS ORIENTED TOWARDS THE INTEL 8008 FORTRAN CROSS ASSEMBLER BUT WOULD BE VERY HANDY TO HAVE. ORDER MCS-129-0674-10K. THEY PROBABLY HAVE AN 8080 VERSION ALSO.

MARK-8 USER GROUP SURVEY

JOE CIMMINO SAYS HE HAS RECEIVED ABOUT 55% OF THE USER SURVEYS BACK SO FAR. THAT MEANS THAT 45% OF YOU HAVE IT SITTING ON YOUR "I'VE GOT TO DO THIS SOME DAY" PILE. PLEASE FILL OUT WHATEVER IS APPLICABLE AND GET IT MAILED BACK. JOE WENT TO A LOT OF WORK AND EXPENSE TO MAIL THESE AND IT WOULD BE AWFUL IF WE DIDN'T GET WORTHWHILE INFORMATION BACK. DO IT NOW!!

JOE HAS ASKED FOR ABOUT 15 PAGES IN NL#7 FOR REPORTING RESULTS OF THE SURVEY AND HIS ANNOUNCEMENT ABOUT A SOFTWARE LIBRARY SERVICE. HE WILL ALSO INCLUDE A SAMPLE PROGRAM, AND DEMONSTRATE WHAT PROPER DOCUMENTATION IS ALL ABOUT.

COMPUTER ALTERNATIVES INDEX (COMINDEX)

COMPUTER ALTERNATIVES SEEMS TO BE THE LATEST BUZZ WORD. NO ONE HAS REALLY TOLD ME WHAT IT MEANS BUT I'VE GOT SOME VAGUE IDEAS. BOB WALLACE, PO BOX 5415, SEATTLE, WA 98105 PUBLISHES "COMINDEX", A DIRECTORY OF GROUPS AND PEOPLE INTERESTED IN THE USE OF COMPUTERS AS A COMMUNITY COMMUNICATIONS TOOL, AND A LIST OF PAPERS, ARTICLES, AND OTHER INFORMATION AVAILABLE FOR COPYING COSTS. THE "COMINDEX" WILL ALSO TRY TO INCLUDE OTHER AREAS OF ALTERNATIVE COMPUTER USE SUCH AS ACCESS TO HARDWARE, SIMULATION OF SYSTEMS, CREATIVITY IN GRAPHICS AND GAMES, AND SOCIAL/POLITICAL RESEARCH. SUBSCRIPTION TO "COMINDEX" IS $2.00 FOR ONE FULL DIRECTORY AND THREE UPDATES. WRITE AND INCLUDE A SASE FOR ADDITONAL INFORMATION.

RESOURCE ONE NEWSLETTER

YOU MAY BE INTERESTED IN THE RESOURCE ONE NEWSLETTER, 1380 HOWARD ST., SAN FRANCISCO, CA 94103. THIS GROUP OBTAINED A SURPLUS XDS-940 TIME SHARE COMPUTER AND IS NOW DEVOTED TO THE FOLLOWING PROBLEMS:
CAN THIS TOOL OF MILITARIZED SOCIETY BE MADE DIRECTLY USEFUL TO PEOPLE? HOW? THEY ARE DEPENDENT LARGELY ON FOUNDATIONS FOR THEIR SUPPORT BUT ARE ALSO SOLICITING TAX DEDUCTIBLE DONATIONS. WRITE AND INCLUDE AN SASE FOR INFORMATION.

DIGITAL GROUP ACTIVITIES

THE DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 IS THE BEST EXAMPLE OF WHAT HAPPENS WHEN A GROUP OF INTERESTED & CLEVER GUYS GET TOGETHER AND SHARE LABOR AND RESOURCES. THEY ARE DELIVERING ON THEIR $8 DOCUMENTATION PACKAGE AND COMMENTS COMING IN INDICATE UNANIMOUS ACCLAIM. THE SOFTWARE DOCUMENTATION AND CASSETTE TAPE 2K MONITOR SYSTEM HAVE BEEN SENT OUT. THE ELECTRONIC DOCUMENTATION PACKAGE HAS BEEN OR SOON WILL BE MAILED OUT. DR. SUDING INSISTED THAT A COPY OF HIS SCIENTIFIC CALCULATOR INTERFACE BE INCLUDED. (THIS IS NEAT! MINI MICRO MART IS SUPPOSE TO HAVE A COMPLETE PACKAGE CONTAINING PC BOARD AND PARTS AVAILABLE SOON FOR $69.95. WITH 256 WORDS OF MEMORY AND A SUDING TVT, A PROGRAM IS AVAILABLE THAT SIMULATES AN SR-50 CALCULATOR USING A MARK-8. THIS SHOULD SOLVE PROBLEMS FOR PEOPLE LOOKING FOR A FLOATING POINT PACKAGE IF THEY CAN LIVE WITH THE CALCULATION SPEED.)

EVERYONE HAS PROBABLY SEEN THE DIGITAL GROUP'S LETTER TO THE EDITOR IN THE APRIL R-E. THAT WAS WRITTEN IN AUGUST 74 SO YOU CAN GET A ROUGH IDEA OF NON-ADVERTISING LEAD TIMES IN NATIONAL MAGAZINES. THE FOLLOWING IS AN EXCERPT FROM THEIR LATEST LETTER DATED 21 MARCH:

PROJECT UPDATE - Digital Group, PO Box 6528, Denver, CO 80206

The digital group is literally exploding, thanks to your support, and now has 4 major efforts going ahead full out.

1. Top priority - support of Dr. Suding's efforts at as high a quality level as possible.

2. We now have about 100 requests and SASE's for the digital group clearinghouse. We are debating on various alternatives and options to complement rather than supplant other efforts such as the Micro-8 Newsletter. (Please remember, that letter was sent to R/E in August, 1974.) Naturally, you will be kept informed of any and all developments and we certainly invite your comments!

3. PC Boards - as you probably guessed, we ran into a non-performance problem with the TVT board from one of our former participants. That problem has been rectified totally by a new individual who is a PC Development professional. His work is both fast and good. He is also very eager to get other boards going.

4. Parts and Kits - We had no desire to become another parts house. However, the mail started coming in and people keep asking for kits, parts, availability and etc. (Lots of Doctors.) And then in walked the manager of a parts house that has been in business for 15 years and who is very eager to contribute to the Microprocessor experimenter effort. (He's also now building a Suding-8.) His prices are reasonable, if not outstanding (ex - 1101's for $1.40), and he is willing to supply kits of new, guaranteed parts for about anything we can come up with. Therefore, we will be offering most developments in the following modes:
   a. Major chip(s)
   b. PC Board
   c. Major chip(s) and PC Board
   d. Complete parts kit
   e. Assembled and tested units

   We are offering full parts kits and assembled units primarily as a convenience for those who desire it. We expect to remain very competitive and offer substantial value but are not trying to do an MITS (we REALLY don't want to become an MITS _ maybe we can goad them into being a little more honest and reasonably priced on peripherals.)

STATUS OF PROJECTS

TVT - Board now in final design stage. Character generator chips will be available at a discount in 2 weeks with luck, 4 weeks without.

Cassette Interface - Board being produced by company in Colorado Springs - available soon - method and price yet to be determined.

Scientific Calculator Interface - Chip, board, and kit should be available very soon through Mini-Micro Mart (if Maury can deliver - MOS Technology has 8 week lead times and no quantity break until 5000 units!) The digital group will serve as backup and will supply software (lots happening here!). You won't believe how powerful this combination is!

Dr. Suding's highest priority design project right now is 4K dynamic RAMs. As fast as he perfects the design, we will do a board and make kits available. Should be in the 1 to 2 month time-frame. With any luck, 4K's should drop in price again (now $12 in 100s) and be even more cost-effective.

BASIC - We will be adapting a subset of BASIC to the Scientific calculator interface as soon as possible but it looks like we'll need the 4Ks.

8800 support and adaptations are being implemented but so far on a relatively low-priority level.

JAMES G. CALLAS, M. D.
EVELYN R. CALLAS, M. D.
631 NORTH SAN PEDRO ROAD
SAN RAFAEL, CALIF. 94903

Adam Trent's hint in the vol. 1 #4 NL about using Augat pins for ic's on the memory board works very well except that many ordinary diagonal cutters will not grip the pin head well enough to pull it out.

A finer pair of cutters, the Hunter A92MS (available from National Camera, Englewood, Colo. as catalog #N-3224) work much better in removing the Augat pins. They are also far superior to ordinary cutters for fine work around PC boards.

One of the least expensive, as well as most efficient, ways of checking fine soldering is to look with an 8X magnifier mounted in a plastic barrel, that's sold by photo shops for about $4. Hold the lens upside down, so as to focus close enough and light the PC board both in front and back.

Another handy hint: an audible continuity tester, as simple as a battery and buzzer in series, is a great convenience in testing for solder bridges.

LOCAL GROUPS

PART OF THE FUNCTION OF THE USER GROUP IS GETTING PEOPLE TOGETHER. YOU SHOULD HAVE A PRETTY GOOD IDEA WHETHER ANY PARTICIPANTS ARE NEAR YOU BY NOW. THE UPDATED ROSTER HAS BEEN POSTPONED AGAIN TILL NEXT ISSUE.

EVERYONE HAS HEARD OF THE DENVER BASED DIGITAL GROUP. THEY ARE A PRIME EXAMPLE OF WHAT CAN BE DONE WHEN A BUNCH OF GUYS GET TOGETHER AND SHARE RESOURCES.

WE WERE EVEN ABLE TO GET TOGETHER A GROUP IN SLEEPY OLD LOMPOC! OUR FIRST MEETING WAS HELD MARCH 19 AT THE CABRILLO COMPUTER CENTER AND WAS ATTENDED BY 4 PEOPLE FROM SANTA BARBARA, 1 FROM PASO ROBLES, AND 13 PEOPLE FROM THE LOMPOC-SANTA MARIA-VANDENBERG AIR FORCE BASE AREA. OUR NEXT MEETING IS SCHEDULED FOR APRIL 16, 7:30 PM IN THE CABRILLO COMPUTER CENTER. MR. BOYCE SHOWED OFF HIS NEARLY COMPLETED ALTAIR 8800. MY PARTIALLY COMPLETED 8008 SYSTEMS WERE ON DISPLAY. (I MAY BE THE VERY LAST ONE TO GET A MARK-8 RUNNING.), THE HOMEMADE PAPER TAPE READER WAS DEMONSTRATED AND OUR PDP-8 WAS LOADED WITH A 4K BASIC SO PEOPLE COULD SEE HOW MUCH FUN A 6K BASIC FOR AN 8008/8080 WOULD BE.

OUT LATEST INFO ON LOCAL GROUPS IS AS FOLLOWS. CONTACT:

DENVER AREA - DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206

WASHINGTON DC AREA - JOE CIMMINO, 19304 RICHWOOD COURT, BROOKEVILLE, MD 20729

CHICAGO AREA - ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035 472-6660 DAYS AND 432-6423 EVENINGS

BAY AREA - FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025

SANTA BARBARA, SANTA MARIA, LOMPOC, VANDENBERG AFB AREA - TED SALLUME, 945 VIA FARGO, SANTA MARIA, CA 805-WE7-4541 OR 805-865-3236 OR THE CABRILLO COMPUTER CENTER OR HAL SINGER, 805-735-1596

LA AREA - DE WALTER EKSTRAND, PO BOX 1260D, SOUTH GATE, CA 90280 (HE WANTS TO START AN LA GROUP)

PLEASE KEEP US UP TO DATE ON LOCAL GROUP ORGANIZATIONS AND WHAT IS HAPPENING. IT WOULD BE IDEAL IF ONE MEMBER FROM EACH GROUP PREPARED A CAMERA READY PROGRESS REPORT FOR EACH NEWSLETTER.

FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025 IS EDITOR OF THE BAY AREA AMATEUR COMPUTER USERS GROUP. THEY HAVE ALREADY HAD THEIR 2ND MEETING AND MAYBE THEIR THIRD BY THE TIME YOU RECEIVE THIS. THE 2ND MEETING WAS ATTENDED BY ABOUT 45 PEOPLE. THE FIRST PAGE OF THEIR FIRST NEWSLETTER IS REPRINTED HERE.

NEWSLETTER

Issue number one Fred Moore, editor, 2100 Santa Cruz Ave., Menlo Park, Ca. 94025 March 15, 1975

AMATEUR COMPUTER USERS GROUP
HOMEBREW COMPUTER CLUB . . . you name it.

Are you building your own computer? Terminal? T V Typewriter? I/O device? or some other digital black-magic box?

Or are you buying time on a time sharing service?

If so, you might like to come to a gathering of people with likeminded interests. Exchange information, swap ideas, talk shop, help work on a project, whatever . .

This simple announcement brought 32 enthusiastic people together March 5th at Gordon's garage. We arrived from all over the Bay Area---Berkeley to Los Gatos. After a quick round of introductions, the questions, comments, reports, info on supply sources, etc., poured forth in a spontaneous spirit of sharing. Six in the group already had homebrew systems up and running. Some were designing theirs around the 8008 microprocessor chip; several had sent for the Altair 8800 kit. The group contained a good cross section of both hardware experts and software programmers.

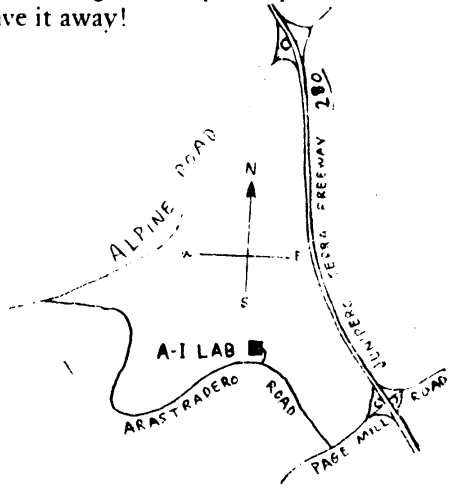
We got into a short dispute over HEX or Octal until someone mentioned that if you are setting the switches by hand it doesn't make any difference. Talked about other standards: re-start locations? input ports? better operating code for the 8080? paper tape or cassettes or paper & pencil listings? Even ASCII should not be assumed the standard: many 5 channel Model 15 TTYs are about and in use by RTTY folks. Home computing is a hobby for the experimenter and explorer of what can be done cheaply. I doubt that standards will ever be completely agreed on because of the trade-offs in design and because what's available for one amateur may not be obtainable for another.

Talked about what we want to do as a club: quantity buying, cooperation on software, need to develop a cross assembler, share experience in hardware design, classes possibly, tips on what's currently available where, etc. Marty passed out M.I.'s Application Manual on the MF8008 and let it be known that he could get anything we want. Steve gave a report on his recent visit to MITS. About 1500 Altairs have been shipped out so far. MITS expects to send out 1100 more this month. No interfaces or peripherals are available until they catch up with the mainframe back orders. Bob passed out the latest PCC and showed the Altair 8800 which had arrived that week (the red LEDs blink and flash nicely). Ken unboxed and demonstrated the impressive Phi-Deck tape transport.

What will people do with a computer in their home? Well, we asked that question and the variety of responses show that the imagination of people has been underestimated. Uses ranged from the private secretary functions: text editing, mass storage, memory, etc., to control of house utilities: heating, alarms, sprinkler system, auto tune-up, cooking, etc., to GAMES: all kinds, TV graphics, x - y plotting, making music, small robots and turtles, and other educational uses, to small business applications and neighborhood memory networks. I expect home computers will be used in unconventional ways---most of which no one has thought of yet.

We decided to start a newsletter and meet again in two weeks. As the meeting broke up into private conversations, Marty held up an 8008 chip, asked who could use it, and gave it away!

NEXT MEETING WEDNESDAY, MARCH 19th, 7 PM at Stanford's Artificial Intellegence Laboratory, Conference room, Arastradero Road in Portola Valley. Look for this road sign: D C Power Lab



Announcement

Texas Instruments Learning Center is presenting an early morning home television series, April 15 - 18, on "Introduction to Microprocessors." In the San Jose - Bay Area this program will be on channel 11 at 6:00 AM.

HOW MUCH POWER SUPPLY?

BY STEVE CIARCIA
41 HILLTOP DRIVE
WEST HARTFORD, CT 06107

DESIGNING POWER SUPPLIES IS NO EASY BUSINESS. THE NEW SERIES OF THREE TERMINAL REGULATORS BEING SOLD HAVE LED THE HOBBYIST INTO A FALSE SENSE OF SECURITY. SINCE THESE CHIPS PROVIDE SUPPOSEDLY FAIL-SAFE OPERATION AND HAVE THEIR OWN THERMAL OVERLOAD SHUTDOWN ABILITY, MANY FORGET THAT THIS USUALLY DOES NOT EXTEND TO THE OTHER EXTERNAL COMPONENTS.

IN GENERAL, IF THE HOBBYIST HAS ONLY A SLIGHT KNOWLEDGE OF SUCH THINGS AS CAPACITOR RIPPLE CURRENT RATINGS, DIODE SURGE CURRENTS, TRANFORMER SOURCE RESISTANCES, THE DERATING EFFECTS OF ELEVATED TEMPERATURES, AND OVERVOLTAGE PROTECTION, HE SHOULD CONSIDER PURCHASING A COMMERERCIAL POWER SUPPLY RATHER THAN DEVELOPING ONE. THE PROBLEM WITH THIS IDEA IS, OF COURSE, THE COST OF HIGH CURRENT SUPPLIES. $175 WOULD BE CONSIDERED MODEST AND COULD AMOUNT TO CONSIDERABLY MORE DEPENDING ON THE CONFIGURATION AND REQUIREMENTS. THIS LEAVES ANOTHER ALTERNATIVE. THERE ARE TWO WAYS TO LEARN THINGS IN LIFE: THROUGH TRIAL AND ERROR OR SOMEONE TELLS YOU. TRIAL AND ERROR CAN BECOME VERY EXPENSIVE IF ONE WIPES OUT 100 OR SO CHIPS IN A COMPUTER WHILE TRYING TO DESIGN A POWER SUPPLY. THIS NEWSLETTER IS DEDICATED TO THE IDEA THAT THERE HAS TO BE A BETTER WAY THAN THAT.

THIS IS NOT AN ENGINEERING DISSERTATION WITH ALL THE FUNNY LOOKING MATH THAT ALL OF US HAVE FORGOTTEN ANYWAY. IT WILL ATTEMPT TO ENLIGHTEN AND EDUCATE THE CURIOUS, PROVIDE DESIGN CONFIGURATIONS TO THE DEDICATED, AND PROBABLY BORE TO DEATH ANYONE WHO REALLY KNOWS HIS STUFF. OUR ATTENTION WILL BE FOCUSED ON REQUIREMENTS FOR SYSTEMS SUCH AS THE MARK-8 AND THE SCELBI-8H. BOTH OF THESE COMPUTERS ARE SOLD WITHOUT POWER SUPPLIES AND IT IS LEFT TO THE INVENTIVENESS OF ITS OWNER AS TO THE TYPE OF "KLUGE" HE PUTS TOGETHER IN AN EFFORT TO GET "ON LINE". IT IS USUALLY AT THIS PPOINT THE TERM "SMOKE TEST" IS APPLICABLE BUT IT IS HOPED THAT THIS FATE CAN BE SUCESSFULLY AVOIDED.

FIRST OF ALL, HOW MUCH POWER SUPPLY DOES ONE ACTUALLY NEED TO POWER A TYPICAL MARK-8? SHOULD ONE USE A SINGLE LARGE MASTER SUPPLY AND RUN POWER LINES TO THE CPU AND ALL PERIPHERALS OR WOULD INDIVIDUAL SUPPLIES BE PREFERABLE? IS A 25 AMP SUPPLY BETTER THAN A 5 AMP? WHAT IS AN OVERVOLTAGE CROWBAR AND AT WHAT VOLTAGE SHOULD IT TRIGGER?

ENOUGH QUESTIONS FOR THE MOMENT. IT IS A SURE BET THERE WILL BE MANY MORE. IT HAS TO BE ASSUMED FROM THE START THAT THIS DISCUSSION IS DEDICATED TO FINDING A CHEAP SOLUTION AS WELL AS AN ADEQUATE DESIGN. THOUGH IT WAS INITIALLY INTIMATED THAT 3 TERMINAL REGULATORS MAY NOT NECESSARILY BE "GOD'S GIFT TO THE COMPUTER HOBBYIST" THEY ARE CHEAP, WORK WELL WHEN PROPERLY APPLIED, & CUT DOWN COMPONENT COUNT CONSIDERABLY.

