What would you like to see the Club do?

Here is your list of recent suggestions and topics:
Work out a way thru the gain of a lot of people in the club to reduce the price of components and of microcomputers. . . continue technical interchange . . . become a real exchange forum for hardware that really can be built as homebrew equipment, and not the blue skies dreaming of what we could do if we only had a 370/148 monster in our garage as it seems that some of the group have in mind. . . any comments? . . . programming techniques and hardware design with detailed explanation (seminar format?). . . . serve as a pool for programs, a place to get advice, new ideas, sources of hardware and software. . . . how to get your Altair up and running. How much memory to do what. . . TTY interfacing. . . more of just what its doing. . . help people interested in this field focus on 'who', 'where', 'how', 'when'. . . . help in developing low-cost I/O gear & equipment and IC sources. . . . new equipment, programs, end uses. . . discussions on hardware & software problems of "Hobby" type equipment. . . . packet switched radio repeater network (see Univ. of Hawaii) . . . provide a forum for ideas. . . . to fit our needs, the club should help those in need find others in need (or others to help). all past member profiles should be published periodically to help this out. . . mostly what it appears to be doing already. However, we could engage in a development project to design & build our own system that would be faster than microprocessor designs . . . open exchange of ideas, information, resources, and abilities. . . . teach me how to build a microprocessor/CRT/floppy disc/print, etc., and fill it/them with keen software. . . . supply otherwise unattainable seminars. . . . one member can talk on his experiences to others. . . . places to call for help. . . . for me basics of what's going on, very basic. . . . would like the use of a Fortran program which will give a machine language in which can be used on a small system . . . continue to exchange knowledge about software and hardware experience and valuable techniques . . . what members have done recently with micro-computers and peripherals. . . . same as now . . . hardware . . . I/O gear and interfacing problems. . . . share programs, library of circuits. . . . separate business meetings from technical sessions. Plan technical sessions on a subject with demonstrations, for example, CRT terminals. . . . provide means of exchanging soft/hardware ideas. . . . provide members with low cost hardware sources. . . . techniques of hardware design (e.g. interfaces), software methods (serial to parallel conversion for example). . . . keep up with new hardware/software products. . . . provide means for exchange of "want ads", type information. . . . get software and distribute, mass discount buying, hold meetings. . . . everything. . . . how about some sort of introduction to the club? . . . get more people interested in their own computers . . . interchange of experience in using available products . . . hardware and software applications in the home . . . make microcomputers easy to understand. . . . provide ways of getting cheap parts. provide easy communication among members. . . . say specifically what each part of a CPU does; and what about memory components? How do the 1's and 0's (bits) go thru the different parts, what happens? what comes out? . . . trade skills, programs, define I/O standards. . . . question: what's IBM doing about development of home computers? . . . help me build the Altair. . . . where to get parts, boards, etc. . . . stop talking to everyone like they've been at all the meetings!!! Have more rap sessions!!! . . . just be a meeting of people with like interests that can help each other with problems and sources of parts . . . interested in everything. . . . have a show and tell when a person gets something going.

There it is in your own words. In typing this a sort of poem popped out:

Don't complain or fuss.
It is up to each of us
To make the Club do
What we want it to.

By taking the initiative you will encourage others in the Club to become more active.

Thanks to Lee, our "song and dance man," for keeping us from all talking at once, until he declares a random access period. Thanks to Robert for making negatives and positives of the MITS boards, TVT boards, and the memory boards. Thanks to Frank and John for holding off from populating their boards long enough for him to do this. Who knows a source for printed circuits? Thanks to Bob for the Intel Text Editor (runs on an 8080 as is). Thanks to Alex for signing "paid" on the Club's K-200 account at Call Computer. Thanks to Jim for demonstrating his Altair with RGS memory boards. He'll supply a schematic to members interested: 247-0312. Thanks to John for presenting his Suding TV display and fielding questions. Thanks to Alex and his team for giving us a good demo of his TVT. (Will you supply parts or kits?) Thanks to Gerald for donating parts and gear for the digital class. Good luck on your trip. Thanks to Steve for developing an Intel cross assembler (for both the 8008 and 8080) for Lawrence Hall of Science Decision BASIC and giving explanation at the SF/Berkeley HCC meeting last Wednesday. Contact Pete Rowe for use of the system. Thanks to Tom for making up address labels for the newsletter.

