RANDOM DATA
By Robert Reiling

DATES—The next several meetings are scheduled at SLAC on Wednesdays. This is a better meeting date for many people but is not as satisfactory for some. There will be some Friday meetings this year as well. The complete schedule will be in the next Newsletter. The February and March schedule is listed on page eight.

SIXTEEN/8—A sixteen bit machine using the S-100 bus was demonstrated at the December 12th meeting by Dick Wilcox and John French. It appears to be an excellent computer system with outstanding software—time sharing even. You will be hearing more about this machine. For the current status and additional details contact the Orange County Computer Mart in the Los Angeles area. Telephone numbers are (714) 838-1381 or (714) 633-1222.

COMPUTER NOTES—Andrea Lewis, editor of the ALTAIR Users Group publication COMPUTER NOTES, has sent many copies for distribution at the Club meetings. Thanks to Andrea and MITS for the copies. All of the copies (several hundred) were distributed in what seemed only moments.

BAMUG—The Bay Area Microprocessor Users Group Newsletter was issued by Timothy O'Hare, editor and writer, to announce the club's new meeting location and meeting on January 6, 1977. You may want to contact Timothy about future meetings. His address is 1211 Santa Clara Avenue, Alameda, CA 94501. When writing it will be a good idea to include a stamped self-addressed envelope.

KILOBAUD—This magazine was delivered in December and has received excellent comments from readers. I haven't managed to get a copy yet but did get an opportunity to scan a copy at the last club meeting. It appeared full of good stuff. Why don't you send me your comments about KILOBAUD for use in the next Newsletter.

If you don't know, KILOBAUD is published by the same organization that publishes 73, the amateur radio magazine. Wayne Green is the publisher with plenty of experience in the publication business. John Craig is the editor. He has been producing the I/O section in 73 for several months now. Subscriptions are available by writing to KILOBAUD or 73, Peterborough, NH 03458. □

MPU SHOPS OPENED BY SEMI SPECS

Semiconductor Specialists, Inc., an industrial distributor, will now cater to the "Computerists" or home computer enthusiast by establishing twelve MPU Shops at their twelve U.S. branches. The first has opened in the Chicago area at the company headquarters.

The Shops will have working models of five microprocessor kits, three non-assembled kits, plus four additional microprocessor chips not in kit form. Two complete developmental systems will be available. In addition, books, power supplies, tape readers, and accessories in kit form will be carried.

Paul Carroll, president, explains: "The industrial distributor has never really catered to the hobbyist, but always allowed cash sales because many engineers and buyers from industry bought small quantities for their personal use. With the advent of the microprocessor, a whole new market of 'Computerists' has developed. These people are engineers, programmers, and technicians from industry who are learning, designing, and programming microprocessor systems at home. They want a place to browse, read, have hands on practice, and see what they are buying. The MPU Shops will have the advantage of supplying many of the extra transistors or IC's they need to input or output their system. The fact that many of these 'Computerists' will end up designing and specifying a future system for their employer is why Semiconductor Specialists is interested in this growing market." Mail orders as well as credit cards will be accepted by the MPU Shops. Contact Semiconductor Specialists, Inc., P.O. Box 66125, O'Hare International Airport, Chicago, Illinois 60666. □

NEW JOYSTICK CONSOLE GIVE MORE FLEXIBILITY TO MICROCOMPUTERS

Cromemco, a leading name in the microcomputer field, has introduced a new 2-axis joystick console that has significant features not found in other joysticks.

For one thing, the new joystick is a console rather

than merely a simple 2-input device.

It is called a console because it includes a speaker and speaker amplifier built into the same housing with the joystick. The speaker greatly enhances the usefulness of this over other joysticks because it facilitates such uses as sound effects for computer and other games—and provides an easy way to obtain such features as acoustic warnings in other applications.

Another interesting feature of the new console is that it includes four pushbutton switches. These can be utilized to add much more flexibility to such applications as using the console for cursor positioning on a color graphics terminal. In such a case the switches can select desired colors.

Cromemco also offers peripherals that simplify application of the joystick. One is a fast 7-channel analog-to-digital I/O card. This unit will directly interface two of the consoles to microcomputers. The I/O is a plug-in card.