MOST PEOPLE WOULD PREFER TO DO AS LITTLE CONSTRUCTION WORK AS POSSIBLE SO THAT IS THE TYPE OF POWER SUPPLY DESIGN WE WILL INVESTIGATE. THE TYPICAL POWER SUPPLY REQUIREMENTS FOR THESE MINICOMPUTERS WITH 1K OF 1101 RAM'S IS +5 VOLTS AT 3 AMPS AND -9 VOLTS AT 1 AMPS. FOR EACH ADDITIONAL 1K OF 1101'S IT TAKES ABOUT 1 AMP OF +5 VOLTS AND 1 AMP OF -9 VOLTS. THIS WOULD MEAN THAT A 4K/1101 SYSTEM WOULD REQUIRE A TOTAL OF +5 VOLTS AT 6 AMPS AND -9 VOLTS AT 4 AMPS. A COMPARABLE SYSTEM WHICH USES 2102 RAMS WOULD REQUIRE +5 VOLTS AT 3 AMPS AND -9 VOLTS AT 50 MA. FOR A 1K SYSTEM. A 4K/2102 SYSTEM WOULD HAVE +5 AT 6 AMPS BUT NO MORE -9 VOLT REQUIREMENT. HEAVEN FORBID THAT ANYONE GETS TO 16K OF 2102'S (THAT TAKES A LOT OF BREAD!) BECAUSE IT WOULD NEED ABOUT 15 TO 18 AMPS OF +5 VOLT POWER. DON'T LET THESE FIGURES SCARE YOU BECAUSE IN THE REAL WORLD OF COMPUTERS THESE ARE VERY SMALL POWER SUPPLIES. THE CONTROL DATA SYSTEM 17, WHICH IS A 32K/16 BIT MINI, HAS A +5 VOLT 42 AMP SUPPLY.

WHAT ALL THIS BOILS DOWN TO IS THAT YOU STILL DON'T KNOW HOW BIG A SUPPLY TO BUILD. DON'T FORGET THE PERIPHERALS. ARE THEY GOING TO BE POWERED BY THE SAME POWER SUPPLY AS THE COMPUTER? IF SOMETHING LIKE THE TVT OR A SIMILAR CRT IS USED IT REQUIRES +5 VOLTS AT 1/2 TO 1 AMP AND -12 AND -5 VOLTS AT AROUND 25 MA. A CASSETTE INTERFACE, DEPENDING WHETHER IT USES UART OR STRAIGHT TTL CAN USE +5 AT 100 MA. AND -12 AT 50 MA. PROM'S ARE COMPARABLE TO 1101'S.

OBVIOUSLY THE COMPUTER IS THE MAIN CONSIDERATION. IT HAS TO BE DECIDED BEFORE ONE LAYS OUT THE CASH JUST HOW BIG A SUPPLY IS EVENTUALLY GOING TO BE NEEDED WHEN ALL THAT GARBAGE YOU NEVER THOUGHT YOU'D GET IS SUDDENLY THERE. IN GENERAL, I WOULD ASSUME THAT NOT TOO MANY PEOPLE WILL HAVE MORE THAN A 4K SYSTEM AND MOST WILL SUFFICE WITH 1K OR 2K. THERE OF COURSE WILL BE AN OCCASIONAL 8K AS I PLAN. LOGICALLY, THOSE WHO PLAN 4K SHOULD PROVIDE 6 AMPS AT 5 VOLTS AS A MINIMUM. IN THESE CURRENT RANGES THERE ARE MINIMAL DIFFERENCES BETWEEN SUPPLIES OF 4, 6, AND 8 A AMPS. THEY ALL GENERALLY USE THE SAME REGULATOR AND JUST CHANGE THE INPUT FILTERING AND HEAT SINK COOLING AS NECESSARY.

SINCE ECONOMY, VERSATILITY, AND EFFECTIVITY ARE THE MAIN CONSIDERATIONS, THE FOLLOWING SUPPLY CONFIGURATION WOULD MORE THAN ADEQUATELY SUFFICE:

THE SUPPLY SHOULD BE A VARIABLE VOLTAGE (5 TO 15) FLOATING OUTPUT DESIGN. THE REGULATOR SECTION SHOULD BE CAPABLE OF 5 AMPS IN FREE AIR AND 10 TO 12 AMPS WITH FORCED AIR COOLING. SINCE THE OUTPUT IS FLOATING, ALL SUPPLIES (+5, -9, ETC) WOULD HAVE EXACTLY THE SAME REGULATOR BUT WITH THE OUTPUT VOLTAGE AND INPUT FILTER ADJUSTED ACCORDINGLY. A BLOCK DIAGRAM FOR A +5 AND -9 VOLT SUPPLY WOULD BE AS ILLUSTRATEED IN FIGURE 1.

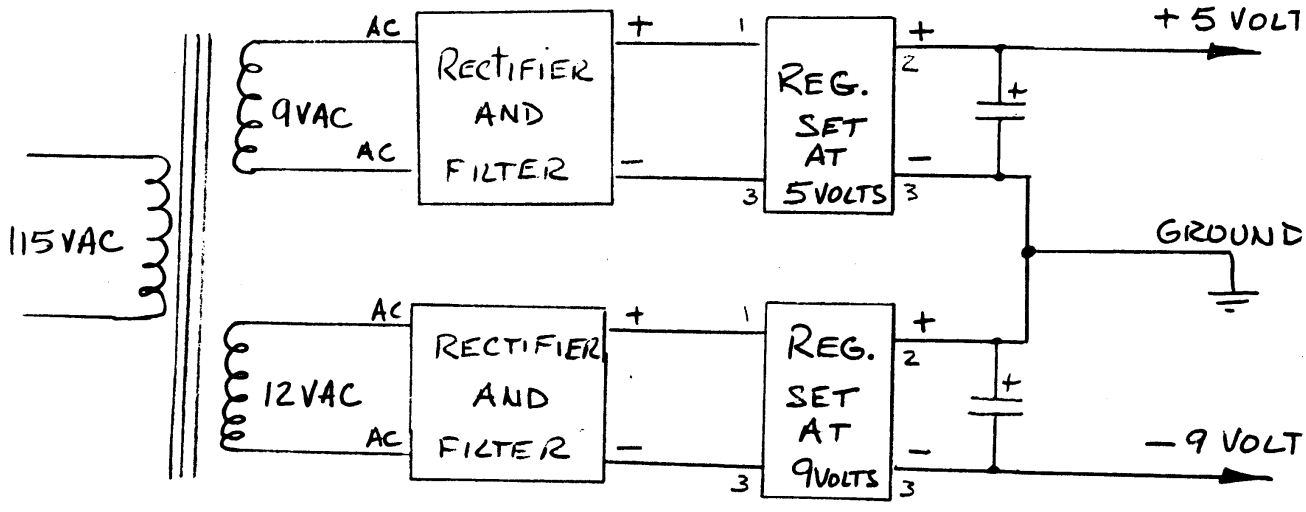


FIGURE 1 POWER SUPPLY BLOCK DIAGRAM

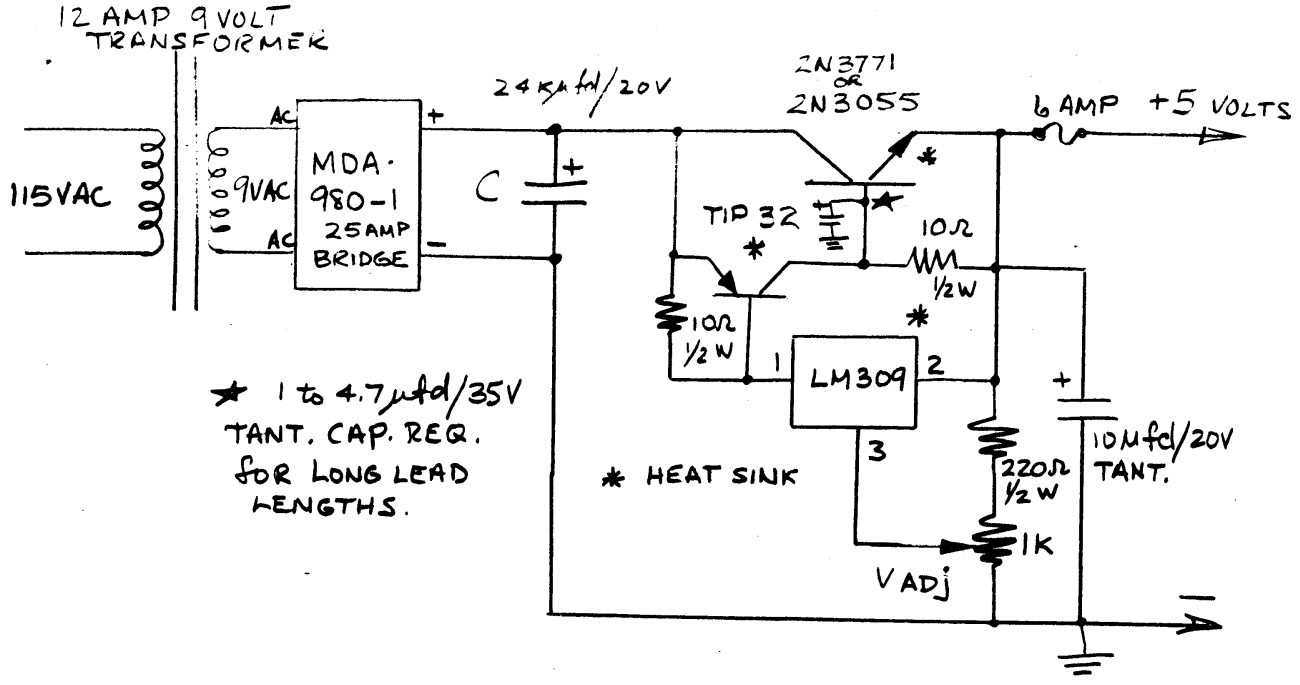
SINCE BOTH REGULATORS ARE THE SAME THERE IS LESS TESTING INVOLVED, FEWER PART TYPES TO ORDER, AND IT ALLOWS THE COMPUTER CONFIGURATION TO BE CHANGED IN MIDSTREAM, SAY FROM 1101'S TO 2102'S. THE FORMER LARGE -9 VOLT SUPPLY COULD BE REVERSED AND SET AT +5 VOLTS AND USED TO POWER A LARGE SECTION OF MEMORY FOR INSTANCE.

THE FOLLOWING IS THE DETAILED SCHEMATIC OF ONE OF THESE BUILDING BLOCK TYPE SUPPLIES WHICH USES READILY AVAILABLE PARTS AND IS FAIRLY INEXPENSIVE. SEE FIGURE 2.

IT IS NOT MY INTENTION TO PUT A SCHEMATIC AND PARTS LIST BEFORE THE READER AND SUGGEST THAT ONLY THE COMPONENTS I HAVE CHOSEN WILL WORK. THIS CIRCUIT IS VERY DEPENDABLE AND OPERATES QUITE SUCCESSFULLY WITH THE COMPONENTS INDICATED. BUT, IN ORDER TO SATISFY THE DEDICATED READERS, I'D LIKE TO OUTLINE SOME "SEAT OF THE PANTS" METHODS FOR COMPONENT SELECTION.

FEW PEOPLE REALIZE HOW TO CHOOSE THE CORRECT VALUE OF INPUT FILTER CAPACITORS AND GENERALLY "LUCKOUT" BY CHOOSING THE LARGEST ONE THEY CAN FIND. THIS WILL USUALLY PROVIDE MORE THAN ADEQUATE RIPPLE FILTERING BUT CAN LEAD TO BRDIGE RECTIFIER BREAKDOWN BECAUSE OF THE TREMENDOUS SURGE CURRENTS REQUIRED TO CHARGE THIS BARGAIN BASEMENT SPECIAL. SUDDEN APPLICATIONS OF RAW AC TO ELECTROLYTIC FILTER CAPS WHEN THE RECTIFIER BREAKS DOWN CAN LEAD TO AN IMMEDIATE UNDERSTANDING OF THE TERM "SMOKE TEST". WHEN DESIGNING POWER SUPPLIES, IT IS BEST TO WORK FROM THE OUTPUT BACK, TAKING INTO CONSIDERATION THE WORST CASE OPERATING MODE OF EACH COMPONENT. NEGLECTING THE ESSOTERIC MATHEMATICS OF A COMPLETE DESIGN SPECIFICATION, AND REALIZING THE ROOM TEMPERATURE

FIGURE 2 VARIABLE VOLTAGE HIGH CURRENT POWER SUPPLY



OPERATING MODE OF HOBBY ELECTRONICS, MUCH CAN BE ASSUMED AND ELIMINATED. A TYPICAL DESIGN PROGRESSION SHOULD BE:

CHOOSE AN OUTPUT VOLTAGE AND CURRENT. A GOOD SUGGESTIONS WOULD BE 5 VOLTS AT 6 AMPS USING THE REGULATOR TYPE PREVIOUSLY DESCRIBED. A THREE TERMINAL REGULATOR SUCH AS THE LM309 REQUIRES APPROXIMATELY A 3 VOLT HIGHER INPUT THAN OUTPUT. THAT IS, FOR A 5 VOLT REGULATED OUTPUT, THE REGULATOR MUST HAVE A WORST CASE MINIMUM OF 8 VOLTS OF RIPPLE FREE DC ON THE INPUT TO OPERATE RELIABLY. IF THE REGULATOR WERE SET AT 15 VOLTS OUT, THE MINIMUM INPUT SHOULD BE 18 VOLTS. THE EXTERNAL COMPONENTS ATTACHED TO THE LM309 ARE CURRENT AMPLIFIERS (THE 309 IS A ONE AMP DEVICE) AND THE ENTIRE REGULATOR SECTION CAN BE TREATED AS A SINGLE COMPONENT WITH ADJUSTABLE VOLTAGE SELECTION (FIGURE 3).

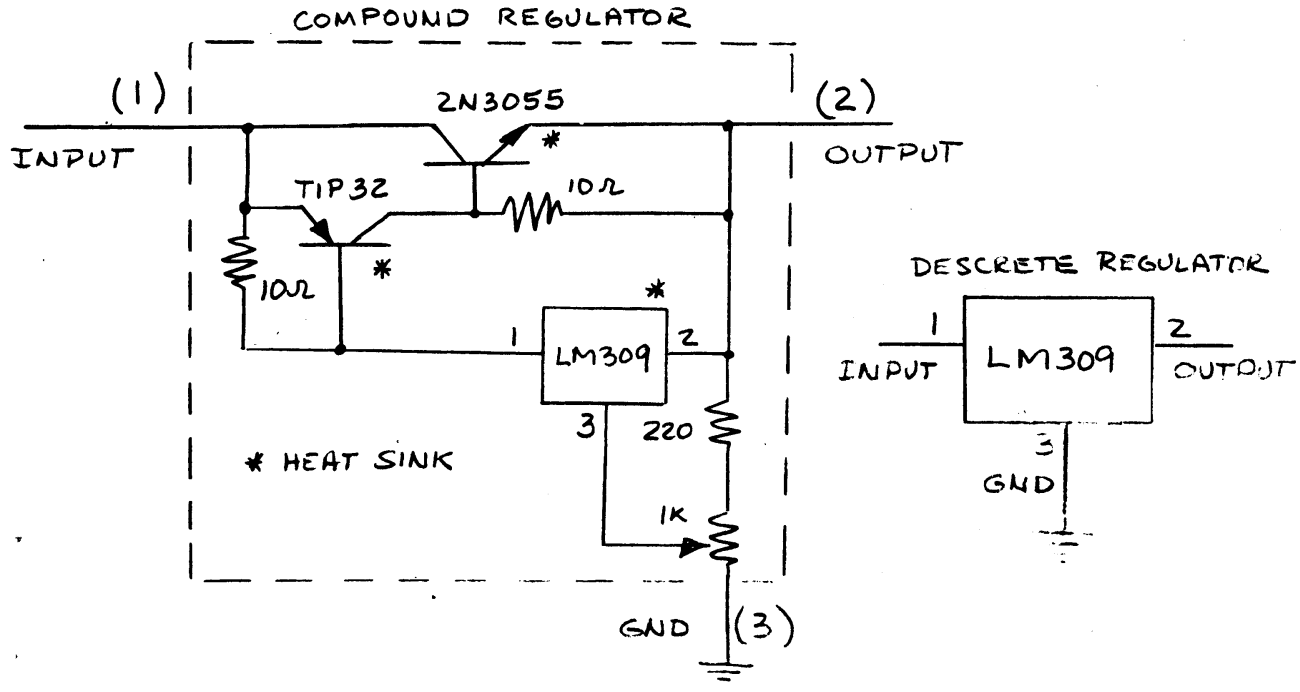


FIGURE 3. REGULATOR WIRING SIMILARITY

POWER DISSIPATION IS STILL A FACTOR TO BE RECONNED WITH AS MUCH OF THE SINGLE REGULATOR WOULD BE. POWER DISSIPATION (IN WATTS OF HEAT BUILT UP IN THE REGULATOR) IS DEFINED AS THE OUTPUT VOLTAGE MINUUS INPUT VOLTAGE TIMES THE CURRENT PASSING THROUGH IT. IN THE 5 VOLT UNIT, THE INPUT IS 10 VOLTS AND THE OUTPUT IS 5 VOLTS, AND ONE IS DRAWING 5 AMPS, THIS IS A MORE THAN MODEST 25 WATTS. THE MAXIMUM RATING OF A 2N3055 IS 15 AMPS WITH 115 WATTS OF POWER. LOOSELY SPEAKING, THIS WOULD MEAN THAT A 5 AMP 5 VOLT SUPPLY COULD HAVE NO HIGHER THAN A V(IN) OF 23 VOLTS. THE CLINCHER IS THAT THE HEAT MUST BE CONTINUALLY REMOVED FROM THE REGULATOR WITH HEAT SINKS, FANS, OR A COMBINATION OF THEM. HEAT SINKS WHICH ARE COMMERCIALLY SOLD AND FOR EXAMPLE RATED AT 20 WATTS USUALLY MEAN THAT THE UNIT WILL COOL (BE CAREFUL OF THIS WORD!). A DEVICE WHICH HAS A CONTINUOUS POWER DISSIPATION OF 20 WATTS AND HOLD THE TEMPERATURE BUILD UP TO NO HIGHER THAN A MODEST 150-200 DEGREES F. (RIGHT ON!). IF YOU WANT ONE THAT WILL TAKE THAT 20 WATTS AND STAY ABOUT 120 DEGREES F (REASONABLE), IT SHOULD HAVE A COMMERCIAL RATING AROUND 60 TO 100 WATTS WHICH IS A LITTLE MORE EXPENSIVE. NOW COMES THE SEAT OF THE PANTS ENGINEERING FOR THE HOBBYIST. IF YOU CALCULATE THAT THE POWER DISSIPATION IS ABOVE 25 WATTS, FORGET ALL THE COMPUTATIONS AND GO BUY A MUFFIN FAN. IT WILL COOL YOUR POWER SUPPLY AND KEEP ALL THOSE TEMPERATURE FALLOUT REJECTS WHICH YOU BOUGHT FROM THE MAIL ORDER HOUSE IN SPEC. WITH A GOOD FAN, A 25 WATT RATED HEATSINK CAN GO 100 WATTS EASILY (DON'T EVER EXCEED THE TRANSISTOR POWER RATING. IT IS DEPENDENT ON SOME THINGS NOT COVERED BY THIS SEAT OF THE PANTS METHOD) AND STAY AT A VERY REASONABLE TEMPERATURE.

UP TO THIS POINT WE HAVE CONCERNED OURSELVES MAINLY WITH THE REGULATOR AND IT'S MINIMUM INPUT REQUIREMENTS. THE TRANFORMER, RECTIFIER, AND FILTER SECTION HAS TO BE DESIGNED TO PROVIDE THE DESIRED INPUT IF THE SUPPLY IS TO WORK. PREVIOUSLY IT WAS MENTIONED THAT AN 8 VOLT NO RIPPLE INPUT IS NEEDED FOR A FIVE VOLT SYSTEM AND 18 VOLTS FOR A 15 VOLT UNIT. OBVIOUSLY THE TRANSFORMER CHOSEN HAS TO BE CAPABLE OF SUPPLYING THE DESIRED VOLTAGE AND CURRENT CAPACITY FOR THE APPLICATION. A THREE AMP SUPPLY CANNOT BE MADE USING A ONE AMP TRANSFORMER. BY THE SAME TOKEN, BE CAREFUL OF USING A TRANFORMER AT IT'S FULL RATED CURRENT BECAUSE IT WILL GET HOT. IT IS MY EXPERIENCE THAT SOME UNITS LIKE THE RADIO SHACK 1.2 AMP SERIES ARE GOOD FOR ABOUT 3/4 AMP CONTINUOUS BUT GOOD GOOD LUCK TO YOU AT 1.2 AMPS. BUY THE BEST TRANSFORMER IN YOUR PRICE RANGE THAT WILL DO THE JOB; YOU WON'T BE SORRY. A GOOD MARGIN IS ABOUT 20% RESERVE CAPACITY. THE TRANSFORMER IS NOT SUPPLYING A CONTINUOUS STEADY CURRENT TO THE FILTER BUT RATHER SHORT BURSTS WHICH CAN BE MUCH HIGHER THAT THE AVERAGE RATING AS QUOTED. THE RECTIFIER SHOULD NOT BE NEGLECTED BECAUSE IT HAS TO BE ABLE TO HANDLE THESE SURGE CURRENTS. THE WORST CASE WHICH A DIODE EXPERIENCES IS ON INITIAL TURN ON WHERE IT MUST INSTANTLY CHARGE THAT GIANT BARGAIN BASEMENT CAPACITOR WHICH FOR A SPLIT SECOND APPEARS AS A DEAD SHORT (THE LARGER THE CAP, THE LONGER THE SHORT) THE ONLY SAVING GRACE IS THAT THE TRANSFORMER HAS A CERTAIN MAXIMUM CURRENT LIMITATION. IF THE SOURCE RESISTANCE OF THE TRANSFORMER IS ABOUT .1 OHM (LOOSELY INTERPRETED AS THE SECONDARY WINDING RESISTANCE AND THIS IS NOT UNUSUAL FOR BIG ONES LIKE THIS) AND THE FILTER CAP CHARGES FROM 0 VOLTS TO 12 VOLTS, FOR AN INSTANT I(MAX)=E(MAX)/R(S). I=12/.1=120 AMPS! SOME WHAT LOWER CURRENTS WILL BE REQUIRED DURING STANDARD CHARGING CYCLES AND YOU THOUGHT YOU'D SQUEAK BY WITH A 6 AMP BRIDGE ON A 6 AMP SUPPLY. WELL, IT ISN'T ALL THAT BLEAK SINCE THIS SAME BRIDGE WILL PROBABLY HAVE A SURGE CURRENT RATING OF 100 AMPS AND A CONTINUOUS RATING OF 6 AMPS. THIS IS A LITTLE TOO CLOSE. PICK SOMETHING LIKE THE MDA980 SERIES WHICH HAS A 25 AMP CONTINUOUS WITH 300 AMP SURGE RATING. THIS BRIDGE WILL MORE THAN SUFFICE FOR A 12 AMP SUPPLY IF THE FILTER CAP IS CHOSEN CORRECTLY.