New clubs are forming across the country. I've heard of beginnings in Los Angeles, San Diego, Sacramento, New Jersey, Wash., D.C., and Boston. I think this is great. We need more decentralized clubs to help the little guy.
Excerpts from a chalk talk on the Tom Swift Terminal by Lee Felsenstein presented at the June 11, 1975, HCC meeting.

The problem with video display is that nothing remains. You've got a screen and you've got a spot—a spot with a tail—that's a video display. For a TV screen you've got to store the data somewhere. And you have got to keep presenting it as the spot goes across the screen, in the right order, in synchronization, and so forth. So that means you have to have a memory.

Until recently, memory consisted of a bucket brigade: shift registers. Since this spot crosses the screen in a continuous pattern—it is always starting at the top line, going thru, and winding up at the bottom line—you need to get that information out of the memory, to the screen, in a repeatable order. And shift registers were made for that. It is basically sort of a pipeline. You trickle stuff in and you get stuff trickling out, and in between the two there is a lot of storage. It is looped around like some kind of air conditioning radiator. And you can get to it here; but you can't get to it in there. If it is somewhere in the middle, you can jump in any place you want, but you've got to.

With his mind thinking one step ahead of where he is, Don Lancaster said let's use the newly available random access memory. And that is a little better described as a pigeonhole. And, yes, you can jump in any place you want, but you've got to tell it where you are going. So then you've got to have some counter that keeps saying "give me the next, give me the next...." And because of the physics of the display, you have to repeat that. You have a data line, which is like a line of characters, and that is composed of at least seven scan lines—for a 7 by 5 character matrix. And the information is repeated each scan line, shifting down one more position in the character generator.

Lancaster says he's invented a TV Typewriter II. It's going to have random access memory. I wasn't the first one, I'm sure, but I realized that you could treat this as a piece of your computer memory. You could jump right in and change a bit or word without having to wait for the whole thing to trickle through and have some crazy kind of bookkeeping circuit there if you want to insert a character. It is not so easy with RAM, but with shift registers its really weird. You have to have some place to store an extra character and then put the one you just got here into the pipeline and keep shuffling-sort of stretch the line until the end comes by. Well, anyone who's played with these things, ... yea. So, Lancaster came up with TV Typewriter II, only someone else beat him out with the design.

Where I was at this time was involved with Resource One doing public access information retrieval system. We put a terminal in a store and a library. No operator; open to the public. People would come in, hand over some money, and would put information in like it was a bulletin board, and search for information. It was very successful; ran for 14 months. During that time people were coming to me, saying, how about a cheap terminal? We couldn't think of anyway to do it right. We wanted a terminal that would survive with untrained people using it—pass a spilled coke test. It had to be reliable. We couldn't think of anyway to do that reliability in hardware. Encase everything in expoxy? There is another approach which we came up with: incorporate the user into the design. Take the place where the terminal is going to be installed and turn that into a little computer club. Then you've got your own service organization there, and they can get on very intimate terms with the equipment. And make it work their way. What this means is putting sort of a hobby center into each terminal. That is not a very good way to express it, but that's the idea. This means building a device which can be expanded, and be modified, and is visible, is understandable, is convivial. [Ivan Illich's term. Read Tools For Conviviality, 1973, Harper & Row] From this approach we focused on the RAM idea. You are halfway to a computer, if you use random access memory and you make access to that memory easy and rational. Look at a terminal as a little pot of memory. How can that memory be made maximally available to people outside it? And how is it to grow and allow people who handle it to manage that growth? ... [Talk continued with more detail.]

Hardware:
The LSI-11 uses four 40 pin DIP's: control chip, data chip, and two microcode read-only-memory chips which store the PDP-11/35, 11/40 instruction set, resident octal debugging technique, resident ASCII/console routine and bootstrap. The PDP-11 repertoire has over 400 hard-wired instructions—no separate memory, I/O, or accumulator instructions. The basic order code uses both single- and double-operand address instructions for words or bytes. Addressing modes include sequential addressing forward or backward, address indexing, indirect addressing, 16-bit word addressing, 8-bit byte addressing, and stack addressing. Variable length instruction formatting allows a minimum number of words to be used for each addressing mode. For more information call Digital Components Group toll free between 8:30 AM and 5:30 PM EST 800-225-9480.

