

The Boston Computer Society

SINCLAIR/TIMEX USER GROUP NEWSLETTER

Volume 2, Issue 9

September 1983

This newsletter is produced to inform group members of the agenda and logistics for future meetings, as well as to recap and amplify the information provided at the last meeting. It also provides a forum for members and interested parties to communicate what they have learned or developed relating to Sinclair and Timex computer products. Meetings are open to the public; however, attendees are encouraged to join the Boston Computer Society (BCS). This newsletter is free to members. Back issues are one dollar each.

USER GROUP MEETING

Date: Wednesday, September 21, 1983
Time: 7:00 p.m.
Place: Large Science Auditorium
UMass, Harbor Campus
(Directions on last page)

SPECIAL ANNIVERSARY CELEBRATION IN OCTOBER

Frank Kaplan from Compusa Corporation of Mountain Side, New Jersey (formerly Centronic Corporation) will be at our meeting to describe the floppy disk system his company has developed for the T/S 1000. The system consists of a disk controller compatible with many different types of disks, a floppy disk drive and case, power supplies, T/S 1000 software, and documentation, tested and ready to go. He will make a special preproduction offer to members at the meeting—the entire package for around \$450. Additionally, Jeff Parker will review the MD1 and MD2 modem from ByteBack.

IMPORTANT NOTICE

Instead of our regular meeting in October, we will be having a special event Saturday, October 22nd, from 10 a.m. till 6 p.m. at the Boston Park Plaza Hotel. This will celebrate the second anniversary of our user group. We will not only be acknowledging the accomplishments and achievements of the group and its individual members, but we will also be examining the numerous ways in which the Sinclair and Timex computers can and are being used—in business, home, education, computer literacy, and entertainment.

There will be the opportunity for you to see and buy items from vendors that support, and are compatible with, Sinclair and Timex computers, including hardware, software, publications, and services. There will also be workshops and demonstrations on various applications, and lectures on topics related to the Sinclair and Timex computers. For an informative and stimulating day for the whole family, please come and help us celebrate. Details inside.

HIGHLIGHTS OF THE AUGUST MEETING

The August meeting turned out to be a very busy meeting. It featured two software reviews, a hardware review, demonstrations of T/S 1500 and T/S 2068 computers, and announcements.

Brint Jefferis gave us a very interesting review of ToolKit, a \$14.95 software item from Gladstone Electronics, Buffalo, New York. He described several of the nine functions provided by the software, including a BASIC line renumbering function which even changes line numbers in GOTOs and GOSUBs. Brint found ToolKit easy to use. He cautioned that, because ToolKit must be located above RAMTOP, it is not compatible with some software, such as QSAVE.

Jack Hill next described Master Math, a series of high school math quizzes from PMI. See Jack's review later in this newsletter. The entire set of quizzes were donated to the BCS for our review and evaluation.

Burt Fisher reviewed VOTEM, an analog interface for our computer. Burt says he is very compulsive about knowing the exact temperature and VOTEM is just what he wanted. See his review in this issue.

Sue Mahoney demonstrated preproduction models of the T/S 1500 and the T/S 2068. The T/S 1500, which will sell for \$79.95, has been delayed pending FCC approval. Sue said it should be available in September or October. According to Sue, the T/S 1500 is basically a T/S 1000 plus 16K RAM in a single package. It features movable keys and the capability of working with the 16K RAM pack to give 32K of user memory. It will also be capable of using "solid state" ROM cartridges which plug into a special holder. The cartridge holder module should cost less than \$20.

The T/S 2068, which is the Timex version of the Spectrum, comes in an attractive silver box, with an easy to use keyboard, edge connector for expansion, a 17.3 volt power supply, both television and monitor output, a "solid-state" cartridge slot, and two Atari type joystick ports, one on each side. It features both color video and sound. In addition to the familiar Sinclair BASIC, there is: a command to VERIFY that programs were SAVED properly without LOADING and thereby erasing the program; multiple statements per line, each statement separated by a colon; a prompt option for the INPUT statement; the capability to SAVE and LOAD data, variables, and memory blocks, as well as to MERGE BASIC code; DATA, READ, and RESTORE statements; programmed recovery from errors with an ON ERROR command; and more. The graphics is much higher resolution than that of the T/S 1000. And there are convenient commands to draw lines, circles, and arcs of a circle. The reaction from a skeptical audience was one of delight; the T/S 2068 looks like a fun machine.