Cromemco also offers a color graphics interface known as the TV Dazzler. This unit allows microcomputers to display memory in color on an ordinary color TV set.

The block diagram below shows how readily the new console and other peripherals can be used with a microcomputer to form a complete operating system.

Price of the new console is $65 in kit form or $95 in assembled, ready-to-use form. Delivery is 15 – 30 days. For more information, contact: Mr. Joe McCrate, Cromemco, Inc., 2432 Charleston Rd., Mountain View, CA 94043, (415) 964-7400. □
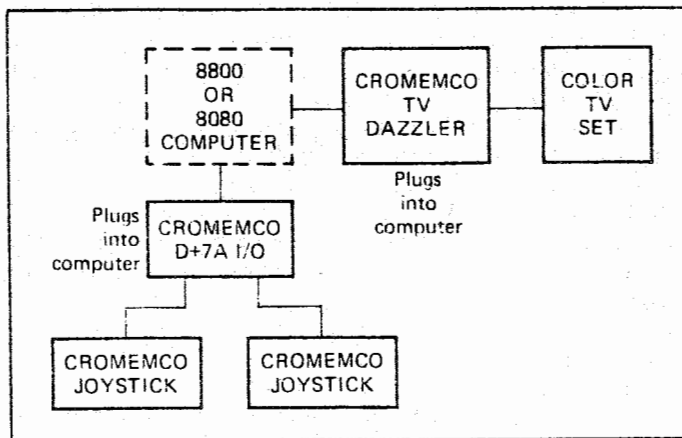
NIBL FEBRUARY 16, 1977

NATIONAL BASIC—National Industrial Basic Language, NIBL, will be discussed at the February 16, 1977 Homebrew Computer Club Meeting. Phil Roybal, MP Product Marketing Manager, and an associate, both from National Semiconductor Corp., will present the NIBL story. Perhaps you read about NIBL in recent articles in INTERFACE AGE and DR. DOBB'S JOURNAL. Look these articles up before

the meeting on the 16th. Phil explains that NIBL is in the public domain and he will have instructions for obtaining NIBL for copying costs. He is expected to announce the future availability of NIBL in ROM. Don't miss this meeting. □

USEFUL BASIC PROGRAM
By William Marlin

This TINY BASIC program was among the first prepared by William Marlin on his AMI Proto Board. He needed label to tell people of his new address—so the program. The label is a listing from the program.

```
:LIST

100 LET I=0
110 PRINT
120 PRINT"FIRST LINE OF MESSAGE",
130 LET I=I+1
140 IF I/3*3<>I GOTO 120
150 PRINT
160 PRINT"SECOND LINE OF MESSAGE",
170 LET I=I+1
180 IF I/3*3<>I GO TO 160
190 PRINT
200 PRINT"THIRD LINE OF MESSAGE",
210 LET I=I+1
220 IF I/3*3<>I GOTO200
230 PRINT
240 IF I<27 GO TO 110
250 END

:RUN

FIRST LINE OF MESSAGE
SECOND LINE OF MESSAGE
THIRD LINE OF MESSAGE

FIRST LINE OF MESSAGE
SECOND LINE OF MESSAGE
THIRD LINE OF MESSAGE

FIRST LINE OF MESSAGE
SECOND LINE OF MESSAGE
THIRD LINE OF MESSAGE

:
```

CASSETTES IN THE HOMEBREW LIBRARY
By Gordon French

There are now cassettes in the Homebrew Library. To make it possible and practical to interchange data and software, and to put to use the experience many

of us have had using cassettes, the library procedure will be as follows:

Library tapes will all be kept on TDK Audua C-60 cassettes. This is a non chromium dioxide tape of high brilliance. It is readily available in the Bay Area. This tape has excellent response at the clock frequency of Tarbell standard.

Tapes with data on them will have the data side or sides Write tap knocked out.

Tarbell format tapes will be with what I call "phase up." Meaning: phased as if recorded on a J.C. Penney Co. Model #6536 with the Tarbell board strapped as recommended in the assembly manual. The need here is not obvious unless you are using some Panasonic or Lloyd cassette machines that record or play back phase down. (My son got a Sears machine that records phase down and plays phase up from a big bearded elf in a funny red suit.). If you are running a Tarbell cassette interface and you haven't bought the Penney's machine, buy one! All the difficulties that I had went away the minute mine was plugged in to replace a Panasonic I had been using.

