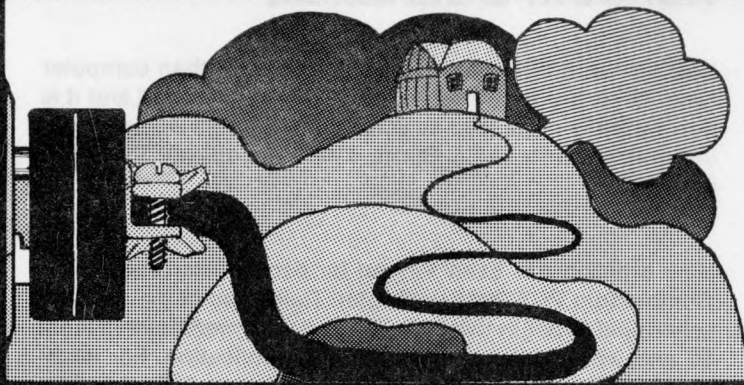# NEWSLETTER Homebrew Computer Club

## Revolutionary Remote Controller Joel Miller

Two Homebrew Club members, Dan Sokol and Gary Muhonen, have designed a revolutionary new controller system for S-100 bus computers. The key feature of the system is that no new wiring need be strung between the computer and remote controller—the system uses the existing 110 VAC wiring already present in the location.

The system essentially consists of two elements—an S-100 compatible controller board that plugs into the computer motherboard and an ac-remote controller that operates the intended device. A 4-wire cable connects the S-100 controller board to a small epoxy wall receptacle box that resembles a calculator charger. The wall receptacle box holds a small printed circuit board that contains a transformer and a few other components. The computer transmits and receives signals through the receptacle box. The receptacle box is located at the 110 VAC wall receptacle to keep 110 VAC off the controller board in the computer. The signal generated by the S-100 controller board goes through the wall receptacle box and is "impressed" onto the 110 VAC waveform for reception anywhere within the local wiring system.

The second part of the system consists of the ac-remote controller. The ac-remote controller contains the decoding circuitry, two relays, two 110 VAC receptacles, and a line cord. The ac-remote is simply plugged into the wall and one or two electrical devices such as lights plugged into the two receptacles on the remote box. The digital word transmitted over the 110 VAC wiring is decoded by the remote, and if the word is intended for that particular ac-remote, one of the two lights is turned on or off. Both channels of the dual-channel ac-remote controller are capable of supplying 500 W.

Not only can two electrical gadgets be controlled by the ac-remote controller, but the entire system is bidirectional—the computer polls all channels and knows what devices are on or off. The entire system is immune to false triggering—several circuits ensure that even if there is a transient on the line, the ac-remote won't actuate. The system is easily programmed in a number of ways, including Basic.

Future plans include a single-channel ac analog remote controller, a dual-channel temperature indicator, a controller for the Apple-II system, a multi-channel digital indicator for burglar alarms and a real-time clock board with battery back-up that measures time from 100 microseconds to 10,000 days. Applications for this system are obviously endless, and range from simple home applications to complex industrial controls. For example, I would love to be able to set my computer to wake me up in the morning by the following process: At 5:30 am, the computer would crank up the heat in the house so it would be warm when I get up. At 6:30, my machine will start the coffee perking (Hal—black, one sugar please) and at 6:45 the bath water will be running. At 6:50 the stereo will come on to wake me with soft music and if I'm not up within 10 minutes, a blaring buzzer will remind me that I've got to be sitting behind a desk in Silicon Gulch within the hour. But the real beauty of a computer-controlled system is that the computer will know when Saturday has arrived and that if I get woken up at 6:50 in the morning, somebody's plug is going to get pulled!

The S-100 controller board ($149) and ac-remote controller ($79) kits are available now. For more information, contact Gary Muhonen, Mountain Hardware, P.O. Box 1133, Ben Lomond, CA 95005. Phone (408) 336-2495.

## Colossal Computer Cartoon Book

Gosh! Gee whiz! Holy Moley! Someone has finally done it and collected all the jokes, jibes and cartoons about the world of computers. Would you believe 15 chapters ranging from cartoons about robots to computer dating to computers in everyday life ("Daily Data") to computers in the office ("Keypunch Lines") to the inevitable malfunctions. A full-page movie ad for the Fortran Monster—scary! Four noted cartoonists are highlighted, each with their own section, namely Dave Harbaugh (very droll), Paul ("The Robot and the Professor") Swan, Sandy Dean and Al Johns. We didn't count them but there have to be several hundred cartoons from ha, ha to droll to punny to sophisticated. The *Colossal Computer Cartoon Book* is available for $5.95 postpaid from Creative Computing, P.O. Box 789-M, Morristown, N.J. 07960.

# Random Data Robert Reiling

Users groups develop as fast or even faster than computer systems. A few months ago, the SOL group started and it is now formally organized as **SOLUS** (SOL Users Society). For information, write to Bill Burns, 4190 Maybell Way, Palo Alto, CA 94306.

Now a group has been formed for people interested in the Commodore **PET 2001** computer. Deliveries of the PET are scheduled to begin this Fall. The first year membership fee is $5 and will include the User Notes publication. For information, write Gene Beals, PET User Group, P.O. Box 371, Montgomeryville, PA 18936.