In other Timex related discussion, Sue stated that all Timex products will be available via mail order. The cost will be the suggested retail price plus a 5 percent handling charge for hardware and a 10 percent handling charge for software. (We didn't ask in which category the "solid state" cartridges belong.) The Timex printer will work with both the T/S 1500 and T/S 2068. The Timex modem will be developed, but will probably not be available until late fall. It is still forecast to cost around \$100. Sue also introduced Paul Schirloff, editor of Timex' newsletter Ramblings.

Al Cloutier (he's the person pictured next to Cliff Danielson on the first page of the July newsletter) says he needs some help charting a course through the game Inca Curse. He wants to exchange maps and information. It sounds like an interesting game.

WE NEED VOLUNTEERS!!!

Our anniversary celebration represents the largest undertaking of the group so far. The success of this event depends on help and support from each of you. We need people to do many tasks, some of which involve work before the event and the majority of which involve support during the event. Some of the tasks include contacting various speakers, coordinating seminars, mailing announcements, addressing envelopes, making signs, posting signs and posters, selling tickets at the door, running the BCS membership booth, designing and producing the printed program, setting up the rooms, and monitoring and explaining the displays. In addition to your time, we need the loan of computers, tape recorders, and television sets for use at the different seminars. Contact Sue Mahoney, Will Stackman (666-8626), or Jack Hodgson at the September meeting or during the next few weeks to get things rolling.

Outline of the Event

In the Terrace Room of the Park Plaza Hotel, vendors will have booths at which they will be demonstrating and selling their products. We are anticipating a good representation from vendors, including many who are coming from out of state. Additionally, there will be displays and exhibits relating to our computer and projects by members. Feel free to contribute.

In other rooms in the hotel, we will present continuing workshops and seminars on various topics including: the use of the computer in the classroom, home and business applications, computer literacy programs, and individual presentations from members. We are still in the process of developing these seminars. If you have an interesting application, please contact us to get on the program.

To finance the event, we will be charging vendors for space and there will be a small admission: \$1 for BCS members, \$2 for students, \$3 for general admission, and \$5 for families. Thanks to a loan from Reston Publishing Company, we have been able to reserve the room and launch the effort. Even with this format, we must have a large user group participation to ensure success. Incidentally, your participation will gain you free admission.

MACHINE LANGUAGE GROUP ACTIVITIES

The Sinclair-Timex Machine Language Group meets on the first Wednesday of each month. Contact Bob Heath at (617) 276-2424 (work) for details.

At the August meeting, Dave Miller demonstrated one of his computer systems and several programs. Dave's system features the DK Tronics keyboard, Memotech 64K RAM pack, Hunter 8K nonvolatile RAM, and QSAVE cassette tape loading system from Intercomputer. Dave says his keyboard has a good feel, but the stick-on labels to identify the keys tend to wear out. He especially likes the numeric key pad to the right of the regular keys on the DK Tronics keyboard. His demonstration with the Hunter nonvolatile was impressive in that the machine language programs he loaded into it at home were still there when he arrived at the meeting.

Dave has made several modifications to the basic hardware, including: installing a play/record switch for the cassette interface, adding a circuit to allow machine code to be executed in the 32 to 48K region, adding memory decode and write protect circuitry to the Hunter board, and putting heat sinks on the regulator and ULA chip.

MACHINE LANGUAGE GROUP (Continued)

Programs demonstrated by Dave included Hot Z from Sinware, ToolKit, and machine language routines to load and move blocks of memory as well as create large empty REM statements to store machine code. Hot Z is a program for debugging and disassembling machine language code. It is especially interesting in that it automatically recognizes references to the system variables and inserts the system variable mnemonic in place of the address in the disassembled code.

Following Dave's presentation, Dave Wood briefly described the word processor he is developing. Dave has modified the machine language subroutine which scans the keyboard and generates the television display. He promised to show us his flashing cursor at an upcoming meeting.

CLIVE SINCLAIR SPONSORS HALF MARATHON by Beth Elliott

The Cambridge Festival second annual Half Marathon, sponsored by Sinclair Research, Ltd., was held on Sunday, July 17, with approximately 1700 runners participating. Encircling the city of Cambridge, England, home of Sinclair Research, the race followed a 2-lap, 13 plus mile course. The event was held as part of a full week of activities at the Cambridge Festival.