So far as phasing is concerned we have not had enough experience with either Processor Technology's new "CUTS" board or IMSAI'S MIO board. PTC's "cuts" board has been designed to be insensitive to phase so we shouldn't have a problem. When I know more about the MIO board, you'll read about it here. Those of you who are regularly working with cassettes and discover the whys and wherefores, please call me and share it.

Tapes should have handlettered information giving the recorder's index to start of record, end of record. This obviously will vary from user to user, but it is generally useful geographic information. Next the name of the program or data. Next the loaded memory limits, expressed in hex, so the label may look like:

002 - 009 "STARFUNK" 0000 - 4800

012 - 022 "BYTES MY MOTHER LOVED" 0000 - 12AF

027 - 099 "SUPERSYS SPILLDUMP" CC00 - DFFF

Tapes without labels or with unreadable ones will be reused for something else.

Leave plenty of blank area between records. The TDK Audua C-60 is long enough to afford us lots of room and avoids confusion when your index is not the same as the label may show. For tapes in Tarbell format be sure to include two or three minutes of sync code so that it will be possible for the next user to adjust his sync potentiometer setting.

When making a copy of anything, load the copy that you have made. When in doubt, do it again. Make a copy as good as you would like to have it for your own use.

Cleanliness is next to having a tape that loads. Keep your greasy paws off the tape surface. If your machine tends to eat tape, borrow someone else's. Sardine oil, cracker crumbs, dandruff, eraser dust, and many other things likely to be found in the average household may inadvertently destroy the work of genius. Please use care in handling the tapes.

For those of you intrepid enough to have once called in an attempt to get something from the library, please skip to the next paragraph. First, I do not have a Fortran of any kind, sort, style or description. Same for PL-1. Don't call me, I'll call you. Next, I neither steal, nor duplicate, software which is protected by copyright. I am a librarian, not a quick copy service. Next, I will not list, catalog, or describe what is in the library. If you know what you want, ask me and I will tell you if we have it. Being a pack rat of many years' standing, I will invariably take anything I know can be had for nothing whether I need it or not. Many of you are better at this than I am, and since there are four hundred of you and only one of me, I'll continue to pursue my hobby between phone calls. If a manufacturer makes low cost software available, please support them by purchasing some. You get a nice clean, readable copy of the documentation. Besides, if you can't get it to load and go, you can write a tear stained letter or openly cry over the telephone and someone may be sympathetic toward your cause, while a lowly library user must be happy with unreadable or incomplete documentation and gets no sympathy whatever he does. Lastly, I get what you give to the library. I constantly encourage everyone to contribute to the library, but some desirable materials never get into the library. If you can't get it from the library, but find another source for some particular thing, either put a copy in the library, or tell me where you were able to locate it. I'll pass the information along to the next fellow.

To get a cassette from the library, please call ahead so that I can verify that it is in the library and available. Then, you and I will set a convenient time for you to drop by my place and pick it up. Since the cassette has a given value, and neither the club treasurer or myself do this for profit, please come bearing a TDK Audua C-60 cassette as "deposit" against the safe return of the club tape. I won't sell your tape, or take money of any nationality. A couple of the members who have found work have already seeded the library with blank tape and program tapes. You don't have to have money to play, and if your story is sad enough you can probably con me out of one for nothing. And if heaven rains bounty on you, bear in mind we are trying to get tax exempt status, and your contribution may be deductible.

One last thing. Please respect the copyright law. You are specifically forbidden from making copies of many materials under the new laws. Several companies have produced software for commercial exploitation, and have protected its value by copyright and whereas these companies may choose not to litigate infringement of their copyright, it is their right to protect their property. Purchase these products from their rightful owners. There are, on the other hand, many programs in the public domain as a direct result of your labors and mine. As time goes on, there will be even more. Here in Silicon Valley we have the best of the best programmers and I have seen some really great stuff simply given away. Remember that the library is really a software exchange. Give a little. Take a little. Don't use our facilities to rip someone off.