Ohio Scientific, Inc. has issued their *Small Systems Journal*, Vol. 1, No. 1 which should be of interest to OSI owners and others with 6502 systems. This issue is 19 pages and includes articles on using the 6502 assembler, the auto-load cassette system, etc. A one-year subscription is $6. Write Ohio Scientific, 11679 Hayden St., Hiram, OH 44234.

Another publication has just been released called *Personal Computer News* and is published by—check this carefully—DataNation Publications. It is billed as "Covering the entire affordable computer field." Twelve pages are in the charter issue with sections devoted to product evaluations, software courses, etc. Subscription price is $9. You may be able to get a sample compy from Personal Computer News, P.O. Box 425, Dayton OH 45419.

Don't forget **Personal Computing 77** at the Shelburne Hotel, Atlantic City, NJ 08401. Dates are August 27th and 28th with over 150 exhibits and 60 hours of seminars.

The Digital Group has released a new flyer which consolidates flyers 1-9 into a well organized 32-page product information catalog. A user group is also announced and called **JUDGE** (Joint Users of Digital Group Equipment). A newsletter will be published for $12 pr year. Write to JUDGE Editor, c/o DGSS, Inc., P.O. Box 1086, Arvada, CO 80001. A copy of the flyer may be obtained from The Digital Group, P.O. Box 6528, Denver, CO 80206.

# Compact Microprinter

Centronics Data Computer Corp. has introduced a compact, high-speed, low-cost microprinter. The microprinter produces copy on aluminum coated paper by discharging an electric arc to penetrate the coating, which is less than one micron thick. Toners ard ribbons are not required.

The printed characters, unlike those resulting from thermal printing, are impervious to light, temperature and humidity. In additon, the finished printed page may be reproduced on most office copy machines. The miroprinter has a print speed of 240 characters per second and costs $595. For more information, contact Centronics, Hudson, NH 03051. Phone: (710) 228-6505.
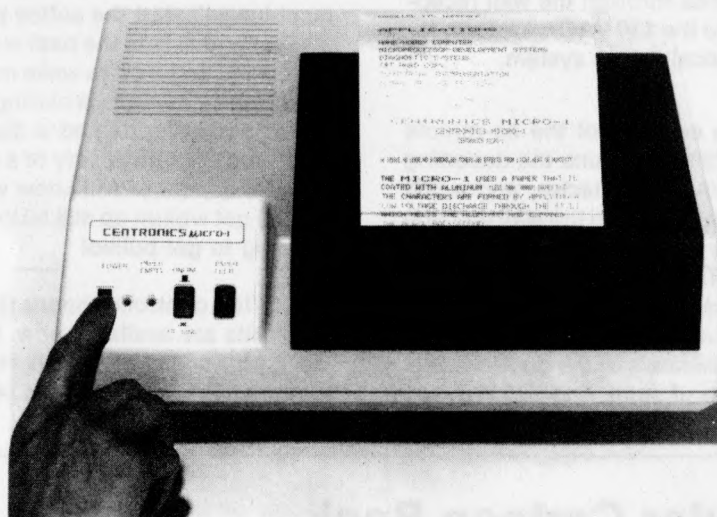
# Standards And Conventions Tom Pittman

In an infant industry like ours, the standards dispute occupies a peculiar role. The people using the systems—and particularly the people trying to use more than one system at a time—are crying, "Let's have some standards!" while the people building these systems appear to want nothing to do with standards. I say "appear" because some of the diversity we see is not intended to work against standardization; it only turns out that way.

Perhaps a parable will make the problem a little clearer. When you buy a rubber stamp, be it a date stamp, a "Paid" stamp or whatever, there will be a flat spot on the handle if it has a round handle. If you hold it with the flat spot facing you, the stamp will imprint with the correct orientation; if it faces away, the date will be up side down. Well, almost always. I bought one with the flat spot on the wrong side. Because it was a cheap model, there was no way I could reverse that handle so it would work in the conventional manner. Since the date stamp gets used more than the others, soon the dates were right side up and everything else was up side down. The upshot is that now all of the rubber stamps in the house have their handles on backwards. I call this a parable because it makes several points.

First, standards serve a purpose not so much of defining what is "right" or "wrong" but to provide a convention that we can get used to, so that we can use things out of habit. The ability to relegate activity to habit frees the mind for other activities, and makes such activities relatively accessible to more people. How many people would type if every keyboard were different?

Second, note that the same factors that affect learning—primacy and frequency—also control the setting of standards. The date stamp got more use, so its peculiarity dominated. MITS was the first to provide personal computing on a large scale, so the Altair bus developed into the standard. On the other hand, audio cassettes were never swamped by a single recording format, so there was little motivation to adhere to any standard. Actually, the situation is a little more complex than that, but primacy and frequency play the biggest parts.

Third, it often turns out that one anomaly can subvert an entire standards effort. While the national standard (if you will) has the flat spot on the rubber stmap handle facing you, in my house it is the reverse. All because one lousy cheap date stamp was put together backwards. I see this same process happening in out industry. Almost two years ago, a committee met in Kansas City to define a standard for audio cassette interchange. Many controllers were designed to this spec, but because of its low data rate and bit density most of us consider is unsuitable for local bulk storage. Enter Tarbell, which has a KC-compatible operating mode, but is also capable of a much higher data rate and bit density. Unfortuneately, the higher data rate recording mode has some serious shortcomings when used for interchange. But instead of the more reasonable approach consisting of KC standards for interchange and Tarbell for local data storage, we begin to see a strong movement afoot to make the Tarbell recording format the interchange standard. Witness the article in August *Kilobaud* (p. 18).