The day promised to be extremely hot and humid and even necessitated advancing the official start time from 10:00 a.m. to 7:30 a.m. This was a precautionary measure taken on the advice of medical authorities and city officials to protect runners from the midday heat. However, moving the start time was easier said than done. The race organizers assisted by Sinclair Research staff (this author included) spent Saturday afternoon phoning each of the over 2000 race entrants. Local radio, newspaper, and television announcements also helped get the word out. Needless to say, a few didn't get the word and there were about 50 disappointed runners who showed up at 10:00.

Among the early morning participants was our own recently knighted Sir Clive Sinclair, running enthusiast extraordinaire. Clive had just passed his 43rd birthday four days prior to the race. Happy Birthday Sir Clive! Also participating in the run were Leonie Baldwin and Beth Elliott, both of the Sinclair Research office in Boston.

Official finishing times are not yet in, but Leonie and Beth both zoomed into the finish just minutes ahead of Clive in approximately 1 hour 45 minutes. We have Clive placing an impressive 949 out of the 1700. This year's winner Bob Treadwell completed the course in just 1 hour 4 minutes 36 seconds. The first woman to cross the line was Joyce Smith, the English world-class runner who finished in 1 hour 13 minutes 53 seconds. Ron Pickering, the "Howard Cosell of Great Britain," emceed the event. From his platform at the finish line, in true relentless sportscaster fashion, he rustled up enthusiasm to cheer Sir Clive and others into the home stretch and across the finish line.

Following the race, competitors and supporters from the English and U.S. Sinclair Research offices attended a relaxed garden party at the Stone House, Clive's Cambridge residence. Familiar faces at the party included Nigel Searle, former Sinclair-Research marketing director in the U.S., and Mary Reinman, former PR representative for Sinclair Research in the U.S. Both are now working for Sinclair Research in the U.K. We all had a wonderfully exhausting weekend. Thanks go out to Clive for sponsoring a terrific sports event.

I have had trouble keeping my four ZX-81 and T/S 1000 computers running for more than 7 or 8 hours. They would quit at the most inopportune times. I suspected high temperature problems and, therefore, made several changes so that the computers ran cooler. Here's what I did with each computer and a summary of my success.

The first thing that I tried was building a custom regulated power supply for my first computer. Also, when I installed the power supply, I bolted the computer to a stand with more space under it than normally provided by its pads. This serves to increase the air supply to the vents underneath the computer. These measures kept the computer working all day and sometimes several days, but it usually quit before the end of the third day.

My second computer has a custom built power supply but, in addition, has the 5-volt regulator mounted on a large metal chassis. This regulator stays very cool. This computer stayed up for at least 28 hours before quitting.

My third computer, as it came from the factory, would quit after about 8 hours. I put additional feet on the computer to increase the bottom clearance and found that it would last for about 17 hours. Then I bought a keyboard into which I mounted the computer. Once again I was back to only 8 hours between crashes. I then cut a large vent hole in the keyboard case resulting in a computer which would run for 24 hours. This was not adequate, so I moved the regulator to a 4 inch by 4 inch aluminum plate along with a heatsink. Now the computer keeps going for approximately 2 days.

My fourth computer is also mounted in an aluminum case along with the keyboard. I placed the regulator on the case with a heatsink. But this computer would quit after about 8 hours. It was mentioned at the June user meeting that the uncommitted logic array (ULA) chip gets hot. I removed the cover of this fourth computer and felt the chip. It was quite hot. I cut a piece of aluminum channel (2 inches by 1/2 inch), applied heatsink compound, and attached the heatsink to the ULA chip. With this change, the computer ran for 12 days before quitting.

(Editor's note: As reported in the June newsletter, Timex has recognized the heating problem with the ULA chip. The chip employs bipolar technology which consumes lots of power and thus the chip runs hot. To solve the problem, Timex is installing heat sinks on the ULA chips. The T/S 1500 logic chip employs CMOS technology and should not over-heat.)

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BUFFERING THE DATA BUS

In this article, an approach to buffering the data bus is described. This approach entails modifying the internal circuitry of the computer, replacing passive components (resistors) with two logic chips.