THE NEXT BIG CONSIDERATION IS THE FILTER CAPACITOR. A LITTLE WAVEFORM ANLYSIS MUST BE PRESENTED HERE SO THAT THE NOVICE APPRECIATES THE DERIVATION AND THE LEARNED SYMPATHY. FIGURE 4 SHOWS THE FILTER SECTION WITH A 9 VOLT TRANSFORMER. THE OUTPUT VOLTAGE FROM THE TRANSFORMER IS 9 VOLTS RMS. AS IT PASSES THROUGH THE BRIDGE THERE IS ABOUT A 3/4 VOLT DROP ACROSS EACH CONDUCTING DIODE (2). THIS MEANS THAT THE PEAK VOLTAGE PRESENTED TO THE CAPACITOR IS GOING TO BE ABOUT:

V(PEAK)=(SECONDARY RMS - DIODE DROP)(1.414)
=(9 - (.75)(2))(1.414) = (7.5)(1.414) = 10.6 VOLTS PEAK

BUT REMEMBER V(PEAK) = V(IN DC) + V(RIPPLE)

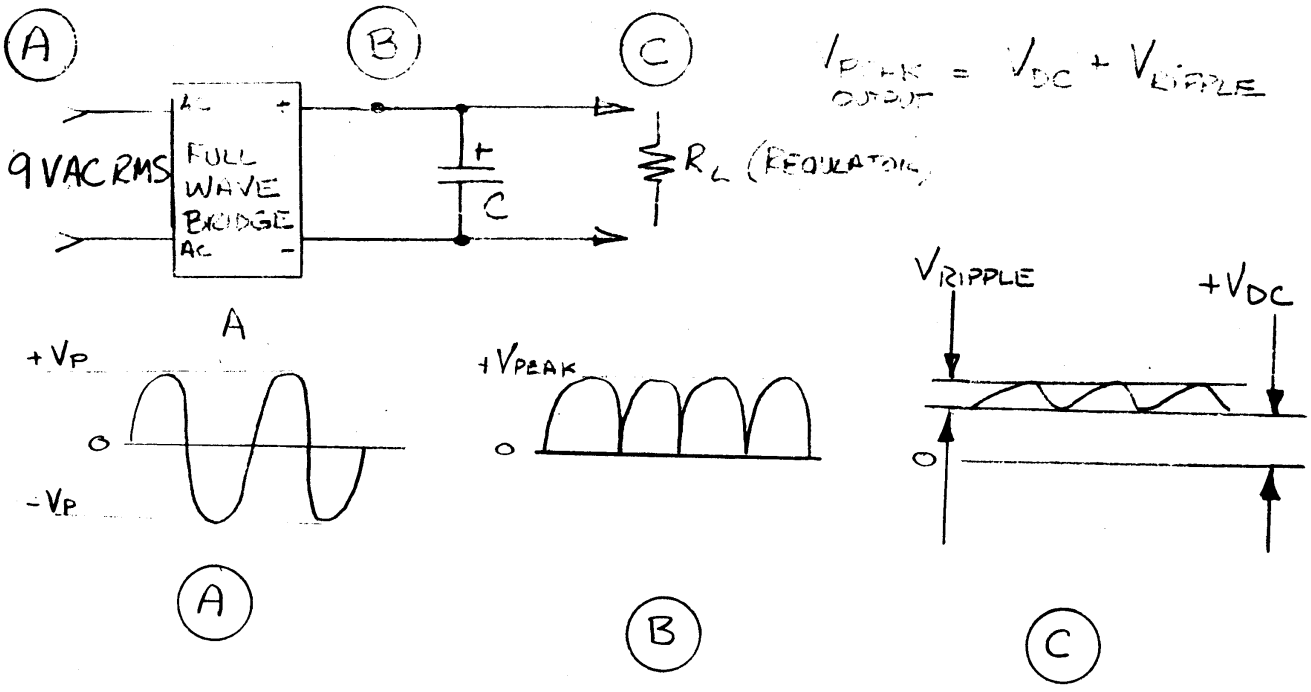


FIGURE 4 FILTER CIRCUIT WAVEFORMS

IT HAS ALREADY BEEN DETERMINED THAT 8 VOLTS IS THE MINIMUM V(IN) FOR A 5 VOLT SUPPLY. THUS THE CAPACITOR MUST BE OF SUFFICIENT SIZE TO ALWAYS STAY CHARGED ABOVE 8 VOLTS. THAT MEANS THAT OF THAT 10.6 VOLTS, 2.6 VOLTS CAN BE RIPPLE. GENERALLY, THAT'S CUTTING IT CLOSE. TWO VOLTS SHOULD BE THE MAXIMUM. CAPACITOR SIZE CAN BE DETERMINED AS FOLLOWS:

V(RIPPLE) = 2 VOLTS I(CONTINUOUS) = 6 AMPS

(3) I = C(DV/DT) OR I = C(V(RIPPLE)/CHARGING TIME)

C IS IN FARADS I IN AMPS DV IN VOLTS DT IN SECONDS

DT = 8.3*10↑(-3) FOR FULL WAVE BRIDGE
DT = 16.6=10↑(-3) FOR HALF WAVE

PLUGGING THESE VALUES IN GIVES:

6 = C(2/8.3*10↑(-3) C = (6)(8.3*10↑(-3)/2
C = .02490 FARADS OR 24,900 MICROFARADS

(DON'T FORGET, CAPS HAVE A +50% -10% TOLERANCE USUALLY)

THIS SHOULD BE CONSIDERED THE MINIMUM ACCEPTABLE CHOICE. 50,000 MICROFARAD WOULD BE REQUIRED FOR A 10 AMP SUPPLY. OVER 120,000 MICROFARAD MAY INTRODUCE CHARGING CURRENT PROBLEMS, EXCESSIVE DIODE HEATING, AND REQUIRE A MORE IN DEPTH ANALYSIS OF THE WHOLE MESS. THE SYSTEM PRESENTED HERE IS DESIGNED FOR 5 OR 6 AMPS BUT CAN EASILY SUPPLY 12 AMPS OR MORE IF ONE REREADS THIS PRESENTATION AND SELECTS THE APPROPRIATE FILTER CAP, COOLING SYSTEM, AND TRANSFORMER BRIDGE COMBINATION. IF 2N3055 APPEARS INADEQUATE, SUBSITUTE A 2N3771. IT IS RATED FOR 200 WATTS AT 30 AMPS AND WOULD BE VIRTUALLY BLOWOUT PROOF IN THESE CURRENT RANGES.

LET'S PRESUME THAT YOU'VE TAKEN MY WORD SO FAR AND BUILT THE SUPPLY, OR AT LEAST A CLOSE APPROXIMATION. NOW OF COURSE, COMES THE FUN PART OF HOOKING IT ALL UP AND TURNING ON THE POWER. IT CANNOT BE SUGGESTED STRONGLY ENOUGH THE NECESSITY FOR OVERVOLTAGE PROTECTION IN THE FORM OF AN SCR CROWBAR CIRCUIT. THE SCELBI-8H HAS A FUSED OVERVOLTAGE SENSING SYSTEM ON EACH CARD BUT IT SHOULD BE CONSIDERED ONLY AS A LAST CHANCE PROTECTION. NORMALLY 7400 SERIES LOGIC HAS A SPECIFIED OPERATING RANGE OF 4.75 TO 5.25 VOLTS. OPERATING BELOW THIS RANGE WILL CAUSE RANDOM AND INDETERMINANT OPERATION. VOLTAGES NOT TOO MUCH ABOVE THESE CAN CAUSE OVERHEATING AND EVENTUAL FAILURE. STANDARD OVERVOLTAGE CIRCUITS ARE DESIGNED TO PROTECT AGAINST A TOTAL CATATROPHIC FAILURE OF THE REG-

ULATOR. THIS TYPE FAILURE MODE RESULTS IN THE APPLICATION OF FULL FILTER VOLTAGE TO THE SUPPLY OUTPUT. IN THE 5 VOLT SUPPLY DISCUSSED EARLIER, 10.6 VOLTS WOULD BE PUT ACROSS THE TTL LOGIC. I DON'T THINK MANY IC'S WOULD SURVIVE!

THE STANDARD OVERVOLTAGE CIRCUIT IS ILLUSTRATED IN FIGURE 5.

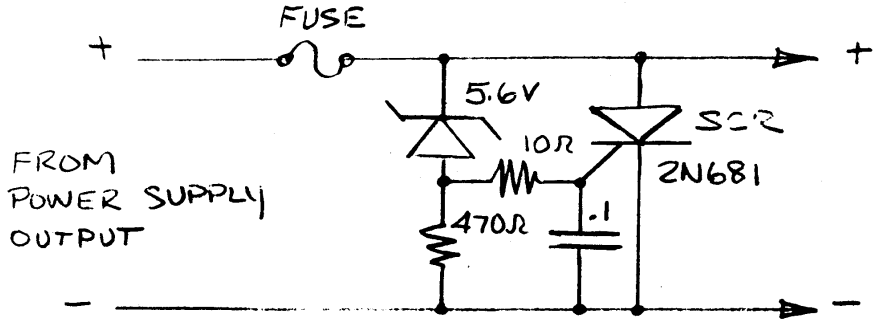


FIGURE 5 STANDARD OVERVOLTAGE CROWBAR

THIS CIRCUIT IS THE STANDARD METHOD AND WILL PROVIDE PROTECTION AGAINST CATASTROPHIC FAILURE. BUT CONSIDER THE HOBBYIST'S OPERATING MODE FOR A MINUTE. HE IS USING 7400 LOGIC, MAY POSSIBLY HAVE GOTTEN SOME MARGINAL CHIPS WITHOUT KNOWING IT FROM MAGAZINE ADVERTIZERS OR FLY BY NIGHT COMPANIES, AND PROBABLY DOES NOT HAVE THE EXTENSIVE TEST EQUIPMENT TO DIAGNOSE INTERMITENT BIT LOSS WHEN OPERATING OUT OF SPEC. THE SYSTEM SHOWN ABOVE WILL NOT TRIGGER THE SCR UNIT APPROXIMATELY 7 1/2 VOLTS. ABOVE THAT VOLTAGE, THE SCR WILL CLAMP THE SUPPLY TO GROUND AND BLOW THE FUSE. THIS IS OF COURSE THE DESIRED RESULT. AT 7 VOLTS NOTHING OCCURS AND THIS CAN BE AS BAD AS 10 VOLTS ON SOME CHIPS. A LOWER ZENER DIODE VOLTAGE CAN BE SELECTED BUT THE VARIATION IN ZENER DIODES AND SCR'S WILL STILL ONLY ALLOW THE COMBINATION TO BE SET AT A TRIGGER VOLTAGE OF PLUS OR MINUS 1 VOLT OF WHERE YOU MIGHT THINK YOU ARE. AN ALTERNATIVE APPROACH IS TO DESIGN A SYSTEM WHICH STILL INCORPORATES THE SCR CROWBAR BUT ALLOWS THE TRIGGER VOLTAGE TO BE PRECISELY DETERMINED. SINCE SUCH A SYSTEM WOULD REQUIRE A VOLTAGE REFERENCE CIRCUIT AS AN INTEGRAL PART, IT CAN ALSO BE USED IN A LIKE MANNER TO SIGNIFY A LOW VOLTAGE CONDITION. THE CIRCUIT FOR THIS DEVICE WOULD APPEAR AS IN FIGURE 6.

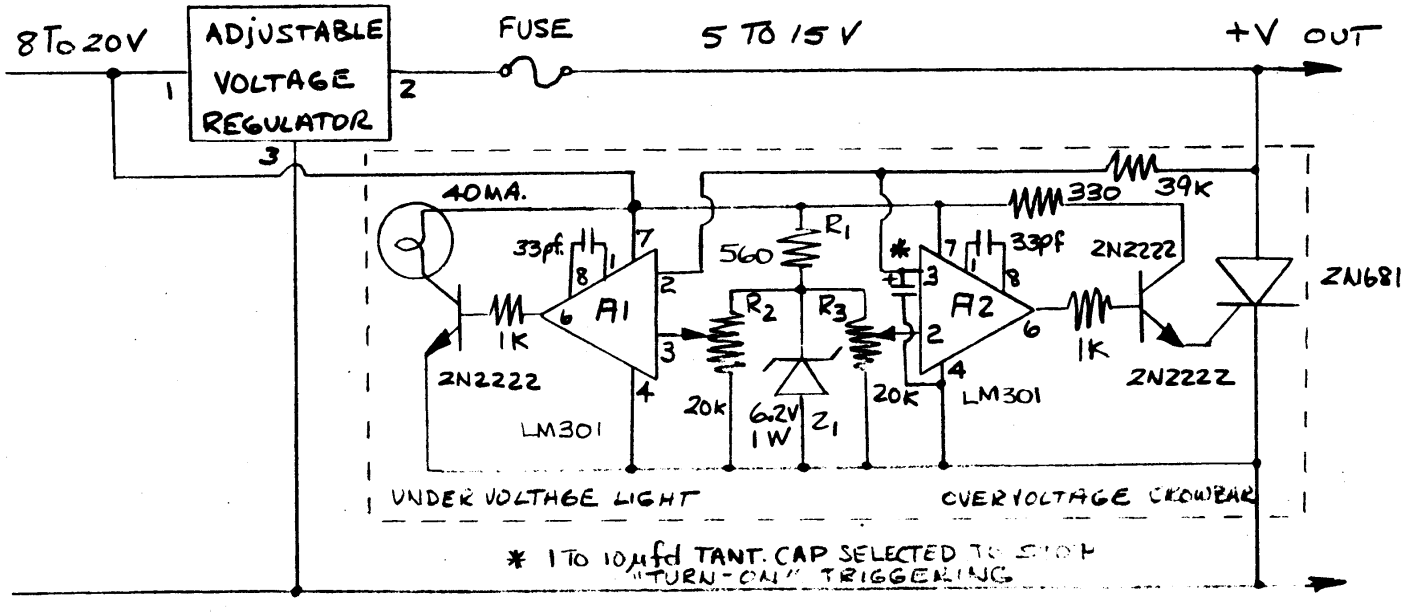


FIGURE 6 PRECISION OVERVOLTAGE DETECTOR

R(1) AND Z(1) FORM A REFERENCE VOLTAGE CIRCUIT. OPERATIONAL AMPLIFIERS A(1) AND A(2) OPERATE AS COMPARATORS AND TRIGGER OVERVOLTAGE (A(2)) AND UNDERVOLTAGE (A(1)) BASED ON THE SETTINGS OF R(3) AND R(2) RESPECTIVELY. THIS CIRCUIT ALLOWS THE TRIGGER POINT TO BE SET AT A PRECISE VALUE AND IN PRACTICE WILL ACTUALLY TRIGGER WITHIN PLUS OR MINUS 3 MV. OF THIS SETTING. AS SUGGESTED, THE OVERVOLTAGE SENSOR IS SET ABOVE 5 VOLTS, USUALLY BETWEEN 5.25 AND 5.50 V, WHILE THE LOW VOLTAGE SENSOR IS SET AT 4.75 V. VOLTAGE OUTPUTS BELOW 4.75 VOLTS WOULD TURN ON A LOW VOLTAGE INDICATOR LIGHT BUT WOULD NOT TRIGGER THE SCR. THIS CIRCUIT PROTECTS AGAINST MARGINAL OPERATION AS WELL AS CATASTROPHIC FAILURE.

OF COURSE, AFTER READING ALL THIS, IT IS NOT EXPECTED THAT EVERYONE WILL BECOME A POWER SUPPLY EXPERT. I DO NOT PRETEND TO BE, BUT I FEEL THAT THE UNIQUENESS OF THE APPLICATION ALLOWS CONSIDERABLE POETIC LICENSE TO BE TAKEN. THE ASSUMPTIONS MADE AND PRESENTED HERE ARE BASED UPON CONSIDERABLE EXPERIENCE AND EXPERIMENTATION. IT IS HOPED THAT THE COMPUTER HOBBYIST WILL EXTRACT THAT INFORMATION MOST USEFUL TO HIM AND BUILD THE BEST SYSTEM WITHIN HIS ABILITIES. IT IS TO THAT END THAT THIS NEWSLETTER IS DEDICATED.

(EDITOR'S NOTE: AS FAR AS WE KNOW, MINI MICRO MART, 1618 JAMES STREET, SYRACUSE, NY 13203 IS ATTEMPTING TO SUPPLY COMPONENTS AND PC BOARDS FOR STEVE'S DESIGNS. SEND THEM A SASE FOR INFORMATION AND ESTIMATED DELIVERY DATES.)

PAST AND FUTURE -- ONE MARK-8

by Terry F. Ritter
2524 Glen Springs Way
Austin, TX 78741 (512)441-0036

From the beginning, when The Machine first started executing test sequences, it was obvious that the tedious process of program entry (via front-panel switches) had to go. Accordingly, effort was placed into the design of a cheap and unique magnetic-core ROM system for storage of keyboard control software. Keyboard control was chosen for many reasons: a personal dislike for TTY sounds, TTY confinement to a particular sitting position, more availiable commands on the keyboard, and BCD numbers availiable from masked ASCII.

After several months, reasonable software systems for keyboard programming and Baudot octal dumping were tested complete, and allowed the necessary 256-bytes of hand-threaded transformer ROM to be placed into service. Subsequently, the addition of four push-button interrupt commands: HALT, NO-OP, RETURN, and RESTART TO EXECUTIVE has almost eliminated the need for switches.

The Mini-Executive deserves special mention, for in 128 ROM bytes, located anywhere in memory, it allows keyboard programming to replace switch programming. It is also compatable with the basic Mark-8 (in my implementation the keyboard strobe activates a NO-OP interrupt, but other schemes could be used). Required, upon power-up, is the entry of eight steps into RAM via the front-panel switches; full keyboard control is then obtained. ASCII numbers Ø through 7 are not keyboard commands, and are thus octal masked (b_2-b_0) and shifted into the Port Ø display from the right, allowing octal program entry. Ten commands are implemented:

H	display H on Port Ø
L	display L
M	display M
8	load H from display
9	load L
.	load M
SPACE	increment H,L and display M
BACKSPACE	decrement H,L and display M
CAROT	call sub at H,L
PRINT	call Baudot octal dump sub, start dump at H,L

The particular keys used for these commands reflects those availiable on my keyboard, which has a seperate numeric pad and special-function keys. Non-implemented commands (+) and (-) are intended for text-editing bubble up/down systems which would appropriately modify the internal "jump to" addresses when machine-language steps were to be added or deleted.

Other commands are "easily" implemented by inclusion in the command look-up table; some other useful commands would be:

call CRT octal program-display system
call CRT register trace system
call dump to tape system
call tape dump check system
call store from tape system
call EROM erased check system
call program EROM system, etc.

It would be nice if the Mini-Executive appropriately set the TTY and CRT ports whenever accessed. Further, the addition of an audible tone-feedback system in which commands were confirmed by output of a different beep-tone or sequence, would allow more confident and error-free program entry and editing, as well as impressing EVERYONE.

These commands constitute a very bottom-of-the-line control system for machine language programming. It is a common mistake to consider machine language work as a tedious necessary evil. Not only is machine language most efficient in use of our scarce memory resource, but (assuming some text-editing programs) it is FAR superior to Assembler in ease-of-use, and Assembler is commonly thought to be the next step up. Sophisticated languages are nice, but remember that a debugged language implementation may take several man-YEARS of effort. Spend a fraction of that time developing machine-language routines, and you have a system that grows with you.