TIC-TAC-TOE IN TINY BASIC
or
How to Make a Program TINY
By Tom Pittman

The only game I have that runs on my 4004 system plays Tic-Tac-Toe, where the computer plays one side. I wrote this some three years ago, but it recently occurred to me that it would be something that would run in TINY BASIC very easily. It is a simple program and although the computer plays aggressively, it is not unbeatable. This program is particularly suited to TINY BASIC because there are only a few variables: we need a nine-element array for the playing board, but that could have been handled by using nine variables. I chose to use the USR function to access nine consecutive memory locations in lower memory (0007 to 000F). That is the only use of the USR function, so if you want to use this program on some other TINY BASIC than mine, you know what to look for.

I did use one other peculiarity of TINY in this program: there are several loops where the index on the loop is W, which takes on the four values 6100, 6200, 6300, and 6400. These are line numbers for the entry points of a subroutine, and the only use of the variable W is in a GOSUB W statement, which selects the corresponding subroutine entry. If you want to convert this program to regular BASIC you will have to fix that part as well as the USR calls.

When I was in high school I worked out a combinatorial solution for this game which could be implemented in relays, and I actually knew somebody who built a Tic-Tac-Toe machine. But when I wrote this program I decided that a heuristic approach would be more fun, so this program does not use the combinatorial approach. The heuristic is a tree-search algorithm of depth one. This is trivial as game programs go, but then, the game is nearly trivial itself. Theoretically the program can be beaten, though I could not find how.

The algorithm is simple. Each empty square is assigned a score representing how good a play in that square is, then the highest score wins. For each row, column, or diagonal going through this square, the score is incremented by 1 if there is an X (the human play) and two blanks, by 2 if all three squares are blank (i.e., the row, column or diagonal is available), by 3 if there is an O and two blanks (aggressive: prefer playing to win than to block), by 20 if there are two X's (must block those), and by 100 if there are two O's (that's a win). This scoring is done in lines 4300–4500.

I wrote the program so that the user can type in the location of the beginning of the interpreter (from which the program derives the address of the Peek and Poke USR routines), then after that it just plays one game after another. Hopefully that minimizes the need to make changes in the code for different processors. One change which owners of TVT terminals might like is to add a line for a Home Cursor operation before printing the playing board. If your TVT recognizes a FormFeed (hex 0C) as the Home function, either of the following will do the job:

```
2020 LET J=USR(G-11, 0, 12)
2020 PRINT "[formfeed] ";
```

The second one will of course look strange on the listing.

After writing the program I realized that it is too big for a 4K system in its entirety. So I separated the setup operations (lines 100–500) so that you can load and RUN them, then CLEAR and load the rest. Or you can omit loading the setup entirely, and just set G and P in the direct execution mode to the proper values for your system.

The rest of the program is still too big.

Now comes the big squeeze. I have a nice text editor on my 4004 which allows multiple string substitutions. I ran the program through the editor, making the following substitutions:

```
LET deleted
PRINT becomes PR
all REM lines removed
delete all spaces (BASIC ignores them anyway)
remove 4th digit of line numbers
    (only makes GOTOs shorter)
```

Then I manually rewrote the PRINT messages to shorten them or to re-insert needed blanks, and fixed the line number computations involving the variable W. The result is a program only 1189 bytes long, compared to the original 3484. This is short enough to run in 4K of RAM including the interpreter.

By the way, Just as I was getting ready to cheat and put a deliberate bug in the program so it could be beaten, my wife found a way to beat it without cheating. It is not a bug, but a direct result of the way the heuristic evaluates each square. Also, on my 4004 the program evaluates its next move in less than one second, or so fast as to appear instantaneous. In TINY BASIC it takes several seconds, so I put in a line which prints a period from time to time as it thinks. This way you know the computer has not stopped.