I titled this column "Standards And Conventions" because the two are related more than they are dissimilar. I think the major difference between the two is that standards are more formal than conventions, and therefore more widely respected. I think it is *conventional* for rubber stamps to have the flat spot face the user; it would be a standard if the Government or some other ruling body (such as ANSI—they have their thumbs in a lot of pies) said this is the way to do it. There is no law that says rubber stamps *must* be made that way (unless there is some regulation affecting ther Federal procurement channels, but that does not affect most of use), but the rubber stamp makers do it anyway. Perhaps they have discovered that, by appealing to habitual behavior, their product is more widely accepted and sells more. In our case, there seems to be neither standards nor conventions, except that it is conventional for each designer to start out with tabula rasa instead of building on the work of others in the field. And there is as yet no market pressure—the ones clamoring for standards are not those who are about to buy a system, but those who are aleady locked into something. In fact, to date the market pressure has been away from standards, as everyone rushes out to buy the newest and most innovative products.

Yet for all the innovation, standardization is not precluded. Look at all the innovations that plug into the de-facto standard S-100 bus. Perhaps all we need is a little more care (or caring) on the part of the designers, so that before making irrevocable design decisions, they ask themselves, "Why am I making this different than...? Have I bothered to examine the other widgets out there to see if my ideas are adaptable to some existing standards? If I changed the design to be more compatible, does it seriously hamper the value of the innovations, or does it merely wound my pride?"

Finally, let me remark that standards and compatibility are serious issues not only for the hardware designers, but also the software designers. I recently had the opportunity to look over the specifications for a new operating system for the 6800. The designer specified a 6-byte monitor service call for system functions. He had carefully thought out what he considered to be the optimum interface, and perhaps he was right. But it flew in the face of the existing conventions which all used 3-bye subroutine calls. Thus, the new design locks out all other software and lock in the users to his company's products. The customer is not informed of this incompatibility until it is too late. It isnot that the job *could not* be done in a compatible fashion, only that the designer did not care.

In the last HCC meeting, I heard that the IEEE is trying to get some standards efforts applied to problems in microprocessors. I will be watching this with great interest, and I may even stick my thumb in (if they let me). In any case, I will try to keep you posted. I hope I can give you a balanced view of the standards problems between my opinionated rantings. If you have any comments, please let me know. It is only with the open exchange of a diversity of ideas that we can come up with viable standards.

# Heath Introduces Line Of Personal Computers

The Heath Company has introduced a new product line designed around two new computers, the H8 and H11. The H8 is an 8-bit computer based on the 8080A. It features intelligent front panel with octal data entry and display, and a resident monitor with built-in bootstrap for one-button program loading. The H11 is a 16-bit machine using the DEC LSI-11 with 4K of memory, a built-in backplane and regulated switching power supply.

System-compatible peripherals include a CRT terminal, paper-tape reader/punch, serial and parallel interfaces, a hard copy printer and a cassette player/recorder. I/O interfaces, additional memory and supplementary software packages are also offered. For more information, write for the "Computer Information Package" from the Heath Company, Dept. 360-26, Benton Harbor, Michigan 49022.

# Computer Rage

Tired of Monopoly, Aggravation and Sorry? Looking for a game that teaches something about computers as well as being fun? Then try Computer Rage. First of all, it uses three dice, but they're *binary* dice, so you can move from 0 to 7 spaces per turn. There are priority interrupts, restricted use input and output channels, power failures, program bugs and branch points. Your objective is to get your three programs (shaped like miniature disk packs) from the input to the output weaving through a maze of program steps, checkpoints, I/O queues, interrupts and decision points.

The game comes with a large (19 by 19") colorful board, 12 playing pieces, 3 binary dice, 38 interrupt cards, rules and a booklet describing how to use the game as an educational tool. Computer Rage is available for $8.95 postpaid from



Creative Computing, P.O. Box 789-M, Morristown, NJ 07960.

# ZOL Updates 8080 Systems To Z-80 CPU

HUH Electronic Music Productions has announced the availability of several new personal computing products. The first is the ZOL modification kit designed to upgrade a Processor Technology SOL-20 to a Z-80 CPU. The kit allows a Cromemco ZPU board (a 4 MHz CPU board) to be installed into the SOL mainframe. The kit is supplies parts, pc board and instruction manual. The price is $29.95.

The other products are software, supplied on CUTS (Computer User's Tape System) compatible cassettes. CUTS cassettes may be directly loaded into SOL/ZOL or into any other computer with a CUTS cassette interface installed. Currently, HUH offers the complete line of Cromemco software including ROS, Control Basic and a Z-80 monitor.

ROS (Resident Operating System) is a program development tool for Z-80 machines. It consists of a complete assembler (Zilog compatible) and text editor. It also provides systems functions such as display, modify, verify and move memory as well as the ability to program 2708-type EPROMs using a Cromemco Bytesaver board. ROS resides in 8K of memory and is supplied with a user's manual. Price is $40.

Control Basic is an extended version of Dr. Li Chen Wang's Palo Alto Tiny Basic (see *Dr. Dobb's Journal*, Vol. 1, No. 5). Features include multiple commands per line, extensive output formatting (including hard and soft terminal widths), numerical field width, tabs, overprinting, decimal or hex output, string input and output with arrays automatically dimensioned, input and output commands for direct I/O control, etc. Control Basic requires only 3K of ROM, or RAM and HUH has added CSAVE and CLOAD to the existing 43 commands. This program is compatible with both 8080 and Z-80 systems and the cost is $40.