For the next few years anyway, it may be desirable to consider one type of small computer system oriented around an EROM main memory. Here RAM would be used primarily as scratchpad, and the EROM's used like disk is used in larger systems (almost). Certainly all command implementations would be in EROM, with larger programs or systems on tape. Who will sell me a 1702 programmer board?

COMPUTER LITERATURE LENDING LIBRARY PROPOSED

ROBERT W. KELLEY, 5806 MT. TERMINAL DR., WACO, TX. 76710 THINKS THIS WOULD BE A GOOD TIME FOR THE GROUP TO ESTABLISH A COMPUTER LITERATURE LENDING LIBRARY. THIS COULD BE A FILE CONTAINING REPRINTS OF MAGAZINE ARTICLES, TECHNICAL PAPERS ON COMPUTER HARDWARE,SOFTWARE, ETC.

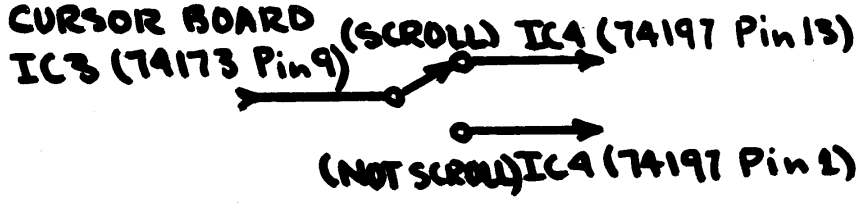
THE COLLECTION AND DISTRIBUTION OF THIS MATERIAL COULD BE ADMINISTERED BY A COMMITTEE. COST OF DISTRIBUTION SHOULD BE BORNE BY THE USER. Editors Note: LET US HEAR FROM YOU "GUYS" THAT WOULD CONTRIBUTE.

MORE SCROLLING MODIFICATIONS FOR THE TVT-1

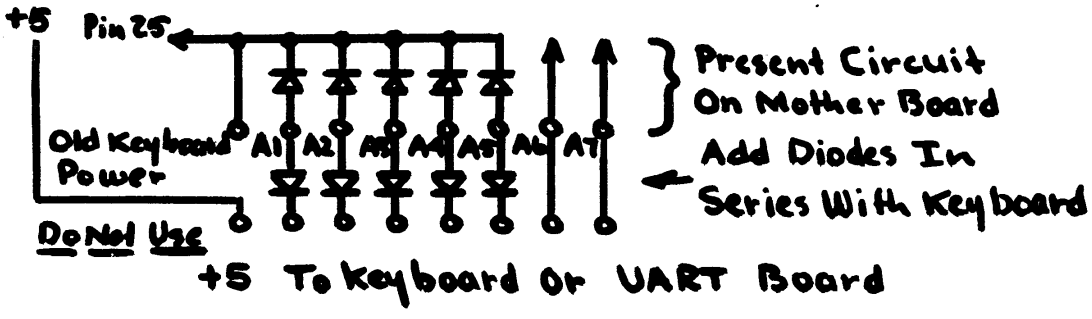
R. D. HOGG, 2516 CASTILLO, SANTA BARBARA, CA 93105 IS NEARING COMPLETION OF HIS PHD IN ELECT. ENGR. AT UNIV. OF CA AT SANTA BARBARA. HE BUILT THE TVT-1 AND HAS INSTALLED THE FOLLOWING SCROLLING MODS. (SCROLLING MEANS ALL LINES POP UP ONE, BOTTOM LINE CLEARS, TOP LINE IS LOST.) HE SAYS:

"THIS SCROLLING CIRCUIT WAS DESIGNED TO TAKE ADVANTAGE OF THE TIMING SIGNALS AVAILABLE IN THE TVT TO AVOID HAVING TO USE CRITICAL ANALOG CIRCUITS. WHAN A SCROLL COMMAND IS RECEIVED, THE CIRCUIT RUNS THROUGH TWO LINES AFTER THE FIRST VERTICAL SYNC PULSE. THE FIRST OF THE TWO LINES RUN THROUGH IS ERASED GIVING A CLEAR LINE AT THE BOTTOM OF THE SCREEN AND MOVING THE REST OF THE DISPLAY UP ONE LINE.

THERE ARE A COUPLE OF MINOR MODIFICATIONS THAT MUST BE DONE TO THE TVT. FIRST, ON THE TIMING BOARD, CUT THE FOIL BETWEEN TEST POINT K AND PIN 5 OF IC7 (7432). RUN A WIRE FROM PIN 5 IC7 TO PIN 40 OF THE MOLEX CONNECTORS. NEXT CUT THE FOIL LEADS GOING TO PINS 24 AND 25 FROM THE CLEAR (HOME) SWITCH ON THE MOTHER BOARD. THE SWITCH CONTACT THAT DID GO TO PIN 25 SHOULD BE CONNECTED TO PIN 9 OF THE 7400 IN THE SCROLLING CIRCUIT. THIS WILL GIVE THE SAME SWITCH FUNCTIONS AS IS SHOWN IN THE SCROLLING SCHEMATIC. AN ALTERNATE WAY TO DO THIS IS TO REMOVE THE CLEAR (HOME) SWTICH ENTIRELY AND INSTALL A SWITCH IN ANOTHER LOCATION AS SHOWN IN THE SCROLLING SCHEMATIC. THE LAST MODIFICATIONS ARE TO CUT THE FOIL ON THE CURSOR BOARD THAT GOES FROM IC3 (7473) PIN 9 TO IC4 (74197) PIN 1. PUT A SWITCH IN AS SHOWN BELOW:

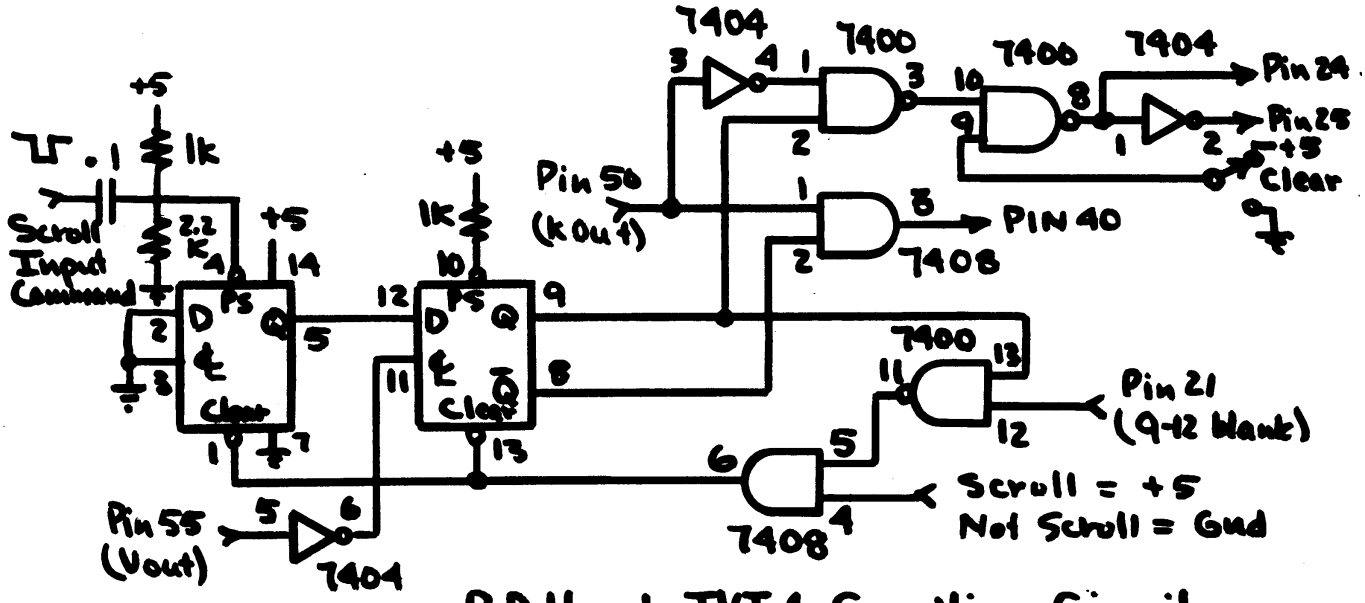


IF ONLY SCROLLING IS TO BE USED, PIN 9 OF IC3 CAN BE PERMANENTLY CONNECTED TO PIN 13 OF IC4. FINALLY, MAKE THE CHANGE SHOWN BELOW TO THE INPUT ON THE MOTHER BOARD. (THIS CHANGE SHOULD BE MADE TO THE INPUT EVEN WITHOUT THE SCROLLING BEING USED IF THE UART BOARD DESCRIBED IN R-E, FEB 1975 IS USED AS HE CLEARS THE INPUTS BY SHORTING THE OUTPUTS OF THE 74157 MULTIPLEXERS TO GROUND WHICH IS A VERY BAD PROCEDURE.)



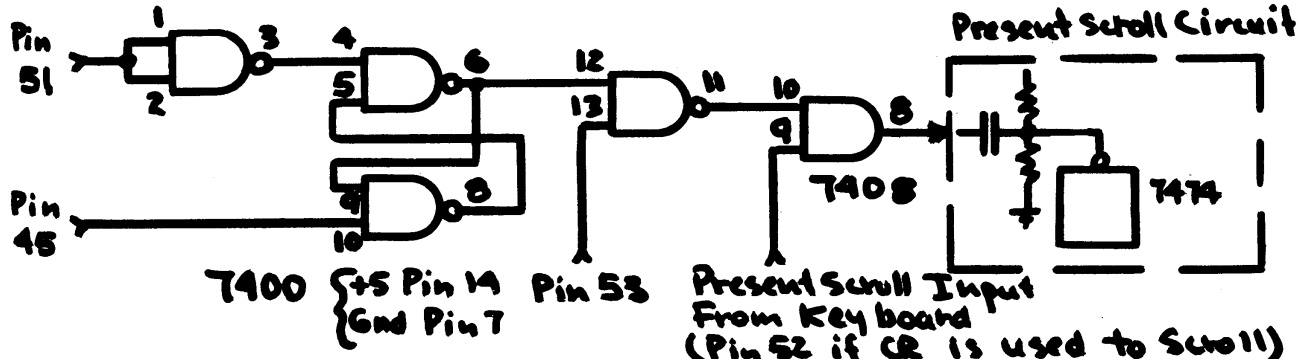
NOTE THAT THE KEYBOARD POWER SUPPLY IS NOW PERMANENTLY CONNECTED TO THE +5 SUPPLY. IT DOES NOT HURT THE KEYBOARD OR UART BOARD NOW TO HAVE A1 THRU A5 GROUNDED.

THE SCROLL COMMAND CAN COME FROM A KEYBOARD SWITCH, MINE IS CONNECTED TO THE CARRIAGE RETURN, OR A SEPARATE SWITCH IF YOU DO NOT WANT TO SEPARATELY DECODE THE CARRIAGE RETURN CODE. SOME KEYBOARDS, SUCH AS THE SWTP KEYBOARD, HAVE AN EXTRA KEY WITH WHICH SEPARATE LEADS CAN BE USED. WITH THIS METHOD OF DOING THE SCROLLING, THERE ARE NO ADJUSTMENTS TO MAKE AND IT WILL NOT UPSET THE OPERATION OF THE TVT WHEN SCROLLING IS NOT USED.



R.D. Hogg's TVT-1 Scrolling Circuit

HERE IS AN ADDITION TO THE ABOVE SCROLLING CIRCUIT WHICH AUTOMATICALLY SCROLLS AT THE END OF A LINE. ALSO INCLUDED IS A MODIFICATION WHICH ALLOWS CR SWITCH TO BE USED FOR SCROLLING."

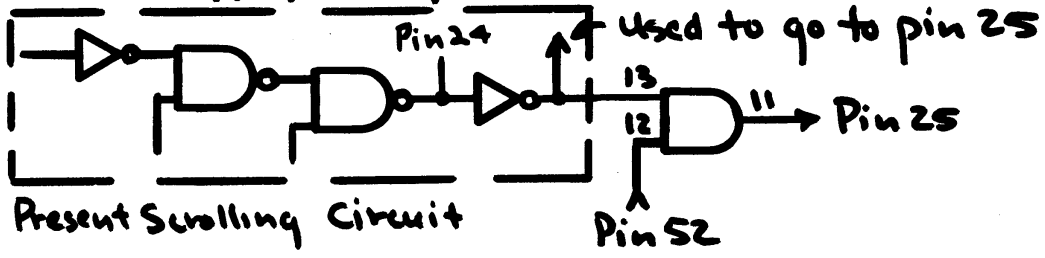


Automatic End Of Line Scroll

7400 added 7408 Part of previous circuit

Changes If You Wish To Use CR For Scroll

(Does not apply if separate switch is used.)

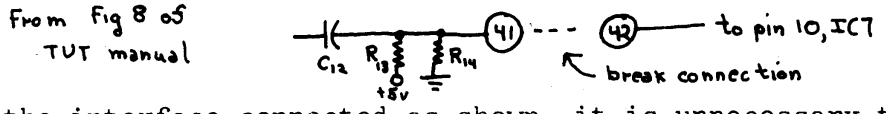


LARRY PLESKAC, 938 PAULA STREET, ESCONDIDO, CA 92027 HAS ALREADY INSTALLED MR. HOGG'S SCROLLING CIRCUIT AND IS VERY PLEASED WITH ITS PERFORMANCE. HE SUGGESTED THAT THIS BE INCLUDED. "THIS IS A SIMPLE MOD TO THE TVT SO THE KEYBOARD WILL CAUSE IT TO SCROLL. REMOVE C5 FROM THE CURSOR BOARD. CONNECT A WIRE FROM THE 0.1 CAP INPUT OF THE SCROLL MOD TO PIN 41. ON THE CURSOR BOARD, CONNECT PIN 41 TO "A". THE CARRIAGE RETURN WILL NOW CAUSE THE TVT TO SCROLL. ALSO, IT IS FUNNY THIS HASN'T BEEN PUBLISHED YET. TO GET THE COMPUTER TO CAUSE THE TVT TO SCROLL ON CR/LF, LOAD 025. THIS ISN'T THE OCTAL SUM OF 015 (CR) AND 012 (LF) OR THE LOGICAL AND, BUT IT WORKS."

WILLIAM E. SEVERENCE, CENTER LOVELL, ME 04016, (207)925-2271 SUPPLIED THE FOLLOWING ARTICLE ON THE TVT & MARK-8. HE WOULD LIKE TO KNOW OF A SOURCE FOR KEYTOPS FOR HIS SWTP KEYBOARD SINCE HE WANTS TO CHANGE A FEW KEYS. HE WOULD LIKE TO FIND A COMPANY THAT WILL DO PC BOARD LAYOUT & FABRICATION FROM A SCHEMATIC AT A RESONABLE PRICE.

TVT - MARK 8 INTERFACE AND MODIFICATIONS TO CLEAR CIRCUITRY (page 1)

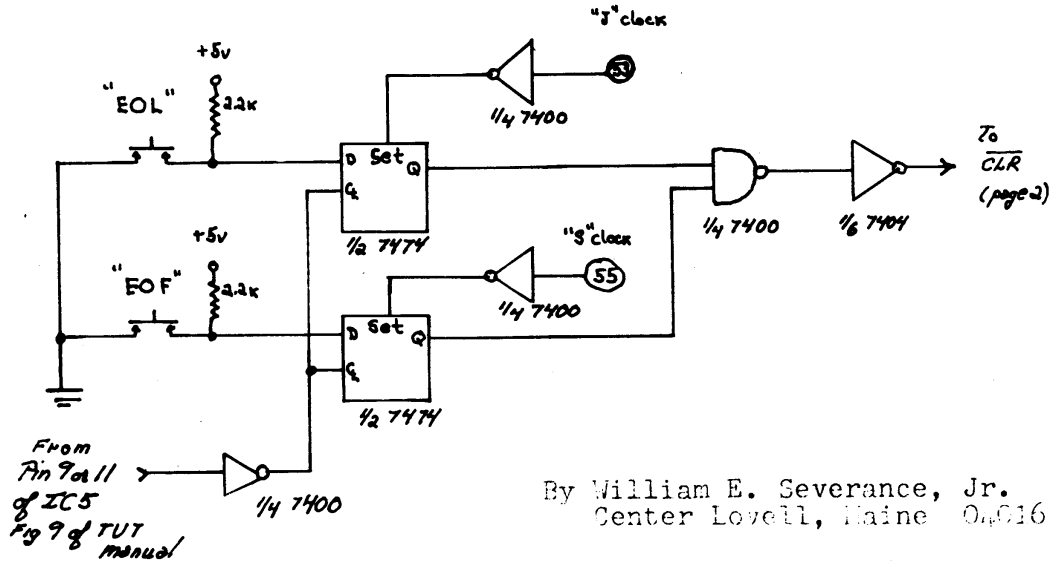
It has been found that the key pressed output of the SWTP keyboard encoder is not sufficiently debounced to drive the Ext. Int. Latch of the Mark 8 as indicated in Appendix A-3 of NL Vol. 1, No. 5. Also, it is advantageous to have a multiplexed interface allowing for use of the TVT alone ("LOCAL") or with the Mark 8 ("LINE"). The accompanying diagram shows this interface constructed of 4 IC's. Keyboard debouncing is best accomplished by the elaborate circuit shown in Fig. 8 of the TVT manual. To provide an insertion point for the interface, make the following modification using the spare stack connectors (41) and (42) .



With the interface connected as shown, it is unnecessary to use a 74123 monostable to condition the Mark 8 Output Port Strobe as is shown in Appendix A-3 of NL Vol. 1, No. 5 and in the Mark 8 manual. Of course, it is still necessary to use a software delay loop when outputing to the TVT.

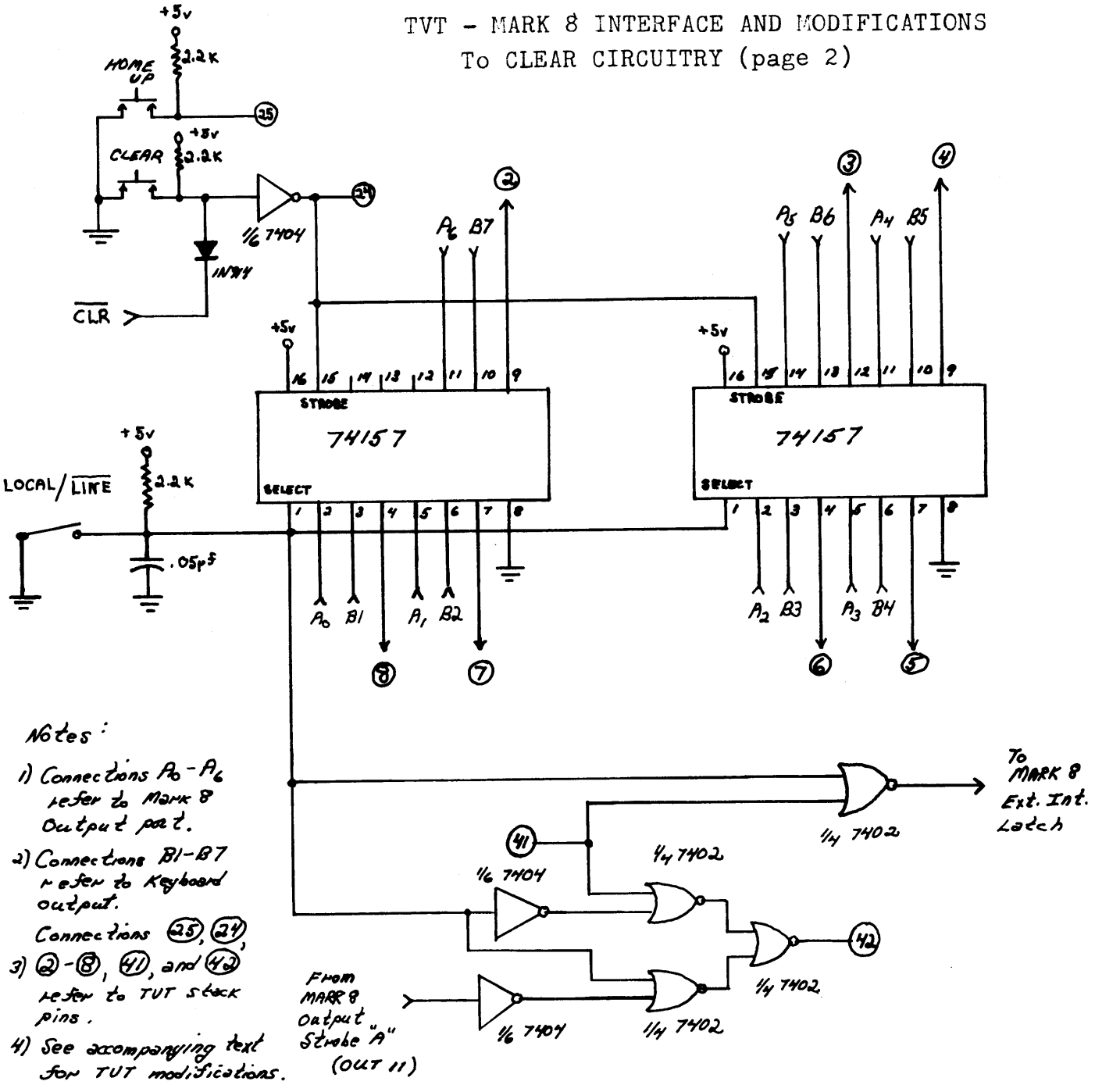
In addition, it was found that the CLEAR function as designed by Don Lancaster for the TVT did not work due to the introduction of random characters should switch S6 of the TVT release the ground on diodes D10-D14 before the ground on stack pin (24) is returned. To overcome this, I have made use of the strobe function of the 74157 data selectors in the interface. When the "CLEAR" button is pressed, a logic 0 appears on stack pins (2) - (8). Also, this allows for the use of a separate push button switch for the "HOME UP" function. To make this modification, cut the foil leading from pin (25) to the cathodes of diodes D10-D14 on the Main Frame circuit board; and remove the existing CLEAR-HOME switch S6; finally, insert the switches and inverter shown on the accompanying diagram. The "CLEAR" function is now TTL compatable, also.