This is the whole program; the compressed version followed it. It is now in the public domain, so have at it.

```
100 REM TIC-TAC-TOE, YOU (X) VS. THE COMPUTER (O)
110 GOTO 200
120 BOARD IS IN MEMORY LOCATIONS 0007-000F
130 .   0 IS EMPTY, 1 IS X, 3 IS O
140 I HAS CURRENT POSITION
150 G IS PEEK ROUTINE ADDRESS
160 P IS POKE ROUTINE ADDRESS
170 F=1 IF YOU PLAY FIRST
180 U IS NUMBER OF UNPLAYED SQUARES
190 Z=1 IF SOMEONE WON
200 REM
210 PRINT "TIC-TAC-TOE, YOU AGAINST TINY BASIC"
220 PRINT "YOU ARE X, I AM O."
230 PRINT "YOU PLAY YOUR TURN BY TYPING THE NUMBER OF A SQUARE."
240 A=0
250 B=0
260 C=0
270 D=0
280 E=0
290 F=0
300 PRINT
```

```
310 PRINT "FIRST, ";
320 PRINT "PLEASE TELL ME WHERE THE COLD START IS,"
330 PRINT "IN DECIMAL";
340 INPUT I
350 IF I/256*256=I GOTO 400
360 IF I/100*100<I GOTO 320
370 PRINT "NO, NOT HEX.  ";
380 GO TO 330
400 P=I+24
410 G=I+20
420 PRINT "THAT IS ";I/4096;(I-I/4096*4096)/256;
430 PRINT "00 IN HEX.  THANKS."
440 GO TO 500
450 TO CONSERVE MEMORY, LINES 100-500 MAY BE RUN ONCE
460 THEN DELETED (CLEAR) BEFORE LOADING THE REST OF THE PROGRAM
500 REM---ON WITH THE SHOW...
1000 LET F=1
1010 PRINT
1020 PRINT "NEW GAME."
1100 LET I=7
1110 LET I=USR(P,I,0)*0+I+1
1120 IF I<16 GOTO 1110
1130 LET U=9
1140 LET Z=0
1150 IF F=0 THEN GOTO 4010
1160 GO TO 2010
1500 REM X WON.
1510 LET Z=1
1520 LET F=0
2000 REM PRINT GAME STATE
2010 LET I=6
2100 PRINT
2110 LET I=I+1
2120 PRINT "  ";
2130 GOTO USR (G,I)*20+2200
2200 PRINT I-6;
2210 GOTO 2300
2220 PRINT "X";
2230 GOTO 2300
2260 PRINT "O";
2300 IF I/3*3=I GOTO 2400
2310 PRINT " I ";
2320 GOTO 2110
2400 PRINT
2420 IF I=15 GOTO 3000
2430 PRINT "---+---+---"
2440 GOTO 2110
3000 IF Z=0 GOTO 3100
3010 REM THE GAME IS OVER.
3020 IF F=1 GOTO 3050
3030 PRINT "YOU WIN."
3040 GOTO 1010
3050 PRINT "I WIN."
3060 GOTO 1010
3100 IF U>0 GOTO 3210
3110 PRINT "CAT'S GAME."
3120 LET F=1-F
3130 GOTO 1010
3200 REM INPUT NEX PLAY.
3210 PRINT "YOUR PLAY";
3220 INPUT I
3230 IF I>0 IF I<10 GOTO 3270
3240 PRINT "PLEASE TYPE A NUMBER BETWEEN 1 AND 9"
3250 PRINT "WHERE YOU WISH TO PLAY YOUR X"
3260 GOTO 3210
3270 IF USR (G,I+6)=0 GOTO 3310
3280 PRINT "THAT SQUARE IS ALREADY TAKEN."
3290 GOTO 3210
3300 REM CHECK IF X WON.
3310 LET U=USR(P,I+6,1)*0+U-1
3320 LET W=6100
3330 GOSUB W
3340 IF J>0 IF L*M*N=1 GOTO 1510
3350 LET W=W+100
3360 IF W<6500 GOTO 3330
3400 REM CHECK IF CATS GAME
3410 IF U=0 GOTO 2010
4000 REM FIND BEST "O" PLAY
4010 LET I=1
4020 LET T=-1
4290 REM EVALUATE I'TH SQUARE
4300 LET S=0
4310 IF USR(G,I+6)>0 GOTO 4490
4320 LET W=6100
4330 GOSUB W
4340 IF J=0 GOTO 4410
4350 LET J=L+M+N
4360 IF J=4 THEN GOTO 4410