The Z-80 monitor fits in 1K of memory and allows the user to display, verify, move and modify memory locations, program EPROMs, display and modify all registers, set up to five break points, etc. The monitor is supplied in two versions—one for ZOL I/O and the other for S-100 bus machines. Also included is a user's manual and a source listing. Price is $25. For more information, contact HUH Electronic Music Productions, P.O. Box 259, Fairfax, CA 94930. Phone (415) 457-7598.

# Strange Names Robert Reiling

Names are becoming an interesting part of the personal computing scene. Naturally, **Apple** is at the core of things. Recently, a computer store ad appeared for **Strawberry Electronics** in Belmont, CA. **Computermania** will take place August 25th through 27th at the Boston Commonwealth Pier. **Bamug** is a computer club meeting in Hayward. And, come to

think of it, **Homebrew** always turns on the postman. The **Digital Deli** computer store is now operating at 80 W. El Camino in Mountain View. Field service is available from **MicroMouse**, 450 San Antonio Rd., Suite 34, Palo Alto, CA. And, don't forget about **Parasitic Engineering**. More nifty names next month if you send me some unusual ones you have discovered.

# Souped-Up Lunar Lander Now In Fortran

More interest is developing in the use of Fortran by users of personal computer systems. For the June 8, 1977 issue of the *Newsletter*, David G. Krauss sent a Souped-Up Luner Lander program in Basic. After looking over the program, Tom Smith, president of the hobbyists club in Omaha, set out to do a Fortran version. Tom checked the program on a larger commercial computer since he did not have a small system with Fortran capability.

```
FORTRAN IV          SOURCE LISTING:              06/23/77

   1           PROGRAM LUNAR
   2   C       LUNAR LIFEBOAT
   3           DIMENSION RNUM(5)
   4           INTEGER T,V,H,F,B,L,TYPE,TYPEIN,ANSWER
   5           DATA TYPE/4/,TYPEIN/4/,NO/'N'/,SEED/37584381/,B/0/
   6           WRITE(TYPE,100)
   7    100 FORMAT('DO YOU WANT INSTRUCTIONS? TYPE Y=YES,N=NO')
   8    101 READ(TYPEIN,200,ERR=101,END=2000)ANSWER
   9    200 FORMAT(1A4)
  10           IF(ANSWER.EQ.NO) GO TO 500
  11           WRITE(TYPE,300)
  12           WRITE(TYPE,310)
  13           WRITE(TYPE,320)
  14           WRITE(TYPE,330)
  15           WRITE(TYPE,340)
  16           WRITE(TYPE,350)
  17           WRITE(TYPE,360)
  18    300 FORMAT('WHILE FLYING A LOW ORBIT MAPPING MISSION NEAR THE MOON'
  19          1,/,'YOUR CRAFT HAS HIT A FLYING WOMBAT!')
  20    310 FORMAT('(AN AVIAN MAMMAL NATIVE TO THE AREA)',/,'YOU ARE SAFE',
  21          1' INSIDE YOUR EJECTED SURVIVAL CAPSULE')
  22    320 FORMAT('WHEN YOU DISCOVER THAT YOUR AUTOMATIC DESCENT COMPUTER',
  23          1/,'IS JAMMED FULL OF WOMBAT FEATHERS AND HAS FAILED,')
  24    330 FORMAT('YOUR MAIN THRUST UNIT IS FALTERING BUT YOU MAY GET DOWN',
  25          1' SAFELY.')
  26    340 FORMAT('TO SAVE THE CAPSULE YOU MUST LAND AT LESS THAN 2 FT/SEC.'
  27          1,/,'TO SURVIVE YOU MUST LAND AT LESS THAN 5 FT/SEC.')