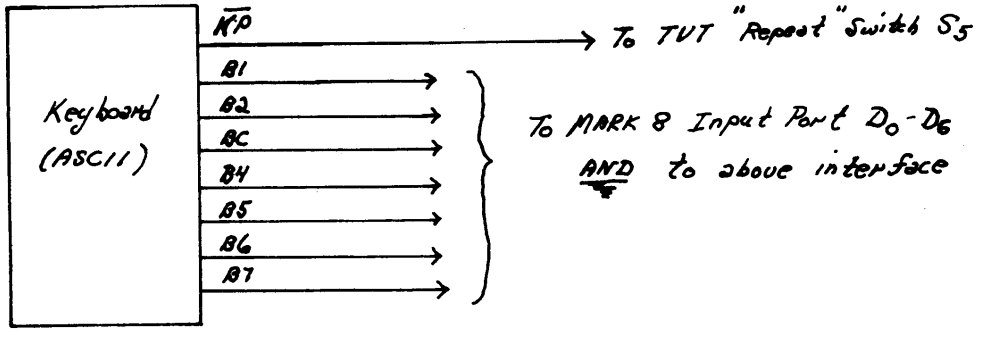
For those that care, the "ERASE TO END OF LINE (EOL)" and "ERASE TO END OF FRAME (EOF)" functions may be provided by the following circuit. "EOL" may be driven optionally by update line "A" from the cursor board for use when carriage returning.



By William E. Severance, Jr.
Center Lovell, Maine 04016

TVT - MARK 8 INTERFACE AND MODIFICATIONS
To CLEAR CIRCUITRY (page 2)

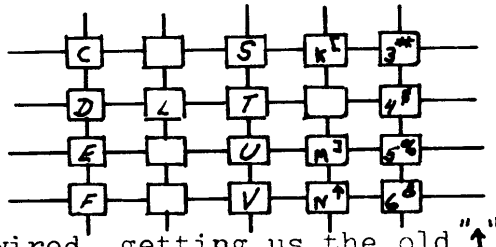




William E. Severance, Jr.
Center Lovell, Maine 04016

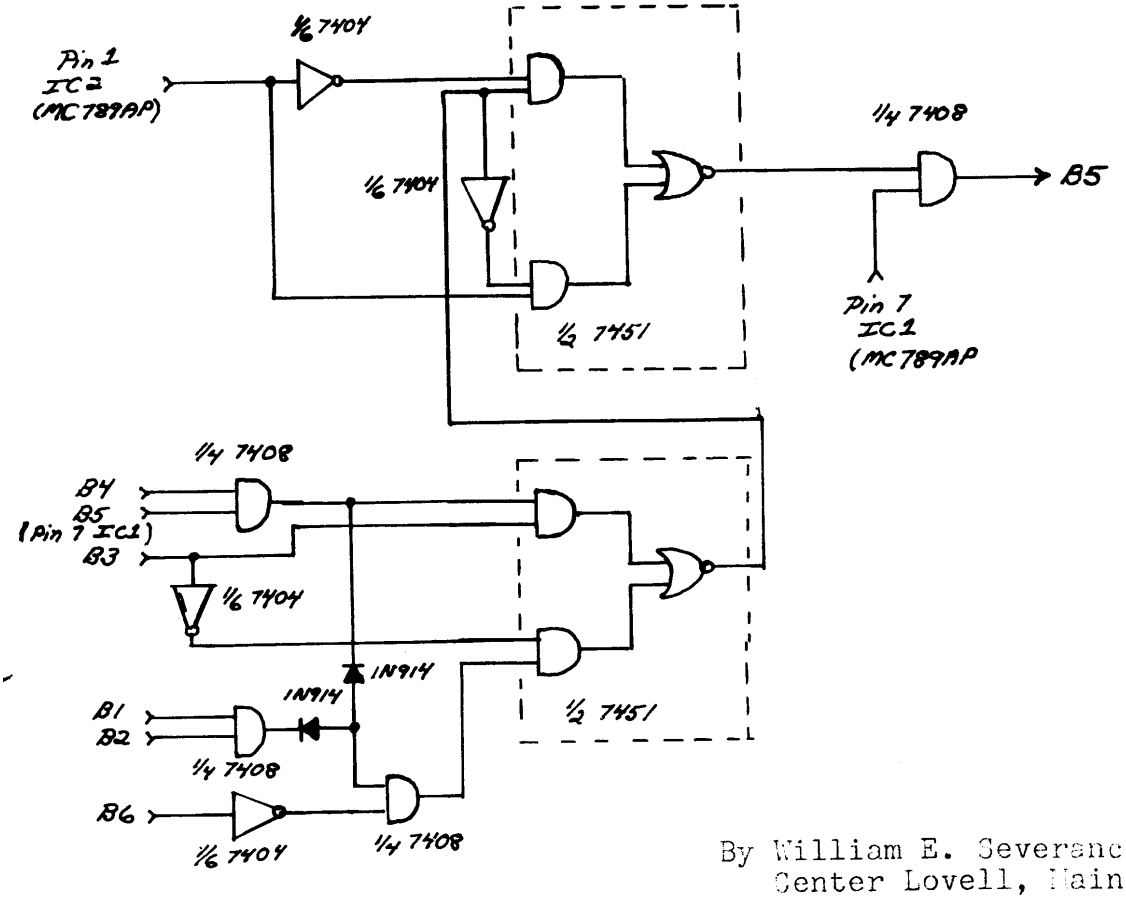
SWTP ASCII KEYBOARD AND ENCODER -- MODIFICATIONS

Any touch typist using this keyboard and encoder will be confused by the upside down pairings of the four keys (, and <); (. and >); (- and =); and (/ and ?). Normally, the pressing "SHIFT" forces a logic 0 onto output line B5. For these four cases, B5 should remain 0 until "SHIFT" is pressed at which time it should go to logic 1. The following circuit detects this special case and accordingly inverts the "SHIFT" action. At the same time, it allows for the standary TTY characters of [("SHIFT K");] ("SHIFT M"); and ↑ ("SHIFT N"). For these, the keyboard matrix must be redefined so that "K" is ASCII 133, "M" is 135, and "N" is 136. Looking at the keyboard matrix of the instruction manual, this places these keys as follows:



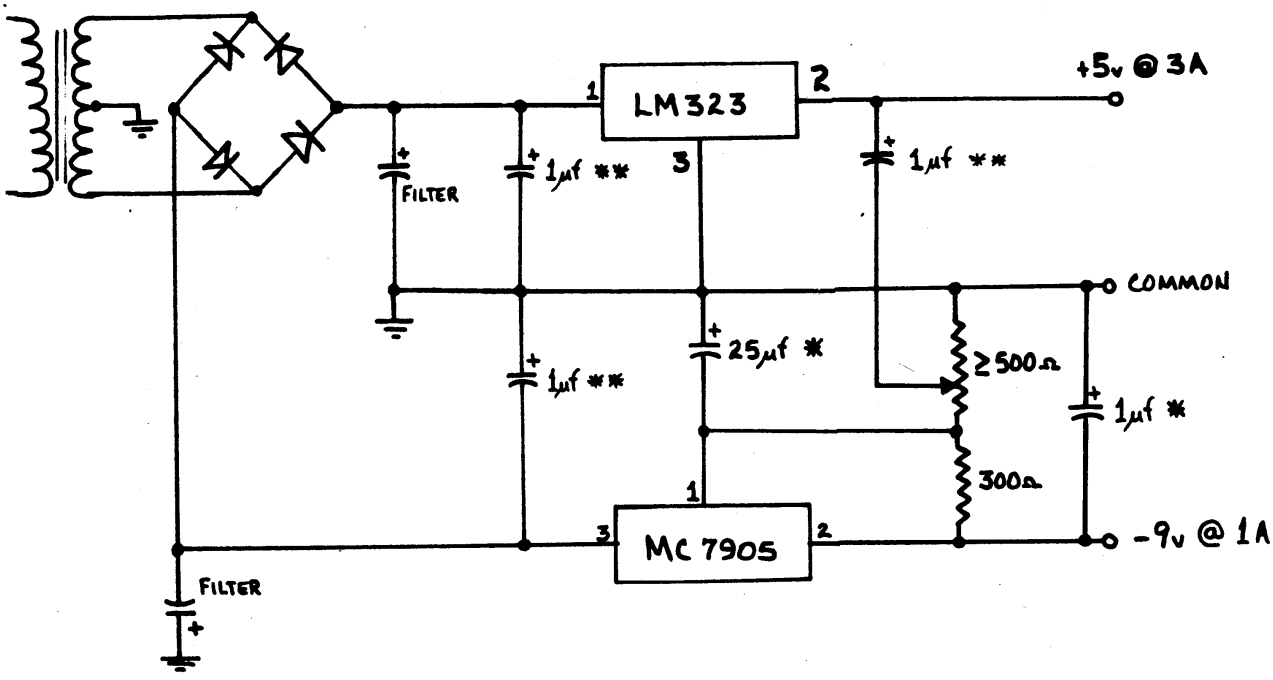
Note: Simply shift common connection of keys "K", "M", and "N" to common of keys "X", "Y", and "Z".

This is easily wired, getting us the old "↑" key back as a spare. Designations B1-B6 below refer to pins at the output connector. Break connections to Pin 1 of IC1 and Pin 7 of IC2 and then wire the circuit below. (I used IC sockets and point to point wiring.)



By William E. Severance, Jr.
Center Lovell, Maine 04016

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARTK, IL 60035 472-6660 DAYS, AND 432-6423 EVENINGS IS USING THE POWER SUPPLY CIRCUIT SHOWN BELOW TO POWER HIS MIL MOD-8 COMPUTER. HE HAS HIS MOD-8 RUNNING BEAUTIFULLY AND ALSO DEBUGGED ONE FOR THE UNIVERSITY OF CHICAGO. HE IS GOING TO SERVE AS THE MONITOR-8 SPECIAL INTEREST GROUP EDITOR AND WILL HAVE A SECTION SOON WHICH WILL EXPLAIN BOARD ERRORS ON THE MOD-8 BOARD SETS AND OTHER THINGS OF INTEREST TO MOD-8 USERS.



* NOT NECESSARY BUT IMPROVES RIPPLE REJECTION & TRANSIENT RESPONSE (IF NOT IN PLACE DO NOT SHORT TERMINAL #1 TO GND)

** NEEDED FOR STABILITY

NOTE: CENTER TAP OF XFORMER MUST BE GROUNDED SINCE IT IS USED AS TWO DISTINCT XFORMERS WITH TWO HALFWAVE RECTIFIERS

POWER SUPPLY

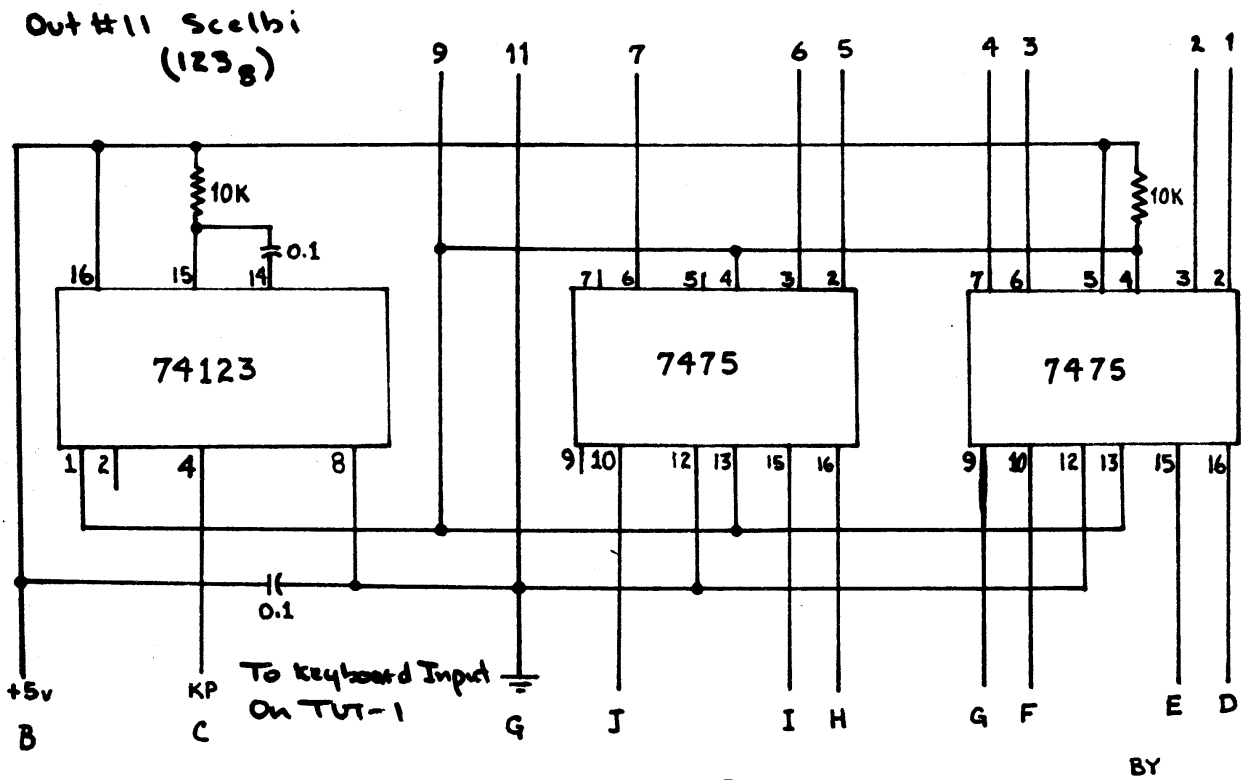
BY

ROBERT SWARTZ

GREGG WEBER, 1000 PLAZA DR., APT. 311-C, STATE COLLEGE, PA 16801 IS A SENIOR IN EE AT PENN STATE. HIS MARK-8 WAS RUNNING IN NOV. WITH AN ASCII KEYBOARD, A TVT, AND A CASSETTE MODEM. HE HAS ACCESS TO A PDP-10 AND SEVERAL PDP-8'S AND IS WILLING TO COPY PROGRAMS FROM ONE FORMAT TO ANOTHER ON A LIMITED BASIS. HIS CASSETTE MODEM IS SIMILAR TO PHIL MORK'S (NL #4) BUT USES A UART. HE RECORDED AND VERIFIED OVER 10:6 BITS WITH NO ERRORS BUT FOUND THAT ON SOME DAYS, TIMING & FREQ. ADJUSTMENTS MUST BE RESET TO COMPENSATE FOR CHANGES IN TAPE SPEED. FIGURING 1/2 THE SPEED ERROR IN RECORDING AND 1/2 IN PLAYBACK, A MAXIMUM SPEED ERROR OF 2.8% OF NOMINAL IS NECESSARY FOR TAPE EXCHANGE IF TAPES ARE TO BE TRADED WITHOUT ERRORS. (JIM FRY DID THE SAME CALCULATION AND CAME UP WORRIED.) COMMON CASSETTE UNITS, ESPECIALLY EL CHEAPOS, WILL NOT BE THIS ACCURATE. THIS CAN BE SOLVED BY 1) SHORTER WORD LENGTHS OF 4 BITS AS IN SCELBI. 2) DON LANCASTER'S AMPLITUDE MODULATED CLOCK AND 3) GREGG'S SOLUTION, RECORDING AN AGREED UPON TEST WORD AT THE BEGINNING OF THE TAPE WHICH CAN BE SAMPLED BY SOFTWARE TO SET UP PROPER READING SPEED. HE SUPPLIED A COPY OF HIS KEYBOARD LOADER PROGRAM WHICH ACCEPTS OCTAL PROGRAM ENTRY, DUMPS MEMORY IN OCTAL ON THE TVT, AND EXECUTES PROGRAMS IN MEMORY. HE WILL SOON ADD CASSETTE LOAD AND DUMP ROUTINES. A LISTING IS AVAILABLE FOR A SASE AND 20 CENTS IN STAMPS.

LESTER C. WARD, BOX 351, MANEO, NC 27954 IS A FIELD ENGINEER FOR WESTINGHOUSE. HE GOT HIS MARK-8 RUNNING JUST AFTER CHRISTMAS. HE USED MOLEX SOCKET PINS THRUOUT AND HAS A SWTP KEYBOARD. HE SUPPLIED A PROGRAM WHICH CONVERTS THE KEYBOARD 0-7 KEYS INTO OCTAL FORMAT AND ENTERS IT IN MEMORY. IT WILL BE SUPPLIED WITH GREGG WEBER'S REPRINT ABOVE.

DR. GEORGE L. HALLER, 1500 GALLEON DR., NAPLES, FL 33940 SUPPLIED THE INTERFACE FOR A TVT-1 TO A SCELBI COMPUTER SHOWN BELOW. A PROGRAM FOR THIS INTERFACE WHICH ACCEPTS A CHARACTER, PRINTS IT ON THE TV, AND STORES IT IN MEMORY WHICH CAN BE DUMPED AS A SUBROUTINE OF THE PROGRAM IS INCLUDED. HE SAYS HIS GOLF HANDICAP PROGRAM WORKS GREAT. (MAYBE HE'LL BE WILLING TO SUPPLY THIS ONE TOO) HE HAS AN ORDER IN FOR A 9K ALTAIR 8800.



BY

DR. GEORGE L. HALLER

14 MAR 75

SCELBI-TO-TVT I INTERFACE

```
003 000 056   SET MEMORY
003 001 005
003 002 066
003 003 000
003 004 125   SET INPUT LATCH
003 005 111   INPUT
003 006 240   SET S FLAG
003 007 120   IS THEIR A CHAR.
003 010 005   NO. GO BACK
003 011 003
003 012 370   LOAD CHAR.
003 013 060   INL
003 014 110   IS PAGE FULL
003 015 020
003 016 003
003 017 050   INH
003 020 106   GO TO OUTPUT
003 021 026
003 022 003
003 023 104   GO BACK FOR
003 024 004   NEXT CHAR.
003 025 003
003 026 123   OUT TO TVT
003 027 026   TIME DELAY
003 030 004
003 031 031
003 032 110
003 033 031
003 034 003
003 035 021
003 036 110
003 037 031
003 040 003
003 041 007   GO BACK TO 023
003 042 056   SET MEMORY
003 043 005   FOR OUTPUT
003 044 066
003 045 000           PROGRAM ASCII KEYBOARD TO
003 046 307   LAM     TV TYPEWRITER AND TO MEM-
003 047 074   IS IT A ORY.  STARTS AT 003-000 THRU
003 050 377   377     003-041.
003 051 150   YES
003 052 067   GO TO HALT
003 053 003
003 054 106   NO GO TO PROGRAM DUMPS MEMORY INTO THE
003 055 026   OUTPUT  TV TYPEWRITER.  STARTS AT
003 056 003           003-042 THRU 003-067
003 057 060   INL
003 060 110   IS L 000
003 061 064   GO TO NEXT PAGE
003 062 003
003 063 050
003 064 104   GO BACK FOR
003 065 046   NECT CHAR.
003 066 003
003 067 377   HALT
```

NOTES: THIS PROGRAM IS SET-UP FOR SCELBI KEYBOARD INTERFACE WHICH REQUIRES OUTPUT 125 TO SET LATCH FOR NEXT CHARACTER. TVT TYPEWRITER IS THE RE MODEL BY LANCASTER WITH C-17 ON CURSOR BOARD CHANGED TO 0.68 UFD. MEMORY LOADED INTO PAGE 005 AND SUCCEEDING PAGES.

ERIC SCHOTT, 208 14TH AVE., JANITA, ALTOONA, PA 16601 FINDS THE BOOKLET FORMAT AWKWARD SINCE HE PREFERS TO PUNCH 3 HOLES AND PLACE THEM IN A THREE-RING NOTEBOOK. HE PROPOSED A NON-REDUCED FORMAT AND A REDUCED FORMAT WHICH MADE GOOD SENSE SO WE'RE TRYING IT FOR THIS ISSUE. IT WILL REMAIN STANDARD FOR THE NEXT 6 ISSUES UNLESS SOMEONE COMES UP WITH A VERY CONVINCING ARGUMENT AGAINST IT.