The SPHERE HOBBIEST SYSKIT cost $650 prepaid before Sept., 1975. Kit includes: processor module (CPU1) using Motorola's M6800 microprocessor, 1K or reprogrammable ROM, 4K dynamic RAM with refresh circuitry and real time clock; display module (CRT1) 16 lines by 32 characters formate with interface for standard TV; 73 key keyboard and interface (KB1); power supply (PWR1); power cable (PCB1); three buss cables (BCB1); and Operator/Reference package (OPR1). Under 60 day delivery on all initial orders (shipping cost to be paid by purchaser). For more information contact Michael Wise, SPHERE 96 East 500 South - Bountiful, Utah 84010 or call 801-295-1368.

4KRA (4096 x 8 RAM) Static Memory Module plug-in compatible with Altair 8800. Fast: access time 520 nanosec. max.; low power: 5.0W typical at 25°C. Kit price $225. For more information call Robert Marsh at Processor Technology Co. 2465 Fourth Street, Berkeley, Ca. 94710 (415-549-0857)

Ken McGinnis is willing to be the club buyer for the Phi-Deck tape transport for cassette tape. Send $100 to him at P.O.Box 2078 San Mateo, Ca. 94401 (If over 50 units are sold, you get $18 back.)

American Microsystems is the second source supplier for the M6800. The AMI 6800 microprocessor manual is available, call 415-969-0610.

For Sale: Cybercom Tape Deck, complete documentation and lots of tape, $225. Also TTL IC's 7402, 14,16,23,70,73,76,82,85 these are new bin 1 parts made by TI. Will sell any quantity to club members at 50% less than surplus prices. Call Herman Poole 263-3078.

ASR-33 TTY Model 3320-5JC new from the factory $969 in any quantity four to five month delivery. Burney Mansolf 312-982-3378.

P9102 APC 500 ns access, 100-999 quantity $2.78 each. Quote from Mr. Bailey, Advanced Micro Devices 408-732-2400. Go to Cramer.

Robert Baer has source for 1702 A's surplus, but guaranteed good, $10.00 each, but we need a minimum order of 80. Bring your money to next meeting.

Software:
I want to start a class in programming. I need to know how many people are interested, and what they expect to learn. Based on the results of this poll, I will define the class objectives, and expect to run one nite (in my home) starting in the fall. Call 408-578-4944. Tom Pittman 469 East Branhman Lane, San Jose, Ca. 95111.


Machine Language Programming for the 8008 (and Similar Microcomputers), manual includes: fundamental techniques, loops, masks, counters, pointers, search and sort routines, floating point arithmetic package, programming for PROM's, etc. $19.95 postpaid from Scehli C. C., Inc. 1322 Rear - Boston Post Road, Milford, Ct. 06460

Announcement:
MITS is having an Altair Seminar at Rickey's Hyatt House in Palo Alto Room July 9th at 9 AM. Check with Repo Paul Terrell 415-965-8581
George A. Barker  926 Roundhill Rd., Redwood City, Ca. 94061 (366-0133) designing a TV TTY. Skill: digital electronic techniques. Hopes to get either an 8008/8080 working this summer.

Jim Brick  820 Sweetbay Dr., Sunnyvale, Ca. 94086 (247-0312) (work tel. 257-6560) has Altair 8800 with RGS buss, planning a CPU to CPU (dual processor), prom burner, general I/O. Use: design, program, etc., process controllers (small CPU 4040) to be done thru 8800 as a means of communication, also general purpose home computing. Experience in large computing operating systems. Currently Sr. Systems Analyst for Tymshare Inc. on their 370/158 running VM/370. Needs: electronics for digital tape recording.

Howard Bornstein  9969 Alba Rd. #3 Ben Lomond, Ca. 95005 (408-336-2468) has HP-65 and plans to build Altair 8800.

Rick Bromagem  8286 Lancaster Dr. #31 Rohnert Park, Ca. 94928 has Altair 8800, TVTypewriter II, and 8K memory. He is planning a 16K system with FORTRAN or ALGOL and tape cassette storage. Use: for research programs and possible business doing software and hardware for OEM's on contract. He has Western Digital memory (4K) and communication chips and has a contact with factory rep. who is quoting 100 quantity prices. Needs access to prom programmer fusible link type. Question: Does anyone have any real and realistic plans to attempt a hook-up of two microcomputers in the future when I/O and memory in?