  28    350 FORMAT('CAPSULE INSTRUMENTATION IS OK AND WILL TELL YOU WHERE',
  29          1' YOU ARE.' )
  30    360 FORMAT('REMEMBER, GRAVITY WILL ADD 5 FT/SEC. TO YOUR DESCENT.',/,
  31          1'GOOD LUCK!!')
  32   C
  33    500 CALL RAND(RNUM,5,SEED)
  34   C
  35           L=RNUM(1)*10+25
  36           WRITE(TYPE,550) L
  37    550 FORMAT('YOUR ENGINES ARE CAPABLE OF A MAX. BURN OF',I3,' FT/SEC.
  38          1 ')
  39   C       INITIALIZE DATA: T=TIME,H=HEIGHT,V=VELOCITY,F=FUEL LEFT
  40           T=1
  41           V=RNUM(2)*75-75
  42           H=RNUM(3)*300+200
  43           F=120
  44           WRITE(TYPE,600)
  45    600 FORMAT('MANUAL DESCENT MODE ENGAGED',/,'TIME HEIGHT VELOCITY',
  46          1' FUEL BURN',/,'SEC. (FEET) (FT/SEC) LEFT')
  47    650 WRITE(TYPE,700) T,H,V,F,B
  48    700 FORMAT(I4,I7,3X,I6,I5,I5)
  49           IF(F.EQ.0.OR.L.EQ.0) GO TO 820
  50    750 READ(TYPEIN,800,ERR=750,END=2000) B
  51    800 FORMAT(I3)
  52   C       L=LIMIT OF BURN
  53   C       B=BURN
  54    P20 IF(B.GT.L) B=L
  55   C
  56           IF(F.LE.0) B=0
  57           IF(B+100.LE.100) B=0
  58           F=F-B
  59           T=T+L
  60           V=V-5+B
  61           H=H+V
  62           E=RNUM(4)*12
  63           IF(E.LT.9.AND.E.GT.6) GO TO 1600
  64   C       E=DETERMINES THRUST FAILURE
  65    830 IF(F.LE.0) GO TO 950
  66           IF(H.LE.0.AND.V+100.LE.95) GO TO 1100
  67           IF(H.LE.0.AND.V+100.LE.98) GO TO 970
  68           IF(H.GT.0) GO TO 650
  69    850 WRITE(TYPE,900) V,F
  70    900 FORMAT('CONGRATULATIONS! YOU HAVE LANDED SAFELY.',/,/,'YOUR ',
  71          1'VELOCITY AT TOUCHDOWN WAS ',I3,' FT/SEC. WITH ',I3,' UNITS OF'
  72          2,' FUEL REMAINING')
  73           GO TO 1300
  74    950 WRITE(TYPE,960)
  75    960 FORMAT('!!!OUT OF FUEL!!! PRAY')
  76           F=0
  77           IF(H.GT.0) GO TO 650
  78           GO TO 1100
  79    970 WRITE(TYPE,980)
  80    980 FORMAT('YOU HAVE MADE A CONTROLLED CRASH! YOU ARE ALIVE',/,
  81          1'BUT THE LANDER IS DAMAGED AND YOU ARE STRANDED!')
  82    985 WRITE(TYPE,990) V,F
  83    990 FORMAT('YOUR CRASH VELOCITY WAS ',I3,' FT/SEC',/,
  84          1'AND YOU HAD ',I3,' UNITS OF FUEL LEFT')
  85           GO TO 1300
  86    1100 WRITE(TYPE,1200)
  87    1200 FORMAT('CRUNCH! YOU HAVE JUST BECOME THE MOON''S NEWEST CRATER',
  88          1/,'YOUR FLIGHT PAY WILL BE FORWARDED TO YOUR WIDOW.')
  89           GO TO 985
  90    1300 WRITE(TYPE,1400)
  91    1400 FORMAT('LIKE TO TRY AGAIN? (Y/N)')
  92           READ(TYPEIN,1500) ANSWER
  93    1500 FORMAT(1A4)
  94           IF(ANSWER.NE.NO) GO TO 500
  95           STOP
  96    1600 CALL RAND(RNUM,5,SEED)
  97           L=L-(RNUM(5)*10+1)
  98           IF(L+100.LE.100) GO TO 1800
  99           WRITE(TYPE,1700) L
 100    1700 FORMAT('DETERIORATION IN MAIN THRUST UNIT',/,'YOUR MAX. BURN IS'
 101          1' NOW ',I3,' FT/SEC.')
 102           GO TO 830
 103    1800 WRITE(TYPE,1900)
 104    1900 FORMAT('YOUR THRUST UNITS HAVE FAILED COMPLETELY')
 105           GO TO 830
 106    2000 STOP
 107   C
 108           END
```
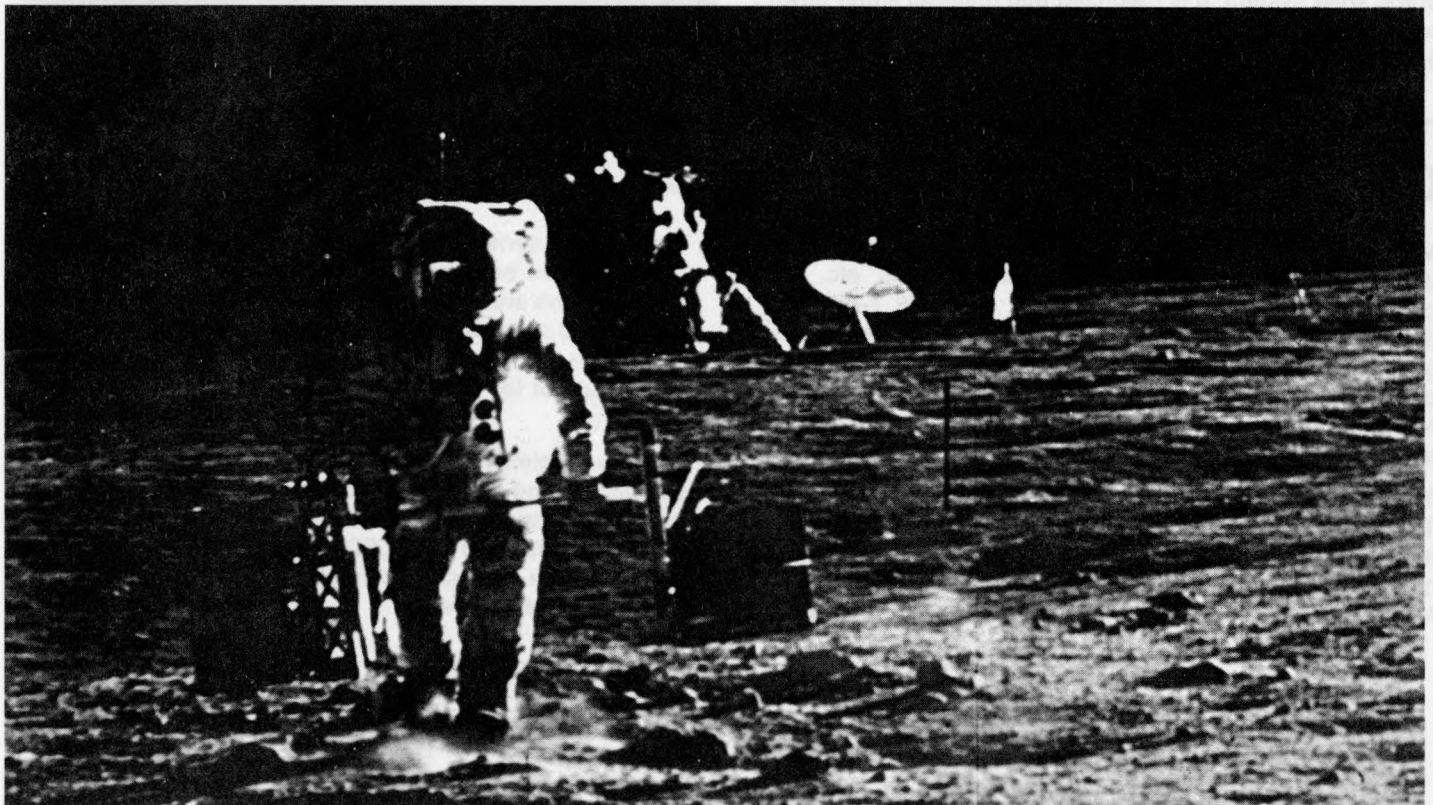
# Homebrew Notes