4370 IF J=2 THEN LET S=S+20
4380 IF J=6 THEN LET S=S+100
4390 IF J=0 THEN LET S=S+2
4400 LET S=S+J
4410 LET W=W+100
4420 IF W<6500 GOTO 4330
4430 IF S<T THEN GOTO 4470
4440 LET T=S
4450 LET B=I
4460 REM SAY SOMETHING, SO IT WONT SEEM SO LONG.
4470 PRINT ".";
4480 LET I=I+1
4490 IF I<10 GOTO 4310
4500 PRINT "I PLAY ";B
4510 PRINT
4520 LET J=USR(P,B+6,3)
4530 LET U=U-1
4540 IF T<100 THEN GOTO 2010
4550 REM I WON I WON I WON
4560 F=1
4570 Z=1
4580 GOTO 2010
6000 REM SUBROUTINE TO LOOK AT ONE ROW, COL, OR DIAG
6010 REM I IS THE POSITION OF REFERENCE
6020 REM L,M,N ARE RETURNED WITH CONTENTS OF THE THREE SQUARES
6030 REM ENTER AT 6100,6200,6300, OR 6400...
6040 REM   TO EXAMINE ROW,COLUMN,DOWN DIAGONAL OR UP DIAGONAL
6090 REM W=HORIZONTAL
6100 LET J=(I-1)/3*3+9
6110 LET D=1
6120 GOTO 6500
6190 REM W=VERTICAL
6200 LET J=I-(I-1)/3*3+9
6210 LET D=3
6220 GOTO 6500
6290 REM W=DOWN DIAGONAL
6300 IF I-1<>(I-1)/4*4 GOTO 6440
6310 LET D=4
6320 REM BOTH DIAGONALS GO THRU CENTER
6330 LET J=11
6340 GOTO 6500
6390 REM W=UP DIAGONAL
6400 LET D=2
6410 IF I>1 IF I<9 IF I=I/2*2+1 GOTO 6330
6430 REM A DIAGONAL DOES NOT GO THRU THIS SQUARE
6440 LET J=0
6450 RETURN
6490 REM NOW WE KNOW CENTER OF THIS THREE AND +/- OFFSET
6500 LET L=USR(G,J-D)
6510 LET M=USR(G,J)
6520 LET N=USR(G,J+D)
6530 RETURN


100F=1
101PR
102PR"NEWGAME"
110I=7
111I=USR(P,I,0)*0+I+1
112IFI<16GOTO111
113U=9
114Z=0
115IFF=0GOTO401
116GOTO201
151Z=1
152F=0
201I=6
210PR
211I=I+1
212PR"  ";
213GOTOUSR(G,I)*2+220
220PRI-6;
221GOTO230
222PR"X";
223GOTO230
226PR"O";
230IFI/3*3=IGOTO240
231PR" I ";
232GOTO211
240PR
242IFI=15GOTO300
243PR"---+---+---"
244GOTO211
300IFZ=0GOTO310
302IFF=1GOTO305
303PR"YOU WIN"
304GOTO101
305PR"I WIN"
306GOTO101
310IFU>0GOTO321
311PR"CATS"
312F=1-F
313GOTO101
321PR"YOUR PLAY";
322INPUTI
323IFI>0IFI<10GOTO327
324PR"ONE DIGIT ONLY"
326GOTO321
327IFUSR(G,I+6)=0GOTO331
328PR"TAKEN"
329GOTO321
331U=USR(P,I+6,1)*0+U-1
332W=610
333GOSUBW
334IFJ>0IFL*M*N=1GOTO151
335W=W+10
336IFW<650GOTO333
341IFU=0GOTO201
401I=1
402T=-1
430S=0
431IFUSR(G,I+6)>0GOTO448
432W=610
433GOSUBW
434IFJ=0GOTO441
435J=L+M+N
436IFJ=4GOTO441
437IFJ=2S=S+20
438IFJ=6S=S+100
439IFJ=0S=S+2
440S=S+J
441W=W+10
442IFW<650GOTO433
443IFS<TGOTO447
444T=S
445B=I
447PR".";
448I=I+1
449IFI<10GOTO430
450PR"I PLAY ";B
451PR
452J=USR(P,B+6,3)
453U=U-1
454IFT<99GOTO201
456F=1
457Z=1
458GOTO201
610J=(I-1)/3*3+8
611D=1
612GOTO650
620J=I-(I-1)/3*3+9
621D=3
622GOTO650
630IFI-1<>(I-1)/4*4GOTO644
631D=4
633J=11
634GOTO650
640D=2
641IFI>1IFI<9IFI=I/2*2+1GOTO633
644J=0
645RETURN
650L=USR(G,J-D)
651M=USR(G,J)
652N=USR(G,J+D)
653RETURN
```