HE SUGGESTS THAT A CONVENTION BE HELD TO FINALIZE A STANDARDIZATION PROPOSAL. HE SUGGESTS CHICAGO OR PERHAPS THE 1975 NCC IN CALIF.

D. MILLER, 1191 RISA PLACE, SANTA ANA, CA 92705, (714)-838-0070 (AFTER 7 PM) HAS A LISTING OF PERIPHERAL EQUIPMENT HE ACQUIRED RANGING IN PRICE FROM $250 TO $3000. WRITE HIM IF YOUR INTERESTED.

ADAM TRENT, BENDIX, BOX A, ASCENSION, PATRICK AFB, FL 32925 SAYS HE ORDERED A $38 POWER SUPPLY FROM ELECTRONICS UNLIMITED IN OLNEY, MD AND HAS ONLY A CANCELED CHECK TO SHOW FOR IT AFTER SEVERAL MONTHS AND SEVERAL LETTERS. (A LETTER THREATNING TO REPORT THEM TO THE POST OFFICE IF THEY DO DIRECT MAIL ADVERTISING HAS PROVED EFFECTIVE IN A FEW OTHER SITUATIONS. HIS SWTP KEYBOARD HUNG UP TOO. HE BAILED OUT AT A LOSS AND PURCHASED A CLARE/PENDAR MAGNETIC REED SWITCH KEYBOARD FROM HERBACH & RADEMAN, 401 E. ERIE AVE., PHILADELPHIA, PA 19134 FOR $40 THAT IS NICE AND HE WAS IMPRESSED WITH THEIR SERVICE.

TO REMOVE SURPLUS WIREWRAP PINS, HE HAS HAD GOOD LUCK USING A THIN LEAD MECHANICAL PENCIL AND A LIGHT HAMMER TO POUND THEM OUT. HE S AYS HE JUST RECENTLY DISCOVERED THE VIRTUES OF VEROBOARD AND WILL USE IT FOR MOST OF HIS FUTURE PROJECTS.

HE HOPES TO RUN INTO SOME OF THE PARTICIPANTS AT THE DAYTON HAMFEST SINCE HE'S PLANNED HIS VACATION AROUND IT.

STEVE WASH, 7277 BLUFF ACRES DR., GREENWOOD, IN 46142 HAS FOUND IT EXCITING TO WATCH THE HOBBY COMPUTER GROUP MUSHROOM INTO SOMETHING REALLY BIG, SORT OF ANALAGOUS TO THE ENTHUSIASM GENERATED BY PDP-8 USERS.

HE IS EMPLOYED BY INDIANA UNIVERSITY-PURDUE UNIVERSITY AT INDIANAPOLIS IN APPLICATIONS PROGRAMMING ON MINICOMPUTERS. HE WOULD LIKE TO RUN A MICROCOMPUTER ON INTERRUPTS. (FOR A PROFESSIONAL PROGRAMMER LIKE YOU STEVE, THAT MAY MAKE SENSE. FOR A HOBBYIST WITH SMALL MEMORY CONFIGURATIONS AND VIRTUALLY NO PROGRAMMING SKILL, IT SEEMS HOPELESSLY DIFFICULT.) HE PROPOSED SOME PRELIMINARY IDEAS FOR A PERIPHERAL FUNCTION PORT AND SUGGESTS ADDING A REAL TIME CLOCK TO THE MARK-8. HE WILL SUPPLY DETAILS AND SCHEMATICS AS SOON AS HE GETS THESE DESIGNED AND RUNNING.

DAVE CHAPMAN, 3420 S. PERRINS RD., MEMPHIS, TN 38118 CAME THRU WITH BEAUTIFUL SCHEMATIC DRAWINGS OF THE PRECISION SYSTEMS POWER SUPPLY. SEND A SASE AND 30 CENTS IN STAMPS FOR A PHOTOCOPY. (LATEST REPORTS ARE THAT PRECISION SYSTEMS HAS LONG SINCE SOLD THEIR SUPPLY AND THAT THEY DON'T EVEN ANSWER THE PHONE OR LETTERS NOW.)

H. N. CAMPBELL, RD 3- BROCKWAY ROAD, MORAVIA, NY 12118, (315)497-0239 TOOK A COUPLE OF MONTHS GETTING MARK-8 COMPONENTS, A COUPLE OF WEEKS ASSEMBLING, AND IT LOOKS LIKE A COUPLE OF YEARS TROUBLESHOOTING. HIS PROBLEM SEEMS TO BE BAD IC'S. MORAL, USE SOCKETS AND/OR CHECK OUT THE IC'S CAREFULLY. (A MARK-8 IC CHECKER PERIPHERAL HAS TO BE A HIGH PRIORITY PROJECT FOR SOMEBODY. WE COULD SURE USE IT.)

BRIAN M. CHESIRE, WA5PPOK, 113 E. ELBERTA #8, ATWATER, CA 95301 WAS A HAM FOR 8 YEARS AND AN ELECTRONIC TECH FOR 10 AND WASN'T INTERESTED IN COMPUTERS UNTIL HE READ THE NEWSLETTER AND SOME RECENT ARTICLES. HE WILL BUILD ONE SOON AND IS STILL TRYING TO DECIDE WHICH ONE.

OTTO BARTH, ELBA TOOL CO., 601 ESTES AVENUE, SCHAUMBURG, IL 60172, (312)894-4100 SAYS THAT ALL THAT RGS DOES IS ADVERTISE. HE STILL HASN'T RECEIVED HIS KEYBOARD ENTRY KIT WHICH WAS PAID FOR ON OCTOBER 3, 1974. HE GOT THE WIRE WRAP VERSION WHICH HE DESCRIBES AS A HELL OF A JOB BUT HE LIKED IT AND CHANGES ARE EASILY MADE. HE HAS HIS DOUBTS ABOUT RGS'S I/O AND IS CONSIDERING GOING TO SOMEBODY ELSE FOR PC BOARDS. HE SAYS THE MANUAL ISN'T WORTH THE PAPER ITS PRINTED ON.

JOHN C. NEVES, 930 PALO ALTO AVE., PALO ALTO, CA 94301 WOULD LIKE TO SEE A CATCHIER MORE ALL-ENCOMPASSING NAME LIKE "MICROCOMPUTER HOBBYISTS" OR SOMETHING LIKE THAT. HE PROPOSES THIS NOVEL SUGGESTION FOR MARK-8 BOARD USERS. THE BOARD HAS CONNECTOR SPACINGS THAT ARE THE REGULAR EDGE CONNECTOR SPACING SO FILE THE EDGES OF THE BOARDS SO THEY WILL PLUG RIGHT INTO THE CONNECTORS. THIS MAKES TROUBLE SHOOTING AND MAKING C HANGES EASIER.

KEN A. MCGINNIS, MD, PO BOX 2078, SAN MATEO, CA 94401 ORDERED 32 2102'S FROM JIM FRY AND 2 PHI-DECKS, A CASSETTE DECK THAT FEATURES COMPLETELY ELECTRONIC CONTROL, CAN SEARCH A 30-MINUTE CASSETTE IN 20-25 SECS, IS DUAL TRACK, AND HAS OTHER IMPRESSIVE SPECIFICATIONS. KEN SAYS HE WOULD SUGGEST ANYONE ELSE WANTING THEM TO ORDER THRU HIM SINCE THE COMPANY WILL TOTAL ORDERS FOR ONE YEAR FOR DISCOUNT. 1 COSTS $95, 10 COST $85, ETC. REQUEST INFORMATION FROM THE ECONOMY CORPORATION, PO BOX 25308, OKLAHOMA CITY, OK 73125 (405)528-8444-EXT. 76. (JIM FRY AND ONE OTHER PARTICIPANT ALSO SENT IN INFO ON THE PHI-DECKS.)

KEN THINKS THE ALTAIR 8800 IS A FANTASTIC UNIT AFTER USING BOB ALBRECHT'S PCC UNIT. HE SUGGESTS THAT IF YOUR NOT COMMITTED TO AN 8008, DO SOME SERIOUS STUDY ON 8080'S. THE INTERRUPT ON THE 8080 MAY BE WORTH THE PRICE DIFFERENCE.

KEN ALSO SUPPLIED A CALCULATOR INTERFACE THAT WILL BE INCLUDED IN THE NEXT NEWSLETTER.

M. PAUL FARR, 3723 JACKSTRADT ST., SAN PEDRO, CA 90731 SAYS PAUL MORK'S MUSIC PROGRAM WAS JUST TOO MUCH! PAUL HAS FINISHED A TARBELL CASSETTE INTERFACE AND IS TOTALLY IMPRESSED. HE HAS NOT HAD A BAD TRANSFER IN WEEKS OF STEADY USE USING A MODEL 3913A MONTGOMERY WARD CASSETTE MACHINE. IT IS COMPATIBLE WITH ANSI STANDARD, 800 BITS/INCH, 1500 BITS PER SEC, PHASE ENCODED FORMAT. 256 BITS LOADS IN 2 SECONDS.

HE SAYS ELECTRONICS HAS ALWAYS BEEN A FASCINATING EVER CHANGING FIELD BUT HE HAS NEVER BEEN INVOLVED IN ANY PASTIME AS EXCITING, FAST MOVING AND ENGROSSING AS THIS AMATEUR COMPUTER ACTIVITY (AND HE'S TRIED SOME PRETTY INTERESTING THINGS LIKE SOARING AND HANG-GLIDING).

VICTOR W. AMOTH & THOMAS R. AMOTH, 228 FOX ROAD, MEDIA, PA 19063 ARE A FATHER AND SON TEAM. SON TOM DESIGNS AND DEBUGS CIRCUITS THAT FATHER VICTOR BUILDS. A 22 PAGE DISSERTATION BY TOM WAS INCLUDED ON MARK-8 AND TVT SUBJECTS. (I'M STILL INVOLVED IN READING IT AND WILL DECIDE HOW TO GET THE INFORMATION TO PARTICIPANTS NEXT ISSUE.)

DOUG AAMOLD, #9 COLONIAL VILLAGE, BROOKINGS, SD 57006 LOANED ME A COPY OF THE ALTAIR 8800 MANUAL. HE SUGGEST THAT IT MAY HELP IN EVALUATION OF THE SYSTEM AND THAT MITS AT PRESENT SEEMS TO BE RELUCTANT TO OUTPUT MUCH DOCUMENTATION, SO CAREFUL CONSIDERATION IS WARRANTED. HE NOTES ALSO THAT THE 8101 USED FOR MEMORY SEEMS TO BE RATHER DIFFICULT TO GET HOLD OF.

GERALD MCKEE, PO BOX 4667, SAN JOSE, CA 95126 HAS A RUNNING RGS-008A WITH 2K OF MEMORY AND A SN001 CASSETTE PERIPHERAL. UNFORTUNATELY HE'S A TV BROADCAST ENGINEER THAT HAS BEEN OUT OF WORK NEARLY A YEAR AND WOULD APPRECIATE ANY EMPLOYMENT LEADS. DUE TO NECESSITY, HIS RGS COMPUTER, TVT, HAM AND TEST EQUIPMENT AND OTHER STUFF ARE FOR SALE. SEND A SASE FOR DETAILS.

DE WALTER EKSTRAND, PO BOX 1260D, SOUTH GATE, CA 90280 IS BUILDING A MARK-8 AND HAS ORDERED 2 ALTAIR 8800'S WHICH WILL BE USED AS A PROCESSOR FOR A DIABLO PRINTER AND RTTY 19, 32, & 33'S INTERFACED TO A SC1100 INTELIGENT TERMINAL ON PHONE LINES. HE HAS SHEET METAL EQUIPMENT AND MAY BE ABLE TO HELP OTHERS WITH CUSTOM WORK. HE WOULD LIKE TO HELP START A LOCAL GROUP IN THE LA AREA.

MICHAEL E. LINDSEY, 2625 FAIRGREEN DR., PITTSBURGH, PA 15241, (412)835-9126 HAS AN INTELLEC-8 CROSS ASSEMBLER RUNNING ON A PDP-10 AND WILL BE ABLE TO ASSEMBLE CODE FOR ANYONE THAT SENDS HIM A SOURCE DECK OR PAPER TAPE AND RETURN POSTAGE. HE CAN ALSO RUN FORTRAN, BASIC AND ALGOL PROGRAMS FOR YOU ON A LIMITED BASIS.

GARY E. JOHNEY, PSC BOX 6967, APO SAN FRANCISCO, CA 96237 CAN READ AND WRITE INTO MEMORY ON HIS MARK-8 BUT CAN'T GET PAST THE FIRST TEST. SO FAR HE HAS FOUND SIX BAD IEU IC'S.

JONATHAN A. TITUS, TYCHRON, PO BOX 242, BLACKSBURG, VA 24060 (703)951-9030 SUGGESTS THAT EVERYONE SEND INFORMATION IN IN A STANDARD FORMAT, READY FOR PUBLICATION. EACH COULD THEN BE ASSIGNED A TECHNICAL REPORT NUMBER AND ABSTRACTS COULD BE PRINTED IN THE NL'S AND PARTICIPANTS COULD ORDER COPIES AT A COST TO COVER COPYING AND MAILING. THIS WOULD TEND TO CULL OUT JUNK MATERIAL SINCE PEOPLE WOULD NOT BE WILLING TO PUT TIME IN ON IT. (IT SEEMS A LITTLE EARLY TO BE TOO RESTRICTIVE. NEWLETTERS USUALLY DIE BECAUSE PEOPLE QUIT SUPPLYING MATERIAL. LET'S KEEP IT EASY FOR THE PRESENT AND SOMEHOW WE'LL TRY TO PUT SOME ORDER INTO THE MATERIAL SUBMITTED.) MR. TITUS SAYS EL INSTRUMENTS, 61 FIRST ST., DERBY, CT 06418 WILL BE ANNOUNCING AN 8080 SYSTEM SOON. HE REPORTS THAT HE HAS HAD AN OPPORTUNITY TO TALK WITH OTHER MICROPROCESSOR USERS AND THAT IT SEEMS NO ONE IS VERY IMPRESSED WITH THE ALTAIR 8800 SYSTEM. MITS DID A SLICK PROMOTIONAL JOB BUT THEY ARE SLOW TO DELIVER AND HE UNDERSTANDS THAT MANY OF THE PERIPHERALS MENTIONED IN THEIR ADS SIMPLY DON'T EXIST. MR. TITUS SAYS HE WILL BE HAPPY TO PUT TOGETHER SOME INFO ON THE INEXPENSIVE PAPER TAPE READER AND WILL SUBMIT IT AS THE FIRST TECHNICAL REPORT.

JIM MCCORD, 330 VEREDA LEYENDA, GOLETA, CA 93017 HAS A TVT RUNNING AND HOOKED TO AN OLD HONEYWELL 112 THRU A SERIAL UART INTERFACE. HE HAS ADDED SCROLLING TO HIS TVT (TRY DAVE HOGG'S CIRCUIT). HE'D LIKE A DENSER DISPLAY. (WRITE THE DIGITAL GROUP AND ENCOURAGE THEM TO RUSH THE 16 LINE, 64 CHARACTER DR. SUDING UNIT TO COMPLETION.) JIM IS GOING TO BUY AN ALTAIR 8800 AND THINKS THAT THE PRE MARCH 1 PRICE WAS A LOSS LEADER AND THAT THEY PLANNED TO MAKE IT UP ON THEIR PERIPHERALS. JIM IS VERY INTERESTED IN A BASIC. HE IS PLEASED WITH JAMES AS A SUPPLIER--UNBELIEVABLE QUICK SERVICE, LOW FAILURE RATE, AND QUICK REPLACEMENT OF BAD PARTS. HE SAYS THAT THE INTERSIL PDP-8 CHIP IS AVAILABLE NOW. (PLEASE GET ME MORE INFO ON THIS AVAILABILITY QUICK.) CAN ANYBODY RECOMMEND A BEGINNERS INTRO TO DIGITAL ELECTRONICS THAT WILL BRING A NOVICE UP TO THE LEVEL NECESSARY TO MAKE EFFECTIVE USE OF SOMETHING LIKE THE TTL COOKBOOK.

R. RILEY, PULSAR R & D LABORATORIES, PO BOX 4310, FLINT, MI 48504 WANTS TO CONTACT OTHERS INTERESTED IN BUYING A 16 BIT, 1.6 MICROSEC, 1K WORD COMPUTER FOR UNDER $1000 AND A DUAL CASSETTE UNIT FOR UNDER $200 PER PAIR. HE WANTS $5 TO COVER PRINTING, HANDLING, AND POSTAGE COSTS. (I SUGGESTED TO HIM THAT PEOPLE ARE GETTING TIRED OF BUYING $5 "PIGS IN A POKE" AND THAT A LITTLE MORE INFORMATION WOULD SEEM NECESSARY. A 4K PDP-11/LSI CAN BE OBTAINED FOR UNDER $1000 AND THE CASSETTE DECKS SOUND LIKE PHI-DECKS. HE'S GOING TO HAVE TO SEND MORE INFO THAN THAT BEFORE I'LL RECOMMEND THAT YOU SPEND $5 ON AN INFO PACKAGE.)

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035, 472-6660 DAYTIME, 432-6432 EVENINGS IS OUR MOD-8 CONFIGURATION EXPERT. HE HAS HIS OWN SYSTEM RUNNING BEAUTIFULLY AND HAS RECENTLY DEBUGGED ONE FOR THE UNIVERSITY OF CHICAGO. HE IS GOING TO SEND MATERIAL FOR A SPECIAL MOD-8 SPECIAL INTEREST SECTION FOR THE NL AND IS HARD AT WORKING DESIGNING A CIRCUIT FOR THE CHANGE OVER TO THE 8080 SINCE MIL'S BANKRUPTCY CUT OFF THE FORMER SOURCE OF THEM. HE LUCKED OUT AND OBTAINED ONE OF THE MONITOR-8 ROM'S WITH A BAD BIT AND HAS IT RUNNING OK NOW AND IS VERY IMPRESSED WITH IT. IF YOUR PLANNING A MOD-8, IT WILL BE WORTH YOUR TIME TO CONTACT ROBERT FIRST.

KENDALL STAMBAUGH, 5009 GUIDE MERIDIAN, BELLINGHAM, WA 98225, 734-9424 SAYS THE NL HAS OPENED UP A NEW WORLD OF WHAT CAN BE FOR HIM AND THAT HE HAS TO FIGHT THE URGE TO START ON ALL FRONTS TRYING TO CATCH UP WITH EVERYONE OVERNIGHT.

DAVID A. BARKER, 1101 GRAD HOUSE WEST, WEST LAFAYETTE, IN 47906 (317)-743-5107 WILL FINISH HIS MARK-8 IN TWO WEEKS, AND HIS PHD SOON. HIS FIRST MAJOR PROJECT WILL BE AN ADAPTIVE MORSE CODE RECEIVER. HE'S WA9NQN, AMATEUR EXTRA.

ROGER L. SMITH, SMITH ENTERPRISES, 4501 E. NANCY LANE, PHOENIX, AZ 85040, (602)968-0774 GOT SEVERAL REQUESTS AFTER HIS RE UART ARTICLE APPEARED FOR AN ASCII TO BAUDOT CONVERTER. HE SAYS ITS BEST TO HANDLE IT WITH SOFTWARE BUT THERE ARE MANY HAMS AND OTHERS THAT ARE USING BAUDOT TTY'S WITHOUT A COMPUTER THAT ARE STILL INTERESTED IN HARDWARE CONVERSION. IT'S COMPLICATED BUT CAN BE DONE WITH $11 WORTH OF IC'S. RE HAS AGREED TO PUBLISH THE CONSTRUCTION PLANS BUT MR. SMITH HAS AGREED TO SEND AN ADVANCE COPY TO THOSE INTERESTED FOR $1.00 TO COVER XEROX COST. THE ASCII TO BAUDOT CONVERTER WITH PC BOARD SHOULD BE AROUND $20 AND BAUDOT TO ASCII WOULD ADD ANOTHER $10 OR SO. HE ALSO HAS AN UPCOMING ARTICLE ON PROMS IN R-E AND ANOTHER ON UARTS IN P-E.

MAYNARD M. DYE, 4986 SAN JOAQUIN DR., SAN DIEGO, CA 92109 (714)274-8406 CANCELLED HIS ORDER FOR AN ALTAIR 8800, ORDERED A CREED TTY FROM WILCOX ENTERPRISES, AND A KEYBOARD FROM MICRO-MINI-MART. HE'S TRYING TO DECIDE WHICH CPU CONFIGURATION TO USE AND PRESENTLY FAVORS THE MIL-MOD-8 VERSION. (WITH THE DEMISE OF MIL, CHECK CAREFULLY TO FIND OUT WHAT KIND OF DELIVERY YOU CAN GET BEFORE SENDING MONEY TO ANYONE.) HE WILL USE HIS COMPUTER TO DO ALL OF HIS MOTEL BOOKKEEPING RECORDS AND HIS PERSONAL INCOME TAX RECORDS.