## STANDARD PORT ADDRESSES
Ed Hall has compiled a list of 8080 ports in use by various manufacturers. Since new products are introduced every day, this list is probably not complete. To update the list, notify Gordon French at 325-4209 between 7 and 9 pm.

## GODBOUT ECONORAM II
Econoram II 8K boards with the 4K group-split switch can be made to run in machines with no front panel by cutting pin 12 of IC10 (phase 01 clock). When the machine in question is the Cromemco Z-2, pull unprotect (S-100 pin 20) up to 5 V. Those intending to wave solder the Econoram board should leave the DIP switch off and hand solder it in later.

| Port | Device |
|------|--------|
| 00-03 | PTC, Cromemco, IMSAI, System I/O |
| 04-09 | Cromemco Tuart |
| 0E-0F | Cromemco Dazzler |
| 10,11,12 | Cromemco Cyclops |
| 30-3F | Cromemco Floppy Disk |
| 40 | Comemco Bank Select |
| 50-59 | Cromemco Tuart |
| 6E-6F | Tarbell |
| 7D, 7E, 7F | Digital Research CPM |
| AF | Heuristics Speech Lab |
| C0, C1 | ICOM Floppy |
| C8 | Processor Tecnology VDM-1 |
| E0,EF | Computalker |
| F0-FF | Processor Technology SOL Ports |

## PTC/STC MUSIC PACKAGE
Members have received the package and report that it works well. Gordon French spent seven hours entering 110 bars of the Mozart Clarinet Concerto. He has put the score into the Homebrew Library.

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# Uranus Has Rings, Too

We don't know what this has to do with personal computing, but did you know that at least five rings, all in a narrow belt 4400 miles wide, have been observed circling the planet Uranus? They were observed from the Kuiper Observatory, a highly modified C-141 aircraft for astronomers.

The C-141 flew over the southern oceans for enough south to be well within the shadow of Uranus, and far enough into the Earth's night hemisphere to be above any clouds and to see occultations of the rings on both sides of the planet—positions not possible from any single ground-based observatory.

The scientists who discovered the rings suspect that the rings are composed of material present during the formation of the solar system. It is theorized that material either never coalesced into moons or is the remnant of moons that have disintegrated.
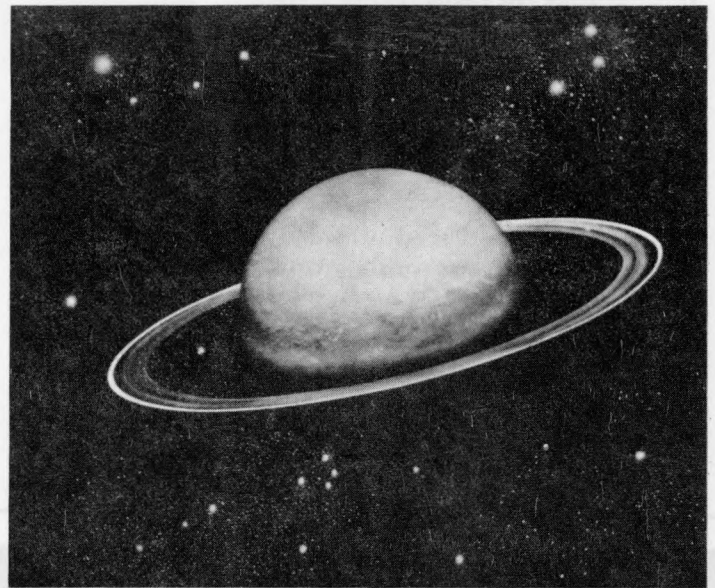


**Artist's conception** of the rings around Uranus, seventh planet from sun—a billion miles beyond ringed Saturn.

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# Old Chips Simplify Hex Readout Eric Breeze

Most of you have seen various circuits for displaying hexadecimal readouts on 7-segment displays, LEDs, etc. The circuits use a combination of gates, the 7446 7-segment decoder, ROMs PROMs and other complexities. For a number of years, Farichild has produced two 7-segment decoder/drivers that display in hex without any extra circuitry. Not only do they display in hex, but they also contain a 4-bit latch to freeze data.