David W. Corbin  3729 DeLa Cruz Blvd. Santa Clara, Ca. 95050 (984-3378) has Altair 8800, paper tape reader/ punch, SMC type writer. Building interfaces for above and mag cassette I/O. Use: to learn 8800 programming. Experience: 15 years electronic eng. in automation field. Need manuals on SMC Typewriter 9816 and SMC Mod 6078000 papertape punch.

John Curtis  1849 Limetree Lane, Mountain View, Ca. 94040 (968-4190) just received Altair 8800 and needs memory for it. Has some prom programmers: Sig-FSC-NSC-TI Fusible link.

Greg Dolkas  2121 Bellview Dr., Palo Alto, Ca. 94303 (327-4945) has lots of chips--no, much together. Building a 16 bit mini with own instruction set, architecture, etc., it should have 2 micro second instruction cycle, hardware stack, more! For use as a conversation piece? Skill: systems programmer and into hardware. "I have most of the parts for TVT I and would like to sell or trade for TVT II!"

Steven J. Dompier  2130 Essex St., Berkeley, Ca. 94705 (841-1868) (547-4069) "I have an Altair 8800 up and running (mostly around in circles right now) and an ASR 33. I am working on a modern, TV graphics display, and of course memory and other boards for the Altair. I am now gathering info on the LSI-11, which looks like a really worthwhile system that amateurs could build. Use: graphics, information handling, games, community memory input, have fun, get mad at, explain, learn from, help defray the image computers have in the average public mind, and .... Knowledge gained so far by building Altair, gadgets, and so on. Need: LSI-11, Flat screen TV (dot matrix), used disk.


Peter B. Dunkkel  52 7th Ave. San Francisco, Ca. 94118 (home 823-5382, work 387-8566) wants to build a computer on 8008 or 8080 for math and games (spherical astronomy). Need I/O gear.

John Dunfield 19874 Viewridge, Saratoga, Ca. 95050 (446-0436) has 1K Altair for use in model railway control. Need Teletype; assembler & code conversion. Would like to hear recommendation for some basic math text package approach for standard algorithms.

Peter Ecclesine  2361 Laura Lane, Mountain View, Ca. 94043 (968-8044) plans to get M6800 ANK/CRT in Aug. Experience: 3 years Assembly language CDC 160s, UNIVAC 1230mc, real time, designed control & monitor systems (8080 based). Need 8080 PL/M and efficiency of compilations.

Roy Elder 1953 Tia Place, San Jose, Ca. 95131 (251-0407) plans a 8008 or 12K system to use in learning and to get a job in the computer field. Anybody that has a system running, I will be available for trade of my time for system time, open for negotiations.

Gary B. Fariss  969 Duriance Court, Sunnyvale, Ca. 94087 (408-732-8259) W6KYF 2 meter gear on Local Repeater. Have 80 char by 27 line TV terminal -- TTY compatible--64 char set., totally homebrew. Modem connected to phone, no intelligence, 110 and 300 BAUD. Working on 27 x 80 -- 128 char set -- DMA access display, intended to interface to 8008 processor/memory system which is not built, but is designed. Will probably re-design for Altair compatible. Use: Intelligente terminal and RTTY = ASCII, ASCII = Morse code for ham radio. Experience: CDC 6000 operation -- FTN 4 -- 6000 compass assembler. Need: Altair prints for CPU, 4K memory, DMA channel, parallel I/O, serial I/O.

Ken Feil  917 Cloud Ave., Menlo Park, Ca. 94025 (854-5258) has a MCS-5 (my own design) and plans TTYTT (own design) similar to TVTTY II. Use: games, data storage, ? Experience: unofficial design engineer. Need: 5008 resident system monitor, resident assembler, and text editor, BASIC compiler. "For people who are building Mark-8's I have a better design."

Terry Fowler  1390 Sagehen, Sunnyvale, Ca. 94087 (249-4765) plans on getting an Altair for entertainment and custom applications. Experience on Intel 4004. "I'm having some universal boards for the Altair made."