ERRATA—Volume 2, Issue 11-12, page 6 (VDM-1 modifications). Line 4 of the modification list should read: "Connect a jumper from pin 7 of IC 17 to pin 4 of IC 17."

THE INDY BYTE CHASER—Newsletter of the Indianapolis Small Systems Group (ISSG) covers activities of the group. Contact Keith Pieper, 54 Sherry Lane, Brownsburg, IN 46112 for meeting schedules and location. When writing, a stamped self addressed envelope is suggested.

GULTON 1030 PRINTER TERMINAL—RS 232, Univac print mechanism, operative NOW, replaced with new terminal. David Ingram, 800 Oak Grove Ave., P.O. Box 896, Menlo Park, CA 94025, telephone (415) 323-6164.

ALTAIR 8800 Computer, Sanyo VM4092 Video Monitor, Cherry keyboard, 20K Pro. Tech. RAM, ACS, Tarbell Cassette Interface, Proc. Tech. Video Interface, 3P+S I/O board Proc. Tech. ALS-8, 2KRO, beefed up power supply, mother board with all 16 edge connectors, listing of 115 basic programs, manuals, extra parts, past issues of *Byte, Interface, Homebrew Newsletters*, and other documentation. Complete system only. Retail value $2659, I want $2000 firm. Leaving town. D. Wier 673-6023, 9AM-6PM. 653-7836 after 6.

Cyclops Camera—Does anyone have a Cyclops camera and controller board? If so, I would like to discuss its operation with you. Call Eric in Livermore at 415-443-1851 (eves).

TELETYPES—Models 28 through 40, new or rebuilt, RO's, KSR's, ASR's. All available immediately. NATIONAL TELETYPEWRITER CORP., 207 Newtown Rd., Plainview, NY 11803. Contact Joe Gibbons at 516-293-0444.

SOL User Group. If you own or have ordered Processor Technology's SOL computer, please send your name, address, phone number and ideas to Bill Burns, 4190 Maybell Way, Palo Alto, CA 94306.

NORTHWEST INDIANA CLUB—Now forming. For information contact David Kominiak, Computer Learning Exchange, 6637 Kennedy Ave., Hammond, Indiana 46323.

SONOMA COUNTY COMPUTER CLUB—Meeting first Tuesday of month at the LO*OP CENTER, 8099 La Plaza, Cotati, CA 94928. Meeting time is 7:30 PM.

SAN DIEGO—ELECTRONIC PRODUCT ASSOCIATES, INC. 1157 Vega Street, San Diego, California 92110, 714-276-8911, announces the availability of the ALL NEW MICRO-68b Micro-bomputer. The MICRO-68b comes completely assembled with hex-keyboard, 6 digit LED display, 8K RAM, 1K PROM Monitor system, CRT/TTY/Audio Cassette interface. It is housed in a ruggedized aluminum cabinet with a 13 slot exorcisor compatible mother board and 20 amp power supply. THe MICRO-68b utilizes the 6800 microprocessor chip set now manufactured by Motorola, AMI, Fairchild, Hitachi and Thompson CSF. The MICRO-68b lists for $1878.00 and is available from stock.

Amateur Radio Auction—One of the largest amateur radio auction events will be held February 26, 1977 at the Ford Aerospace and Communications Corporation cafeteria. Auction starting time is 9:00 a.m. Saturday. Doors open at 8:00 a.m. for sellers to register and set up equipment. Door prizes, flea market, exciting auctioneers, and time to socialize too. Location is 3939 Fabian Way, Palo Alto, CA 94303. Sponsored by the South Peninsula Amateur Radio Klub—SPARK.