The pinouts are identical to the 7446 except that the Lamp Test input (LT) is made into an active-LOW Latch Enable input (EL). The 9368 can be used for driving common-cathode LED displays such as the FND70, FND500, 501, MAN3, 4, etc. It sources 18 mA of current at 1.7 V, does not require any series resistors and has active-HIGH outputs. The 9370 can be used similarly except for common-anode LED displays and incandescent lamps. The 9370 sinks up to 25 mA, and can sink up to 40 mA but is not guaranteed at this level. The 9370 does require current limiting resistors for LEDs but not for incandescent lamps.

The hexadecimal decode format produces numeric codes '0' through '9' and alpha codes 'A' through 'F' using the upper and lower case fonts as shown. With just six of these devices, all the address and data LEDs on an IMSAI or Altair front panel can be replaced so information is displayed in the convenient hex format.

# Bulletin Board

**WANTED—Singer, Friden, Talcott disk** drives. We will buy drives from you or will make your drive operational for you. Nick Hurd. (415) 657-2666.

**Computers And The Stock Market—I** am interested in forming a group to compare notes and gather information on the use of computers and timeshare services to follow price changes in the stock market. I know people are out there who are interested in this. I will volunteer to act as a clearing house and help plan get-togethers. Contact Jim Finnell, 760 S. Saratoga Ave., Z101, San Jose, CA 95129. Phone (408) 249-7977.

**M16 NEWSLETTER planned—Send** materials and suggestions to Fred Holmes, M16 Newsletter, 101 Brookbend Court, Maudin SC 29662. Send a stamped, self-addressed envelope if you want a copy.

MICROMOUSE Computer Field Services— Is your computer being a louse? Are its parts all over the house? When fairy tales are all you hear, to fix the beast, call Micromouse! Contact John V. Volkborn, Microcomputer Systems House, 450 San Antonio Road, Suite 34, Palo Alto, CA 94306.

**FOR SALE—IMSAI assembled kit—as** is, never used: 8080-1, 22 MB sockets ($600), PIO-4-4 with cables ($150), PIC-8 ($100), three RAM-4 boards ($100 each), P.T.C. assembler firmware ALS-8 ($350). Earnest Alejandro. Phone 961-9623 after 7 pm.

**Call For Participation—You are invited** to participate in a 1978 National Computer Conference to be held June 5-8 in Anaheim, CA. You may participate in the following ways: write a paper for review, prepare a demonstration, prepare a short talk or send us your ideas on interesting topics. Detailed NCC guidlines for participation should be available from Mr. Stephen Miller, Conference Chairman, SRI, 333 Ravenswood Avenue, L1109, Melo Park, CA 94025 or Dr. Leonard Liu, Program Chairman, IBM Research Lab, K51/282, 5600 Cottle Rd., SJ, CA 95193.

**THE *NEWSLETTER* is made possible** by your donations. Please remember that we must pay for labels, postage, production and printing. Donations can be given to Ray Boaz at the club meetings or sent to P.O. Box 626, Mt. View, CA 94042.

**GET THE *NEWSLETTER!* Anyone in-** terested 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 club meetings and is also mailed to individuals who are unable to attend the meetings.

**FOR SALE—Ten cubic yards of two and** five ply NCR teletype paper (NCR paper is carbonless). We have about 3300 rolls of the stuff. This is a very thin paper and seems to last forever (more or less). Prices for two ply are $11 per carton for 1-9 carton, $8 for 10 cartons; for five ply, it's $8 per carton for 1-9 and $6 for 10 cartons or more. For more than 10 cartons we'll deal. We will accept cash (naturally), or a good check or we are willing to horse trade. Bob Mullin, Joe Gaunthier, 1980 National Ave., Hayward, CA 94545, phone (415) 782-0600.

**People liked the "circuit idea" last ish,** so we would like to continue publishing ideas on a more-or-less monthly basis. However, we need input, so please send in your ideas. When preparing your idea, keep the following requirements in mind.
We are limited to a single page, so keep the idea or application relatively simple. Illustrations should be large, clear and include all the information a person will need to build the circuit. A brief explanation should accompany the circuit to describe its operation and any other pertinent details (include graphs and tables where necessary). Keep it short and to the point. All text must be legibly written, preferably typed (double spaced). Please include your name and phone number (where you can be reached during the day) on all pages. If you have any questions, call Joel Miller at (415) 962-3372.

**FOR SALE—Tom Smith & Dave Storla** have one inch paper tape in 1,000 foot rolls. It's NCR, green and lightly oiled. $10 per 30 roll case or $2 per box of 5 rolls. $1 discount to club members. Shipping costs must be paid by purchaser. Contact Tom Smith, 2708 Calhoun St., Bellvue, NE 68005.

**OSI SYSTEM Information Exchange—I** am currently building an OSI system and would be interested in exchanging info with anyone of a similar bent. Write Bob Reiling, Box 626, Mountain View CA 94042.

**WANTED—New Product Ideas. If you** have a new hardware/software idea or prototype that can be sold to the American consumer household, contact me immediately. Now starting a company for national marketing of new consumer microcomputer products. My background is in finance, mass-marketing and organizing new ventures. Ted H. Hoffman, 745 Shelter Creek Lane, San Bruno, CA 94066. (415) 588-2716.