J. A. STARK, MD, 485-34TH ST., OAKLAND, CA 94609 ORDERED 24 2102'S FROM JIM FRY AND HAS MODIFIED THE MARK-8 MEMORY BOARD AND IS WILLING TO SEND US THE CHANGES NECESSARY. HE SAYS HE MAY NEVER DO ANOTHER BIG PROJECT WITHOUT PLATED THRU HOLES AND HAS HAD A BAD TIME WITH THE WIRED BUS AND IS REPLACING IT WITH MOLEX CONNECTORS. HE INTENDS TO TRY THE MOD-8 VERSION SOON.

R.S. FORMAN, 2421 N.W. JOHNSON, PORTLAND, OR 97210 HAS PURCHASED THE $9 ALTAIR 8800 CONSTRUCTION MANUAL.

GARY W. KRAMER, PURDUE UNIVERSITY, DEPT. OF CHEM., WEST LAFAYETTE, IN 47907 IS A RESEARCH ASSISTANT AND WILL USE A MARK-8 AS A FRONT END PROCESSOR/BUFFER FOR A HP9820 PROGRAMMABLE CALCULATOR WHICH WILL ALLOW THEM TO INTERFACE THEIR GAS CHROMATOGRAPHS TO THE CALCULATOR. THE MICRO WILL BE A FANCY DATA BUFFER WHICH WILL FEED DATA INTO THE CALCULATOR. GARY SUGGESTS LOOKING INTO THE MONOLITHIC SYSTEMS MEMORY ARRAY OR THE DATARAM MINI CORE MEMORY AVAILABLE THRU ALTAJ ELECTRONICS. HE HAS A SET OF EACH AND SAYS THEY ARE NICE BOARDS WITH GOOD DOCUMENTATION, ESPECIALLY T HE DATARAM UNIT.

ROBERT E. WHITMOYER, MD, OLD DOLLAR RD., BOX 13, RD #1, HEUVELTON, NY 13654 IS AN EYE SPECIALIST AND IS RESEARCHING A SYSTEM TO HANDLE OFFICE A CCOUNTING, MEDICAL FORMS, AND DATA PROCESSING. HE QUESTIONED HEATHKIT FOR INFORMATION ON UPCOMING KITS BUT THEY WOULD NOT COMMENT. (THAT PROBABLY MEANS THEY ARE ABOUT TO ANNOUNCE ONE.) HE WOULD LIKE TO DO SOME MEDICAL INSTRUMENTATION ON ELECTRICAL MANIFESTATIONS OF THE VISUAL SYSTEM ALSO.

W. H. BURTNER, RR2, BOX 267, VALPARISO, IN 46383 SAYS HE GOT THE RGS-008A PC BOARD KIT AND ITS A REAL TINKER TOY JOBBIE. THE I/O DEVICE IS A SOCKET WITH NO PLACE TO MOUNT IT. THE MANUAL IS 25 PAGES NOT WORTH THE PRICE OF THE PAPER. HE FEELS EVEN WORSE WHEN HE COMPARES IT TO THE ALTAIR 8800 KIT HE JUST RECEIVED. ALL FIRST CLASS MATERIAL AND A REALLY SHARP LOOKING RIG. THE SWTP TVT-II COMES AS TWO PC BOARDS AND A HANDFUL OF PARTS. THEY SAID "NO CASE" BUT HE COULDN'T BELIEVE THEY WOULD NOT FURNISH SOME KIND OF CHASSIS TO MOUNT IT ON. IT WORKS GREAT--BUT WHAT A HASSLE TO GET IT ALL TOGETHER. WOULD YOU BELIEVE HE ALSO HAS A MARK-8 UP AND RUNNING THAT WILL BE USED TO CONTROL A MUSIC SYNTHESIZER.

PERRY A. COLSTROM, 5750 N.E. MADISON ST., MINNEAPOLIS MINN 5543[illegible] OCCASIONALLY COMES ACROSS PAPER TAPE PUNCHES AND READERS, CARD RE[illegible] ERS, MAG TAPE HEADS & DRIVES, AND KEYBOARDS. YOU CAN SEND HIM A S[illegible] FOR CURRENT OR FUTURE ITEMS AND PRICES. HE WILL INCLUDE DOCUMENTAT[illegible] WHEN POSSIBLE. (PLS NOTE THAT THE ADDRESS GIVEN ABOVE IS CORRECT... THE ONE IN NL #5 IS NOT.)

D.W. EKSTRAND, P.O. BOX 1260, SOUTH GATE CA 90280, RECOMMENDS A BOOK ENTITLED "INTRODUCTION TO DATA PROCESSING" FOR THOSE IN NEED OF A GOOD BASICS BOOK (AND ALSO FOR THOSE COMPLAINING ABOUT THE 8080 HEX). IT'S PUBLISHED BY PRENTISS HALL AND THE AUTHOR IS FR CRAWFORD (LIB CODE NUMBER IS 651.26).

K.W. HAMILTON, DARTEK ELECTRONICS, P.O. BOX 2460, DARTMOUTH NOVA SCOTIA B2W 4A5, WILL GLADLY PROVIDE A FLYER LISTING PARTS AND PRICES TO ANY OF YOU CANADIANS HAVING TROUBLE GETTING PARTS.

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO CA 92027, IS VERY HAPPY WITH THE SCROLLING MODIFICATION PROVIDED BY MR. HOGG (AND INCLUDED IN THIS MONTH'S NL). HE ALSO HAS THE DIGITAL GROUP'S CASSETTE INTERFACE UP AND WORKING. HE MENTIONS THAT THE ZENER DIODE IN THE MODULATOR CIRCUIT IS BACKWARDS. ALSO, THE 470 OHM RESISTOR IN THE DETECTOR CIRCUIT SHOULD BE SELECTED FOR A 5 VOLT OUTPUT (HIS PUT OUT 8 VOLTS PRIOR TO MAKING THE CHANGE). AND, USING PARALLEL IN AND OUTPUTS WILL REDUCE THE SOFTWARE. HIS SWTP KEYBOARD PUTS OUT A SLASH WHEN NO KEY IS PRESSED, AND HE IS WONDERING IF OTHERS ARE GETTING THE SAME RESULT?

DAVID YULKE, 121 LIBERTY AVE., SILDEN N.Y. 11784, WILL BE OFFERING A PROM PROGRAMMING SERVICE AFTER APRIL 15TH. HE WILL CHARGE $5 TO PROGRAM YOUR CHIP. THE PROGRAM SHOULD BE SENT TO HIM ON PAPER TAPE IN BNPF, HEX, OR OCTAL (MONITOR-8) FORMAT. HE CAN HANDLE 1702, 1702A, 5202, AND 5203'S. HE IS WORKING ON A UART COMPATIBLE VERSION OF MONITOR-8 & HAS MODIFIED THE LOAD SYMBOLIC & PROM PROG ROUTINES. HE'LL SUPPLY A LISTING AS SOON AS IT IS THOROUGHLY DEBUGGED.

J. SCOTT WILLIAMS, PO BOX 932, BELLINGHAM, WA 98225, IS QUITE ENTHUSIASTIC ABOUT DR. SUDING'S VIDEO GRAPHICS WORK BECAUSE OF THE POSSIBILITIES OFFERED FOR MICROCOMPUTER GAMES. (AND GAMES IS HIS GAME)

W.H. BURTNER, RR2 BOX 267, VALPARAISO IND 46383, HAS ADDED TWO 4K BOARDS OF 2102'S TO HIS MARK-8'S ORIGINAL 1K AND IS HAVING DECODING PROBLEMS (THE 1K SHOWS UP IN THE HIGHER ADDRESSES & INTERFERES WITH THE NEW MEMORY). IF ANYONE COULD OFFER A HELPING HAND IT WOULD BE APPRECIATED. HE IS ALSO CURRENTLY INVOLVED IN THE CONSTRUCTION OF AN ALTAIR 8800 AND JUST ORDERED A CREED TTY FROM BOB COOK.

PAUL E. FEICK, INTERMOUNTAIN COMPUTERIZED BUSINESS SYSTEMS, 1105 MALA DRIVE, LAYTON UTAH 84041, IS OWNER/MANAGER OF I.C.B.S. AND PLANS TO USE THE ALTAIR 8800 HE RECENTLY ORDERED TO CUT DOWN ON THE TELEPHONE AND CPU EXPENSES INCURRED BY HIS BUSINESS. HIS SYSTEM WILL EVENTUALLY HAVE THE TVT II, CASSETTE STORAGE, HS PRINTER AND USE BASIC AS THE PROGRAMMING LANGUAGE.

MORRIS KRIEGER, 37 EIGHTH AVENUE, BROOKLYN N.Y. 11217, WOULD LIKE TO SEE SOMETHING LIKE A HEATHKIT INSTRUCTION SHEET (WRITTEN IN LAYMEN'S LANGUAGE) FOR THE CONSTRUCTION OF A MARK-8 (AND ALSO SOMETHING TO CLEAR UP SOME OF THE TERMS WHICH ARE CONSTANTLY BEING THROWN HIS WAY). IF SOMEONE IN HIS AREA HAS A MARK-8 UP AND RUNNING (OR BUILDING) AND WOULD LIKE TO SHOW IT OFF, THERE'S A GOOD CHANCE THAT MR. KRIEGER WOULD APPRECIATE AN INVITATION TO COME OVER AND SEE IT.

RICHARD P. INZINA, 4415 WHITE ACRES RD., CLARENCE N.Y. 14031, IS STILL IN THE CONSTRUCTION STAGE WITH HIS MARK-8. HE JUST ORDERED A CREED TTY AND IS INTERESTED IN BUILDING A 5 LEVEL PT READER. THE MARCH 73 ISSUE OF 73 MAGAZINE HAS AN ARTICLE ON A 5 LEVEL READER WHICH USES A TD (TAPE DISTRIBUTOR). IF ANYONE KNOWS WHERE HE CAN GET A TD, PLS LET HIM KNOW. HE HAS HAD NO LUCK AT ALL IN GETTING A RESPONSE FROM PRECISION SYSTEMS REGARDING THEIR POWER SUPPLY.

JOHN W. CHOCHRAN, PO BOX 966, JESUP, GA 31545 HAS ORDERED SOME PARTS FOR THE MIL MOD-8080. HE ALSO SENT CLIPPINGS FROM "ELECTRONIC NEWS" ON MIL'S BANKRUPTCY AND THE TI MICROPROCESSOR PROGRAM ON TV STARTING APRIL 15.

TIM RAND, 59 WILLINGTON OACKS, STORRS, CT 06268 SAYS HE IS VERY EXCITED ABOUT EVERYTHINGS THAT IS GOING ON. IT SEEMS TO HIM THAT A WHOLE GANG OF COMPUTER HOBBYISTS SPRANG UP FROM NOWHERE. (NOW, HOW CAN WE CONVICE THOSE OLD TUBE TV MEN AT RADIO-ELECTRONICS AND POPULAR ELECTRONICS THAT THIS IS TRUE AND GET SOME CONTINUITY IN THEIR TECHNICAL AND PROJECT ARTICLES.) HE IS PUTTING OFF CONSTRUCTION FOR A WHILE. HE'S INTERESTED IN COMPUTER GAMES AND GRAPHICS AND WILL BUILD A POWERFUL DISPLAY PROCESSOR AND INTERFACE IT TO A MARK-8. HE WAS A PPOGRAMMER FOR 10 YEARS BUT IS NOW A DIGITAL DESIGN ENGINEER WORKING ON DATA GENERAL NOVA SYSTEMS.

DAVID F. STOUT, 717 SARANAC DRIVE, SUNNYVALE, CA 94087 (408)736-0846 HAS BUILT A TVT AND IS HALF FINISHED WITH A MARK-8. HE INTENDS TO EXPLORE THE POSSIBILITIES OF USING THE MARK-8 TO CONTROL AN ELECTRONIC MUSIC SYNTHESIZER.

GEORGE TATE, 3544 DANLIA AVE., LA, CA 90026 WAS UNHAPPY WITH MITS'S RESPONSE TO OUR REQURESTS FOR I/O INFORMATION AND IS WRITING THEM WITH HIS FEELINGS ON THE PROBLEM. HE HAS AN 8800 ORDERED WITH 4K OF MEMORY AND PARALLEL I/O PORT. HE SUGGESTS THAT A WAY OF COUNTERING THEIR RESPONSE IS BY ALL 8800 USERS EXCHANGING INFO ON OPTIONS THAT THEY BUY SO OTHERS CAN DUPLICATE THEM AT LOWER COST.

EDWARD C. EPP, SWAN LAKE CHRISTIAN CAMP, VIBORG, SD 57070 WILL START A MICROCOMPUTER PROJECT AS SOON AS HE CAN GET THE FINANCES FIGURED OUT. HE'S AN ELECTRONICS INSTRUCTOR AT FREEMAN JUNIOR COLLEGE AND PLANS TO USE HIS MACHINE FOR TEACHING IN HIS CLASSES.

DONALD K. ABELES, 7054-25TH N.E., SEATTLE, WA 98115 (206)525-7764 WROTE MITS STATING THAT DUE TO THEIR LACK OF COOPERATION WITH THE MICRO-8 USER GROUP, HE WAS CANCELING HIS $1000 ORDER. HE HAS A SCELBI-8H KIT THAT WORKED THE FIRST TIME HE TURNED IT ON. HE HAS ORDERED THE SCELBI TAPE AND TTY INTERFACE. (AFTER YOU SEE THE PDP-11/LSI YOU'LL BE MOST HAPPY YOU CANCELLED WITH MITS.)

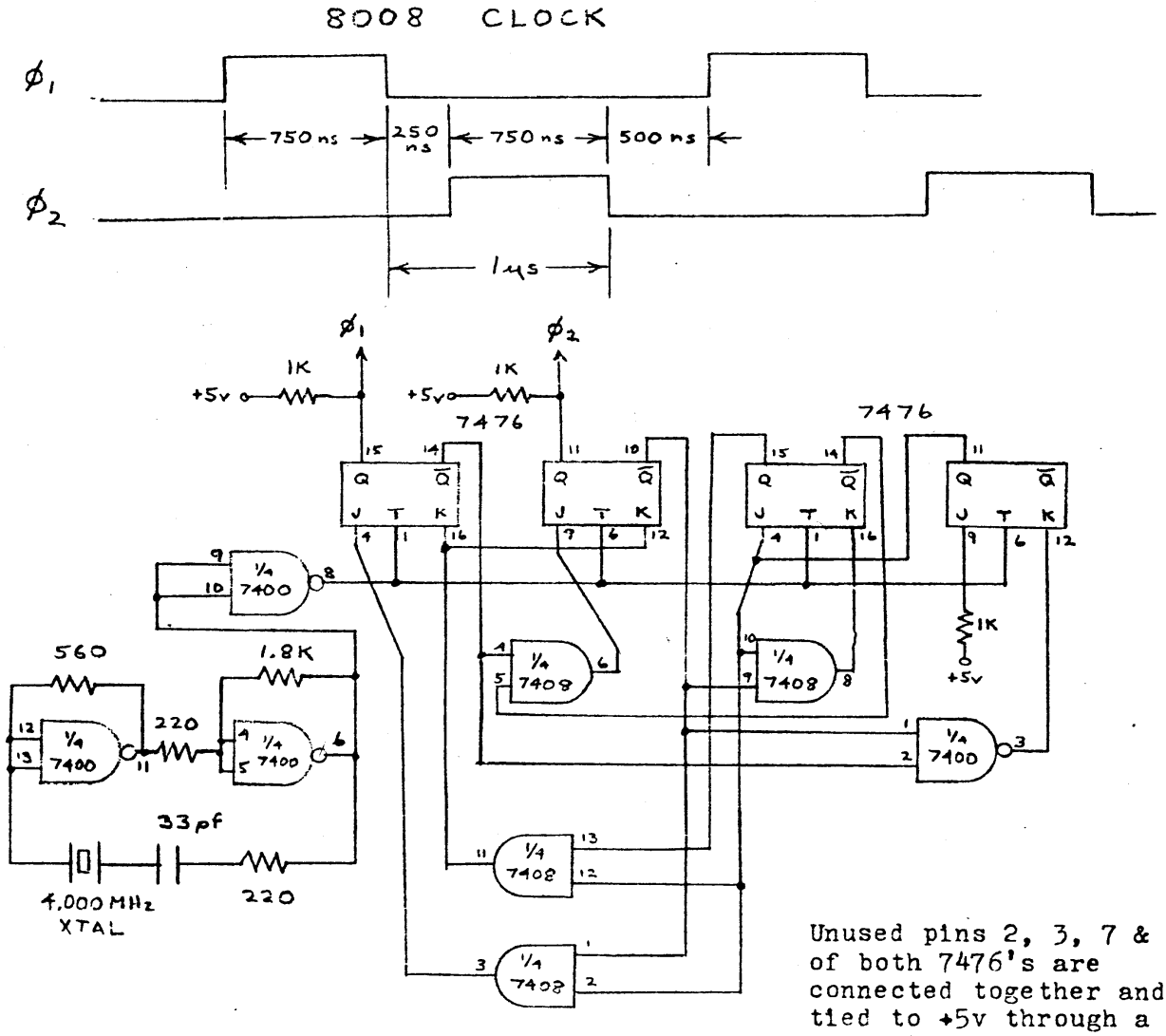
O.C. TASKER, PO BOX 168, ROMNEY, WV 26757 HAS COMPLETED HIS MARK-8 AND IS STARTING ON THE 7 INCH COMPUTER HOBBYIST GRAPHICS DISPLAY. HE HAS AN M-15 TTY AND M28 REPERF AND TD. FOR A POWER SUPPLY, HE USED FOUR 6 AMP-HOUR SURPLUS NI CAD CELLS AND AN UNFILTERED BATTERY CHARGER. THE -9 VOLTS WAS OBTAINED FROM A +5 TO -9 CONVERTER THAT WAS PART OF A SOLID STATE MEMORY SOLD BY ALTAJ. HE IS USING AN 8008-1 BUT IT WILL NOT RUN AT 800 KC. I SUGGESTED THAT HE USE THE BUS LOAD SWITCHING CIRCUIT IN THE INTEL MCS-8. ANY OTHER SUGGESTIONS?

JOHN W. NALL, PO BOX 1563, TALLAHASSEE, FL 32304 SUGGESTS DIFFERENT NL EDITORS FOR EACH OF THE FOLLOWING SPECIAL INTEREST GROUPS: 1) HAM RADIO ENTHUSIASTS. 2) SOFTWARE NUTS 3) HARDWARE NUTS 4) COMPUTER APPLICATIONS.

WILLIAM PARRISH, PARRISH SOLID STATE POWER SYSTEMS, 127 WINFIELD AVE., JERSEY CITY, NJ 07305 WANTS TO OFFER 5 VOLT 3 AMP POWER SUPPLIES FOR $75.--. HE OFFERS A SPECIFICATION MANUAL FOR $1.50 TO MICRO-8 PARTICIPANTS THE COST OF WHICH WOULD APPLY TO THE PURCHASE OF THE POWER SUPPLY. (THE MANUAL I RECEIVED CONTAINED NO CIRCUITS AND NO SPECIFICATIONS.) HE SAYS HE IS USING ALL BRAND NEW PARTS AND WILL SEND A COMPONENT LIST IF YOU WANT TO SEE WHY HE IS ASKING $75 FOR THIS UNIT.

HE SAYS ALL DC COMMONS FROM POWER SUPPLIES AND PC BOARDS SHOULD TERMINATE AT ONE POINT ONLY AND THAT THIS POINT SHOULD BE TIED TO EARTH GROUND TO MINIMIZE NOISE PROBLEMS. ALSO MAKE ALL GROUND WIRES AS HEAVY AS POSSIBLE.

WALTER M. WHITE, 343 S. MADISON AVE., 18, PASEDENA, CA 91101 WONDERS IF THERE IS ANY THOUGHT TO STARTING A SOFTWARE LIBRARY. (JOE CIMMINO HAS THE ONLY PLANS THAT WE KNOW ABOUT AND HE HASN'T FIRMED THINGS UP YET. IN THE MEANTIME, THE CABRILLO COMPUTER CENTER WILL ATTEMPT TO DISTRIBUTE SOFTWARE OF GENERAL INTEREST. WRITE DIRECTLY TO THE AUTHOR FOR SPECIAL ITEMS.) HE WARNS THAT THE MARK-8 CLOCK DOES NOT MEET INTEL'S MINIMUM PULSE WIDTH SPEC OF 700 NS FOR PHASE 1 AND 550 NS FOR PHASE 2. THE MARK-8 CLOCK IS ONLY 500 NS WIDE. HIS CIRCUIT BELOW MEETS SPECS BUT RESULTS IN A SLOWER CLOCK RATE OF 444 KHZ INSTEAD OF 500 KHZ. HE IS WORKING ON A COLOR, VARIABLE CHARACTER SIZE TVT WHICH IS HALF FINISHED. IT USES THE MOTOROLA MCM6571L UPPER & LOWER CASE CHARACTER GENERATOR AND WILL DISPLAY 32 LINES OF 64 CHARACTERS WITH VIDEO INJECTED DIRECTLY INTO THE VIDEO AMP OF THE TV. HE ALSO SUPPLIED A MEMORY CHECKING PROGRAM WHICH WE'LL SEND YOU COPIES OF FOR A SASE AND 30 CENTS IN STAMPS. IT CONTAINS A NEAT RANDOM NUMBER GENERATOR THAT MAY BE USEFUL IN OTHER PROGRAMS. WALTER IS PARTICULARLY INTERESTED IN A FLOATING POINT PACKAGE. CAN ANYBODY HELP HIM OUT?