CLUB LIBRARY—Gordon French, club librarian, has lots of interesting material and is able to loan it to anyone with a definite need, but . . . *please adhere to the following:*
    ☆ Limit your telephone calls to the hours of 7PM to 9PM weekdays only. This is important. Gordon's phone number is (415) 325-4209 in Menlo Park.
    ☆ Be specific with your request and Gordon can probably help you—he cannot randomly review the contents of the library for you.
    ☆ No reproductions will be made of any materials.
    ☆ All materials loaned must be returned so they are available for others to use in the future.

HOW TO GET THE NEWSLETTER—Anyone interested in computers as a hobby may receive the *Newsletter* by sending a request to the **Homebrew Computer Club Newsletter, P.O. Box 626, Mountain View, CA 94042.** The *Newsletter* is distributed monthly at the club meetings and is also mailed to individuals who are unable to attend the meetings.
    If you have an input to the *Newsletter*, send it in and it will be published as quickly as possible. However the editors cannot promise that everything sent will be published immediately. All manuscripts must be typed and carefully proofed. All listings and diagrams should be as clear and easy to read as possible.
    The *Newsletter* is made possible by your donations. Please remember that we must pay for postage, labels and printing. Donations may be given to **Ray Boaz** at the club meetings or sent to the above address.

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FIRST WEST COAST COMPUTER FAIRE
EXCLUSIVELY DEVOTED TO PERSONAL & HOME COMPUTING

- Present a **TUTORIAL** for an absolute beginner, just starting to think about owning his own computer
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- Personal Computers for Education associated with a University of California short-course
- Computers & Amateur Radio
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- Computer-Driven, & Computer-Assisted Music Systems
- Speech Synthesis Using Home Computers
- Microprogrammable Microprocessors for Hobbyists
- Program & Data Input via Optical Scanning

- Floppy Disc Systems for Personal Computers
- Computer Games: Alphanumeric & Graphic
- Computers & Systems for Very Small Businesses
- Personal Computers for the Physically Handicapped
- Personal Word-Processing Systems
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- Other Sections for Club Leaders, Editors, Organizers, etc.

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Contents

HOMEBREW COMPUTER CLUB MEETINGS
Where And When

The Homebrew Computer Club meets at 7PM at the Stanford Linear Accelerator Center Auditorium. Dates scheduled for February are the 2nd and 16th, and for March the 2nd, 16th and 30th. The dates and the location are subject to change. If a change does occur, every effort will be made to provide advance notice in the *Newsletter*. □
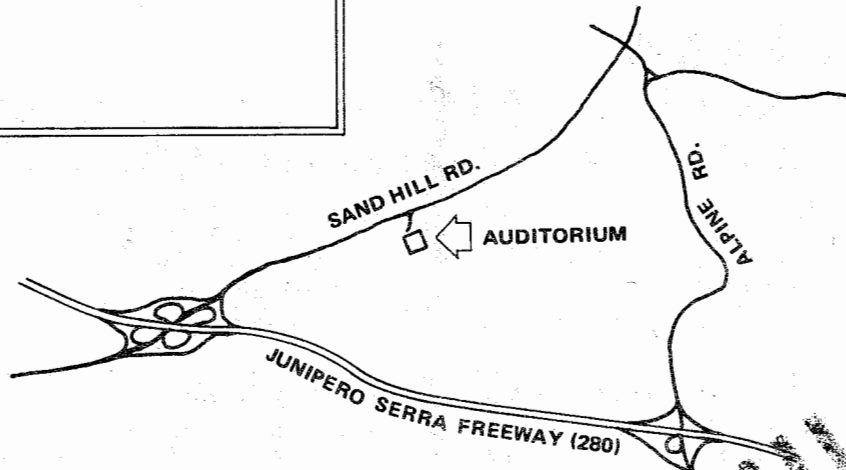
HOMEBREW COMPUTER CLUB
NEWSLETTER

P.O. Box 626
Mountain View, CA 94042

FIRST CLASS MAIL

Michael J. Holley

Daly City
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