**FOR SALE—Minifloppy drive and 10** diskettes. Unused Shugart SA400 drive with 10 SA104 mini-diskettes (single-hole) and 16' long 3M dual-drive signal cable with connectors. I paid $40 for the cable and $436 for the Shugart drive and diskettes—a total of $476. Will sell for $400 or best reasonable offer. Pete Cornell, Box 1290, Los Altos, CA 94022, phone (415) 948-8269.

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

**IF YOU HAVE INPUT to the *Newsletter*,** send it in and it will be published as quickly as possible. The editors cannot promise that everything sent will be published. All manuscripts *must* be typed (double spaced) and carefully proofed. All listings and diagrams must be as easy to read as possible.

# In This Issue Contents

## Where And When Club Meetings

The Homebrew Computer Club meets at the **Stanford Linear Accelerator Center Auditorium.** Dates scheduled for August are the 17th and 31st. For September, the dates are the 14th and 28th. The dates and location are subject to change. However, if a change does occur, every effort will be made to provide advance notice in the *Newsletter*.
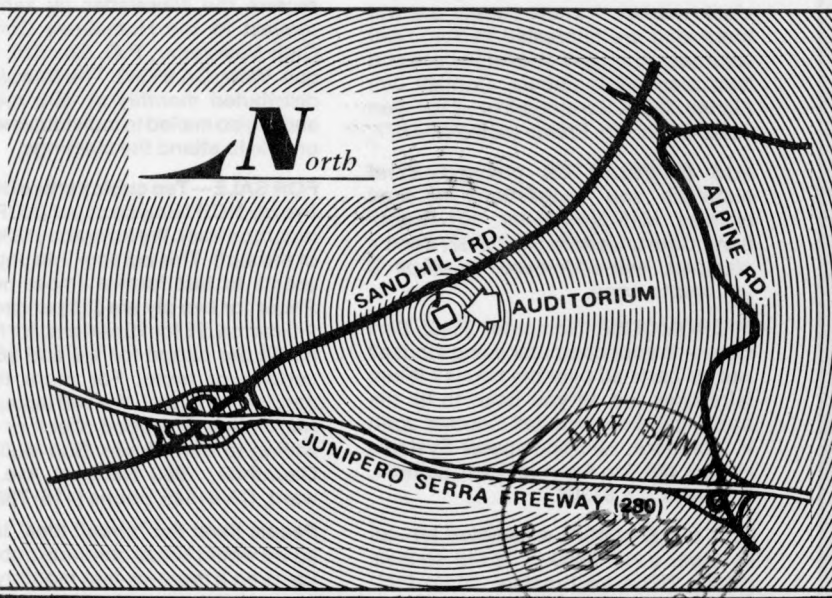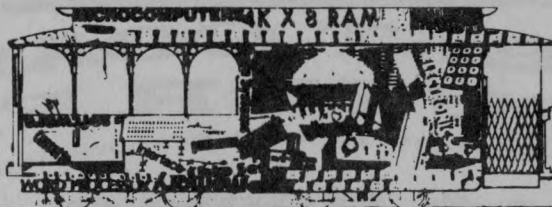


# Homebrew Computer Club

## *Newsletter*

P.O. Box 626, Mountain View, CA 94042

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Music & Computers (43)
Electronic Mail (8)
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Residential Energy & Computers (2)
Systems for Very Small Businesses (5)

Entrepreneurs (6)
Speech Recognition &
   Speech Synthesis by Computer (14)
Tutorials on Software Systems Design (11)
Implementation of
   Software Systems and Modules (10)
High-Level Languages for Home Computers (15)
Multi-Tasking on Home Computers (10)
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*middle* of "Silicon Valley" — the south end of the San Francisco Peninsula
expecting
■ 10,000-15,000 People ■ 50-100 Speakers ■ 150-190 Exhibitors
**MARCH      3  -  4  -  5,   1978**
*9am-6pm      9am-6pm      Noon-5pm*

(That's right after Compcon concludes in San Francisco)

# AND AGAIN

# The THIRD West Coast Computer Faire

will be held in
The Huge **Los Angeles Convention Center**
expecting
■ 12,000-16,000 People ■ 60-120 Speakers ■ 180-250 Exhibitors
**OCTOBER      27  -  28  -  29,   1978**
*9am-6pm   9am-6pm   Noon-5pm*

# YOU Can Be A Part Of It:

■**Talk about your latest project**      ■**Exhibit homebrewed system**      ■**Organize & chair Conference Section**

Write *now* for speaker's instructions       Prizes for best "homecooking"       Help gather speakers *you* want to hear
Conference talks will be published       (just like an old county fair)       Assure the Conference has topics that interest *you*

*Talks to be included in the published* **Conference Proceedings** *must arrive by January 2, 1978, in the required format.*

*Some* of the **Conference Sections** being planned:

- Tutorials for computer novices
- Speech synthesis & speech recognition
- Computer-driven & computer-assisted music systems
- Computer graphics & video art
- Personal computers for the physically disabled
- Manufacturer tutorials on explicit systems
- Personal computers for education
- Business systems using "home" computers
- Computers & amateur radio
- Hardware & software design & implementation
- Standards for hardware, interfaces & software
- Workshops for club leaders, retailers, NL editors, etc.

*Quick!* **Write for more details:**
Computer Faire, Box 1579, Palo Alto CA 94302