David Gjerdum P.O. Box 7201 Santa Rosa, Ca. 95401 (528-7216) buying Altair for programming use.

Frank Harvey  8186 Terrace Dr., El Cerrito, Ca. 94530 (415-524-7982) has Altair with 1K. Planning to build line printer, keyboard, & cassette storage. Use: study & design compilers, sail making problems, tax work. Need: cheap modem, any and all help & advice on TV displays.

Julian Hernandez  1015 Continental Dr., Menlo Park, Ca. 94025 (854-5003) has time share terminal with Call Computer. Thinking about purchasing an Altair for hobby use and business. Have ASR 33.

Bruce R. Kendall  334 A Camille Ct., Mountain View, Ca. 94040 (967-3613) "I was thinking about building a system using an Altair until I saw how slow it ran BASIC." Have some home shop equipment (drill press and "3" lathe). Would like to start out with a tymeshare terminal & printer.

Kenneth Koll  12685 Lompico Rd. Felton, Ca. 95018 is gathering parts and info for an 8008 or 8080 system. "Initially I want to build a general purpose video game with different games stored on cassette. Once I get a processor and memory together I'm sure there will be other trips. I am an electronics tech by trade. I am reasonably adept in digital (hardwired) and analog design and PC fabrication. On a limited basis I can make available a moderately well equipped college lab in the Santa Cruz area (scopes, counters, pulse generators). Need: all the information I can get my hands on about programming these beasts. I have never dealt with machine codes before."

Ted Kramer  475 Encinal Ave. APT B, Menlo Park, Ca. 94025 (328-1590) have imagination, planning maybe an Altair, maybe a 16 or 32 bit something. To have fun, make money, make friends. Experience in programming systems Applications (business, manufacturing). Need: everything:-- "How do you hold a soldering iron?"

Jerry Lawson  3080 Olcott St. Suite 210 A, Santa Clara, Ca. 95050 (408-244-1400) Field Application Engineer Fairchild. Experience: digital design, software prog. local F-8 microprocessor applications.

Jim Leek  2801 F Street, Bakerfield, Ca. 93301 (805-327-2725) have an Altair up and running (mostly around in circles right now) and an ASR 33. I am working on a modern, TV graphics display, and of course memory and other boards for the Altair. I am now gathering info on the LSI-11, which looks like a really worthwhile system that amateurs could build. Use: graphics, information handling, games, community memory input, have fun, get mad at, explain, learn from, help defray the image computers have in the average public mind, and .... Knowledge gained so far by building Altair, gadgets, and so on. Need: LSI-11, Flat screen TV (dot matrix), used disk.

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Bob Wiepking 1901 Halford Ave. # 160, Santa Clara, Ca. 95051
(244-6993, 246-7501 x 2557) would like to make something balance a checkbook and measure a voltage. Ultimately, I'd like to learn an assembly type language so I can get a feel of what microcomputers are good for. Need: instruction in use of microcomputers; also need a micro computer.

Dio Wier 2755 Seventh St. Boulder Colorado 80302 (303-442-5448) working on software for home computers. use: games, maybe message switching, income tax program, home medical advisor, legal advisor, recipe program for the young lady. Have 10 years experience as a computer systems analyst; also used to be a transmitter engineer, worked on R & D at LRL, Berkeley. Need: "The whole ball of wax."

Randy Wigginton 806 Logan Ct. Sunnyvale, Ca. 94087 (732-1656) planning to get Altair 8800 to play games.

Michael R. Witham W6PTK 1655 Longspur, Sunnyvale, Ca. 94087 (245-0972) have 8008, video display & parts with which to make a small home computer. Use: games, video, and ham radio use, and some bookkeeping. Need: keyboard.

Club Treasury Report:
INCOME: Collected at MITS Mobile Seminar June 6 $12.00. Collected $58.00 at June 11 meeting and $18.00 at June 25 meeting. Received $45.00 in the mail. Total income: $133.00.


OLD BALANCE: June 5, 1975, $47.58.
NEW BALANCE: As of July 2, 1975, $129.21. Cost of this newsletter has not been deducted. About 300 will be printed and mailed (estimate cost to be $65 - $80). We request a dollar donation from all new attenders and encourage regular club members to contribute from time to time. Please fill out a Club Survey Questionaire to let us know what you have to share and what your needs are.