Unused pins 2, 3, 7 & 8 of both 7476's are connected together and tied to +5v through a 1K resistor.

George Fischer, Staten Island, N.Y. received his Altair 8800 kit and had it 95% complete within two weeks. Regarding the Altair for the hobbyist, he is optimistic. First, it fills a need as an easy to assemble, attractively cased mini. Second, add-ons can come from the hobby environment as well as MITS.

George is also building M P Publishing's ECS 8008 system. This project requires a lot more effort but he expects to learn a lot more from it.

And, from John Craig.....

NEW ADDITIONS TO THE ROSTER

Jon Turner, 301 Ocean Ave. #8, Santa Monica CA 90402, would like some suggestions regarding the best kit to build. Mr. Farr?

D.A. Powell-Williams, 6023 S.E. Marine Drive, Burnaby B.C. Canada V3N 2X8

Don Hartley, Route 1, Box 329, Yorkville ILL 60560, sent us a photo of his completed Mark-8 and TVT (as of last Nov, even). He has a very sharp octal entry and display set-up (from Dec Pop Electronics) and plans to use his Mark-8 for weather research, graphics, and learning programming. He could use some help and pointers in basic programming techniques. (Just remember, Don, if you can't get started on a program....do a LOAD A, and take it from there!)

James E. Connaway, 639 Frederick St. S.W., Vienna VA 22180, and.....W4ESN. (NOTE: if you HAMS come up with a time and frequency we'll sure be glad to publish it.)

Daniel L. Pastell, 2904 Via De La Guerra, Palos Verdes Estates CA 90274.

Robert Baer, 921 Lincoln Ave., Palo Alto CA 94301

Brian Chesire --WA5PPO/L--, 113 E. Elberta #8, Atwater CA 95301

Robert G. Confrey, PSC Box 4636, Beale Air Force Base CA 95903

Beardsley Ruml II, 3306 Cathedral Ave. N.W., Washington D.C. 20008, is a lawyer interested in reducing the cost of legal services to middle and low income consumers thru the use of computers.

Steven A. Fischer, Box 337 SDSM&T, Surbec Center, Rapid City S.D. 57701, is in the process of purchasing "a computer based on INTEL's 8080." (Would that be an Altair 8800, Steve?)

John Angus, 97-30 135 RD., Ozone Park L.I. 11417 (That "L.I." stands for Long Island, I think. But, I bet the Post Office would prefer N.Y.) Anyway, welcome aboard, John.

Robert E. Smallwood, 20-12 St. N.W., Calgary Alberta Canada, T2N 1Y3, says that C&C Specialists, P.O. Box 7847, Stanford CA 94307, owes him $10. Has anyone else had dealings with this company?

Thomas J. Young, 327 Duxbury Rd., Silver Spring MD 20904, is in the process of building his Mark-8.

H.N. Campbell, R.D. 3 - Brockway Road, Moravia N.Y. 13118, finished his Mark-8 about three months ago and has been troubleshooting it ever since trying to get it up and running. He wouldn't object to an offer of help from anyone in the area.

Oh, and here is a good one!! Tom Boyko, Varian Data Machines, 12062 Valley View, Suite 204, Garden Grove CA 92645. Tom is a Customer Engineer with Varian and I had him as a student in a disc class several weeks ago. (As a matter of fact, he was the only student!) We probably spent 60% of our time discussing the Mark-8 and 40% discussing the Diablo Disc. He got so fired up about this thing that he went home and started on a wire-wrap version and had 256 words of memory ready to go within 24 hours. (& he's sharp, so watch out for him!)

John Bird, Assoc. Professor, Community College of Baltimore, 2901 Liberty Heights Ave., Baltimore MD 21215

Michael A. Carlisle, 25 Twain Ave., Berkeley CA 94708

Bob Anders, P.O. Box 2063, Davidson N.C. 28036, is a senior chemistry major and has built his Mark-8 for an independent study project in on-line control of chemical instrumentation. He expressed his gratitude for the de-bugging tips in previous newsletters and reports that James Electronics provided him with speedy service and reliable components. He is, of course, interested in A/D and D/A interfaces.

Charles Musitano, Boeing, 4 Valley View Drive, Goddard Kansas 67052, is (I believe) either building an 8080 or is interested in it. (Actually, if he's building it....that would mean he's also interested in it!)

Jerry M. Newcomb, 825 Pacific Terrace, Klamath Falls OR 97601

Bob Pearce, 28 Hakim Street, Danbury Conn. 06810, recently bought the Mark-8 PC boards from M&R Enterprises and they recommended he contact us before he started construction. I like that.

Bill Seward, Dept. of Physics, Pomona College, Claremont, California 97111

Bob Wallace, P.O. Box 5415, Seattle, Washington 98105

Mark Yoseloff, Dept. of Math, Arizona State University, Tempe, Arizona 85281

We got hold of a copy of the AMATEUR COMPUTER SOCIETY NEWSLETTER put out by Stephen B. Gray, Amateur Computer Society, 260 Noroton Ave., Darien Conn. 06820. If you're interested, the subscription cost is $5 and the NL is published every two or three months. (subscription and membership for $5)

Dan L Kniesner, Librarian, Ohio Institute of Technology, 1350 Alum Creek Dr., Columbus Ohio 43209

Robert J. Elliott, Electronics Instructor, Miramonte High School, Acalanes Union High School District, 750 Moraga Hwy., Orinda CA 94563, is currently building a Mark-8 for classroom use. He's resurrecting a Kleinschmidt printer for output and plans to have a CRT display, paper tape system, & mag tape. And...a card reader system.

DeWalter Ekstrand, P.O. Box 1260 D, Southgate CA 90280

L. Dabrowski, 1815 N. Karlov Ave., Chicago ILL 60639

Mark Baker, 6113 Calle Tuberia, Scottsdale ARIZ 85251 is "in the process of building a microcomputer." Und vot kind of machine you building, Mark? Und vot you going do vid it?

Lonnie G. Clifton, Electronics Instructor, Indiana Vocational Technical College, 3501 First St., Evansville IND 47710, states that his school has a Scelbi System with an ASR-33. He would like very much to hear from other educators using minicomputers as an educational tool. (e.g., problems encountered, CAI, curriculum, special programs, etc.)

Steven Dompier, 2136 Essex St., Berkeley CA 94705, is currently building the Altair 8800 with disc capabilities.

Maynard M. Dye, Net Worth Programming, 4986 San Joaquin Drive, San Diego CA 92109

Antonio Grante, Spevack Surgical Supply, Inc., 1345 Nostrand Ave., Brooklyn N.Y. 11226

Dennis Griessner, P.O. Box 1743, Cullowhee N.C. 28723, is a high school student who recently finished the TV Typewriter and is currently working on a tape reader. He plans to build a microcomputer in the future but right now "money is a problem." Welcome to the club, Dennis.

Douglas Hogg, 2516 Castillo (rear cottage), Santa Barbara CA 93105

Richard P. Inzina, 4415 White Acres Rd., Clarence N.Y. 14031, is currently building a Mark-8 and eventually plans to interface it with a TVT, cassette, and some sort of hard copy device.

Microcomputer Techniques, 11227 Handlebar Road, Reston VA 22091. (Ah din' git no name on thet one!)

.....

Oops! Almost forgot! One final note before I depart..... Mr. Wayne Davies in Mission Viejo California got his Mark-8 up and running at 2 A.M. Sunday morning, February 9th.

ARTHUR NOGUEROLA, 05 OLD FARM RD., VALHALLA, NY 10595, IS A RESEARCH ASSISTANT AND PROGRRAMMER AT HUNTER COLLEGE (NYC). HE IS WORKING IN THE CHEMISTRY DEPT. WHERE THEY ARE USING THE 8008 TO COLLECT DIGITIZED SPECTRA WHICH THEN GO THRU A UART TO A NOVA COMPUTER FOR PROCESSING.

FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025 IS PUBLISHING THE BAY AREA COMPUTER GROUP'S NEWSLETTER.

NEIL A. BENSON, 10040 NICOLLET, BLOOMINGTON MN 55420, HEARD ABOUT US FROM THE "COMPUTER HOBBYIST" AND HAS ABOUT 3/4 OF THE GOODIES FOR HIS MARK-8.

WALTER J. KLOS, 5193 S. ETNA ST., KLAMATH FALLS OR 97601

GARY ALEVY, EMORY UNIVERSITY, BOX 21393, ATLANTA GA 30322, IS INTERESTED IN BUILDING A MARK-8.

MARTIN NICHOLS, 100 GUY ST., DOVER, NJ 07801, HAS THE UNIQUE DISTINCTION OF BEING A PERSON WE INADVERTANTLY IGNORED. IT'S POSSIBLE WE SIMPLY LOST YOUR FIRST CORRESPONENCE, MARTIN, (OR THE US POSTAL SERVICE DID) BUT IN ANY CASE WE APOLOGIZE. MARTIN HAS BEEN INVOLVED FOR THE PAST TEN YEARS IN SOFTWARE DEVELOPMENT FOR LARGE SCALE MACHINES AND IS CURRENTLY BUILDING A MARK-8.

TED SALLUME, 945 VIA FARGO, SANTA MARIA, CA 93436 IS THE PERSON RESPONSIBLE FOR GETTING THE LOMPC-SANTA MARIA-SANTA BARBARA LOCAL GROUP GOING.

HOWARD P. DODGE, THE CHOATE SCHOOL, WALLINGFORD, CN 06492 HEARD ABOUT US THRU THE "PEOPLE'S COMPUTER COMPANY."

JOHN CHRISTENSON, 439-16TH AVE. NO., SOUTH ST. PAUL, MN 55075 IS INTERESTED IN BUILDING THE MARK-8 AND THE TVT.

EDWIN L. MORGAN JR., 314 VINE ST., CHILLICOTHE, OH 45601, ALSO HEARD ABOUT US THRU PCC AND WOULD LIKE TO FIND OUT MORE ABOUT THE MARK-8. WELL, ED, IT ALL STARTED IN THE JULY 1974 ISSUE OF RADIO-ELECTRONICS MAGAZINE.

BRUCE HARRIS, 1532 N. LAFAYETTE, CLAREMONT, CA 91711.

TOM GRAHAM, 5107 ALAN AVE., SAN JOSE, CA 95124 HAS AN 8008 AND IS READY TO START A MARK-8.

CRAIG K. HARRIS, COORDINATOR, CLONLARA, 1289 JEWETT ST., ANN ARBOR, MI 48104 (313)769-4511 WORKS AT A SEVEN YEAR OLD FREE SCHOOL THAT WAS GIVEN A HAZELTINE TERMINAL AND PRINTER. THEIR GRANT FOR COMPUTER TIME RAN OUT AND THEY ARE LOOKING FOR ALTERNATIVES. THEY ARE LOOKING FOR LEADS ON ORGANIZATIONS THAT MIGHT BE INTERESTED IN FUNDING EXPERIMENTAL OR DEVELOPMENTAL PROJECTS FOR EARLY ELEMENTARY STUDENTS.

INFORMATION FROM SUPPLIERS

DR. MICHAEL HAYES, MNH APPLIED ELECTRONICS, WAS RECENTLY TRANSFERRED BY THE MILITARY SO THE NEW ADDRESS FOR HIS COMPANY IS PO BOX 367, JAMUL, CA 92035 AFTER APRIL 15. HE WARNS THAT THERE MAY BE SOME DELAY TO CUSTOMERS IN THE MOVE BUT THEY WILL TRY TO KEEP THINGS RUNNING SMOOTHLY. HIS MODEMS ARE SELLING WELL. CURRENT PRICES ARE $35 FOR MODEM ALONE, $5 FOR DOCUMENTATION, $5 FOR CABLES, AND $5 FOR POSTAGE AND HANDLING. JOE CIMMINO SENT A DRAWING ON WIRING THEM UP FOR USE IN A CASSETTE MODEM SYSTEM. (SEND A SASE AND A COUPLE OF STAMPS IF YOU NEED A COPY.) MIKE HAS FINISHED HIS MARK-8 AND IS INTERFACING IT TO A DIGITAL CASSETTE UNIT MADE BY MFE CORP., SALEM, NH. HE SAYS BILL ALLEN, SURPLUS ELECTRONIC, NTD INC., 9600 BALTIMORE BLVD., COLLEGE PARK, MD HAS NICE METAL CASES AND POWER SUPPLIES PERFECT FOR THE MARK-8.

MAURY GOLDBERG, MINI MICRO MART, 1618 JAMES STREET, SYRACUSE, NY 13203 (315) 422-4467 SAYS THE MIL BANKRUPTCY THING WAS A REAL BLOW. IT WON'T AFFECT THE MOD-8, BUT IT WILL SLOW DOWN THE 8080 VERSION. HE HOPES TO GET A FEW MONITOR-8 ROM'S. SEND A SASE FOR INFO ON WHEN AND WHAT THEY WILL COST. HE PROMISES US A NEWSLETTER ARTICLE ON THE MIL DEMISE AND ITS EFFECTS FOR THE NEXT NL. HE WILL HAVE A KIT FOR THE SUDING SCIENTIFIC CALCULATOR COMPLETE WITH PC BOARD AND ALL IC'S, SOFTWARE, ETC. FOR $69.95 UNTIL THE FIRST 25 KITS ARE GONE, $74.95 THEREAFTER. THE FIRST 25 WILL BE DELIVERED BY LATE APRIL. HE IS SELLING OFF 2000 2102'S @ $3.95 PLUS $2.00 HANDLING AND SHIPPING DURING APRIL ONLY. HE SHOULD BE ABLE TO SUPPLY MIL MOD-8 CASSETTE INTERFACES SOON. HIS MAGAZINE AD HAS KEPT HIM ON THE PHONE ALMOST CONTINUALLY. DUE TO AN UNEXPECTED HANGUP, THEY CAN NOT ACCEPT BANK AMERICARD OR MASTERCHARGE CARDS.

MARTY SPERGLE, M&P ENTERPRISES, PO BOX 1011, SUNNYVALE, CA 94088 HAS THE FOLLOWING DEAL ON 2102-1'S. (YOU GUYS WITH THE 8080'S BETTER WATCH WHAT YOU BUY OR YOU'LL END UP HAVING TO WAIT YOUR PROCESSOR ON THE MEMORIES. THESE ARE FAST ENOUGH. MOST OTHERS AREN'T.) PRICES ARE $4.50 EACH, 8 FOR $35, 16 FOR $68, 32 FOR $130, AND 64 FOR $250. HE HAS SOME 8008-1 (THE FAST ONE) FOR $50.00.

JAMES E. HEIL, OWNER, ELECTRONIC DISCOUNT SALES, 138 N. 81ST ST., MESA, AZ 85207 AGREES WITH COMMENTS REGARDING MITS AND POP ELECTRONICS IN NL #5. HE DOSEN'T APPRECIATE THEM DISGUISING COMMERCIAL ADVERTISEMENTS IN THE FORM OF HOBBY CONSTRUCTION ARTICLES. HE NOTES THAT THE BROCHURE ADVERTISING THE ALTAIR 8800 "USER GROUP" IS EVEN LESS HEAVILY DISGUISED, CRASS ADVERTISING. HE IS STILL SELLING MF8008'S FOR $50 AND 8080'S FOR $175. WRITE FOR CATALOG #6 WHICH IS 7 PAGES AND CONTAINS MANY EXCELLENT BUYS ON HARD TO GET COMPONENTS.

JOHN R. BURGOON JR., SOLID STATE MUSIC, 1222 CAROLYN DRIVE, SANTA CLARA, CA 95050 296-7330 HAS THE FOLLOWING AVAILABLE:
4K MEMORY BOARD $163.80 PLATED THRU HOLES, BLUE, ALL 2102'S (32) 8008 SPEC SPEED, SOCKETS, CAPS, EDGE CONNECTOR, 2 7442, 2 7404, 1 7400 BOARD IS SET UP FOR MARK-8 BUS.
2102/2602'S - 8/$32 1101/2501'S - 8/$8.-- BOTH MARK-8 TESTED.
1702 EROM'S - $18.-- (CHECK TO SEE IF THESE ARE A'S)
8223 PROM'S - $3.50
7489/8225 RAMS - $1.85 8263 MUC - $4.00 8288 DIVIDE/12 - $1.00
BARE 4K 2102 BOARD - $17.00 1103 - $1.50
8008'S - MARK-8 TESTED - $44.00

PARTICPANTS CAN'T SEEM TO SAY ENOUGH KIND WORDS ABOUT JAMES ELECTRONICS. DAVE DUSKIN IN LOMPOC HAS PLACED MANY ORDERS WITH HIM AND THE LONGEST TIME IT HAS TAKEN TO RECEIVE PARTS IS 4 DAYS FROM TIME OF MAILING TO RECEIPT OF THE COMPONENTS. FAILURE RATE HAS BEEN LOW AND REPLACEMENT OF THOSE FEW COMPONENTS FOUND TO BE BAD IS FAST.

==========

MICRO-8 NEWSLETTER SUBSCRIPTION FORM

_____ PLEASE SEND NEWSLETTERS NO 6 THRU 11 ENCLOSED IS A CHECK
I I FOR $6.00 MADE OUT TO THE CABRILLO HIGH SCHOOL COMPUTER CENTER.
_____

_____ PLEASE SEND NEWSLETTERS NO 1 THRU 5 OFFSET PRINTED. ENCLOSED
I I IS A CHECK FOR $3.50 MADE OUT TO THE CABRILLO HIGH SCHOOL
_____ COMPUTER CENTER. (IT MAY BE SEVERAL WEEKS BEFORE THEY
ARE RECEIVED FROM THE PRINTER)

NAME _____

ADDRESS _____ TELEPHONE # _____

_____ (IF YOU DON'T MIND BEING
_____ CALLED BY OTHER PART-
_____ ICIPANTS)

ZIP

==========

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

312-357-3021

NEW ITEMS AND NEW PRICES

8008 - 8 bit Microcomputer chip		$45
	with Creed	$40
1702A - 256 x 8 Programmable and erasable ROM		$30
(Programmed with Creed Monitor free)	with Creed	$25
2102-2 1K x 1 RAM Static		$4.50
	8 or more	$4.25
	32 or more	$4.00
74LS138 Deooders (1 out of 8)		$2.25
25 pin connectors (male or female)		$1.00
Plastic case for above		$1.00
8 conductor cable, 2 are heavy power leads		$.10 per foot
50 feet of above with 25 pin male connectors and plastic cases on each end (2 1/2 lb)		$6.00
Teletype modle 28 KSR, printer and keyboard, table model with table - heavy duty 5 bit machine, 10 years old		$250.00
IBM 054 punched card verifier(can be used to read cards under control of 8008)		$150.00
731 Selectric I/O typewriter - like new -		$800.00
IBM 2740 terminal with I/O Selectric and control electronics		$1800.00
Dura Mach 10 with I/O Selectric, 8 level punch and 8 level reader and electronics		$1000.00
Flexowriter with tape reader and punch		$250.00
Rixon Speed Conversion module with connector to plug into, manual and instructions to use to convert TTY signal speed. This is a beautiful piece of commercial equipment.		$9.50
Other Rixon circuit packs:clocks, modems, multiplexers, powersupplies - write for list.		

Weights: Creed - 55 lb, Creed shipping crate - 9 lb, transformer - 4 1/2 lb, Interface kit and packing for Creed - 5 1/2 lb, box of 10 paper tape reels - 9 3/4 lb, power box - 4 3/4 lb, tape winder and reels 4 3/4 lb.

Shipping: FOB Naperville. Will be sent Greyhound COD for shipping charges for large items unless you specify otherwise. Greyhound seems to be the best and cheapest. The Creed is too heavy for parcel post or UPS. REA is another alternative, but is more expensive. It is possible to pack a tape winder with the Creed in its crate or up to 14 reels of tape. Other items will be packaged separately.

The Creed manual grew to 26 pages and is finally ready to go. We are currently investigating a power supply for an entire 8008 system using the power transformer included with the Creed interface and an 8008 system built on one of the wire wrap boards we advertise at $10.

A lot of interest has been generated in the MIL monitor on one 2K word chip, however recent events have cast some doubt on when and if it will be available in this form. We are also investigating the possibility of offering the MIL monitor or an improved version of it on 1702's or possibly having our own 2K chip made up. In order to have our own 2K chip made we would have to have a good number of people willing to subscribe ahead of time and put down a deposit on it. In the meantime I would suggest that you use the Creed monitor on 1 or 2 1702's since they can be easily reprogrammed later and the Creed monitor will give you the basics to get you going.

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