NEXT MEETING: WEDNESDAY, JULY 9, 7 PM at Stanford Linear Accelerator Center in the Auditorium. We meet here every two weeks (July 23, August 6, etc.). Everyone welcome; bring something to show or share.

Publications:
The latest CoEvolution Quarterly (Summer 1975 $2.) includes a 17 page section on "Personal Computers" edited by Marc Le Brun. Plans are to continue this section in future issues. Subscriptions are $6.00 per year. CoEvolution Quarterly Box 428 Sausalito, Ca. 94964.

The latest People's Computer Company newspaper (Vol. III, # 6) is devoted to a look at hardware. Subscriptions are $5.00 for 5 issues (Vol. IV starts in Sept.). PCC Box 310 Menlo Park, Ca.

Lee Felsenstein is initiating a monthly periodical (hopefully) called: The Journal of Community Communication to encourage dialog of concerned non-hierarchical communications systems which can be created and used by people in their daily lives as members of communities—such as applications of computer technology and microcomputer devices in information networks and public memory systems. He suggests a dollar per issue and welcomes letters, ideas, opinions, etc. Write: LGC Engineering 1807 Delaware St. Berkeley, Ca. 94703 (415-845-4736).

The first issue of BYTE! will have 96 pages including an article on serial interfaces for TVTs by Don Lancaster, an article on surplus keyboards, an article on assemblers, an article on how to recycle IC's from PC boards, a review of the RGS-008A Kit, and other notes, info, letters, and advertisements. Introductory subscription rate is $10.00. BYTE! Green Publishing, Inc. Peterborough, N.H. 03458

Micro-8 Newsletter is still the best for letting us know what microcomputer experimenters are doing. Subscription is $6.00 for six issues. Micro-8 Newsletter Cabrillo High School Computer Center, 4350 Constellation, Lompoc, Ca. 93456.
DESIGN NOTES: Arbitrary Logic Function Generation
Via Digital Multiplexers

Terry Lee, Consulting Engineer, Temar Electronics
2400 Geary Blvd. # 6
San Francisco, Ca. 94115

It happens too often, I would say, that in the course of designing combinational logic circuits I run across problems that seem to require an inordinate amount of gates. When such problems arise the solution is a digital multiplexer. Figure 1 shows a truth table; using A, B, and C we want a circuit that will generate Q. This may be simple using gates, I have not tried, but for illustrative purposes we will solve the problem using a 74151 digital multiplexer.

In order to implement Fig. 1 connect the select inputs, $2^0$, $2^1$, and $2^2$, to A, B, and C and the data inputs to the appropriate logic level. When CBA = 100 the logic level at data in 4 will appear at the output. Since Q = 1 is desired, data in 4 must equal 1. Figure 2 shows the completed circuit.

Suppose we now have the truth table shown in Figure 3. It would seem that with four variables we must use a 1 of 16 multiplexer, but this is not so.

The best solution seems to be B. It should be noted that it is not always possible to eliminate the inverter. In some cases even five variables can be handled by a 1 of 8 multiplexer by using the enable input, if one exists. For this to work one of the variables must have a constant output for one of its values. Suppose Figure 3 had a fifth variable, E, and when the table was rearranged as recommended we arrived at Figure 12.

It can be seen that when CBA = 000, Q = 0 irrespective of D; therefore, data in 0 should be connected to logic 0. When CBA = 001, Q = 1 irrespective of D; therefore, data in 1 should be connected to logic 1. When CBA = 010, Q = D; therefore, data in 2 should be connected to D. The completed circuit is shown in Figure 5.

In order to assess the possibility of eliminating the inverter and minimizing the fan out required for the extra variable all cases should be tried. Figures 6 thru 11 show truth tables and completed circuits using A, B, and C as extra variable.
75 BAUD = RTTY 100 WPM
45 BAUD = RTTY 60 WPM

A Stable Bit-Rate Clock for UARTS

submitted by:
Gary B. Fariss  W6KYF
969 Durlane Court
Sunnyvale, Ca. 94087
408-732-8259

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<td>E</td>
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Frequency Table

FRED MOORE
558 Santa Cruz Avenue
Menlo Park, Ca. 94025