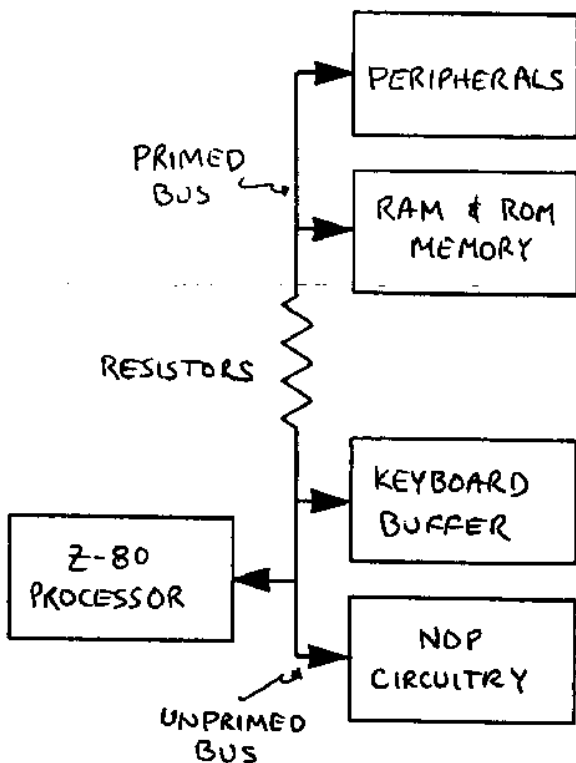
The data bus is the name used for eight specific input and output signal paths in the Sinclair-Timex computer. Almost every piece of information processed by the computer's Z-80 processor flows along these signal paths. The data bus extends from the Z-80 microprocessor chip through various internal circuits. It terminates on the edge connector on the rear of the computer.

When peripheral devices are attached to the computer, it is often necessary to buffer the signals on the data bus. Buffering entails placing circuitry on the signal paths which isolate or eliminate undesired signals and amplify or enhance desired signals. Buffering is usually, but not always, provided in commercially available peripheral devices. If you plan to design your own devices, you will need to have buffering circuits.

The buffering approach described here is currently in operation on a MicroAce computer. The MicroAce is similar in design to the ZX-80 and early ZX-81s. It was sold by mail order in the U.S. Our approach should be applicable to the ZX-81 and T/S 1000, machines with the uncommitted logic array (ULA) chip. However, some additional circuitry is required.

In the Sinclair-Timex computer, the data bus is actually separated into two buses. On a schematic these are designated as D_1' , D_2' , ..., D_8' and D_1 , D_2 , ..., D_8 , i.e., primed (') and nonprimed signal paths.

Separating the primed and nonprimed data buses is a set of resistors. The value of these resistors is 1 kilohm in the earlier computers, 470 ohms in later ones. The separation of the data bus into two parts was done because of the unique way in which the computer generates the television display--the processor, or nonprimed, side of the bus executes NOP (no operation) instructions at the same time as display character information is being transferred on the primed side. Because of this approach, Sinclair was able to reduce the parts count and achieve a low cost computer. The existence of the resistors on the data bus, however, makes it more essential than otherwise to buffer peripheral devices.

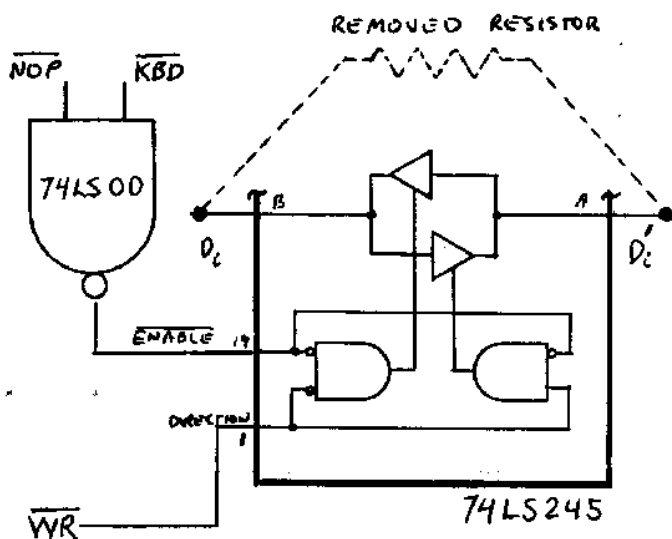


The figure to the left illustrates some of the electrical connections with the data bus. It shows the two parts of the data bus

separated by resistors. On the Z-80 processor side of the bus are the NOP function and the keyboard. On the primed side of the bus are the ROM and RAM memory, external peripheral devices, and other circuitry. Our approach to buffering the data bus is to replace the resistors with an octal bus transceiver chip (a 2-way buffer), such as the 74LS245.

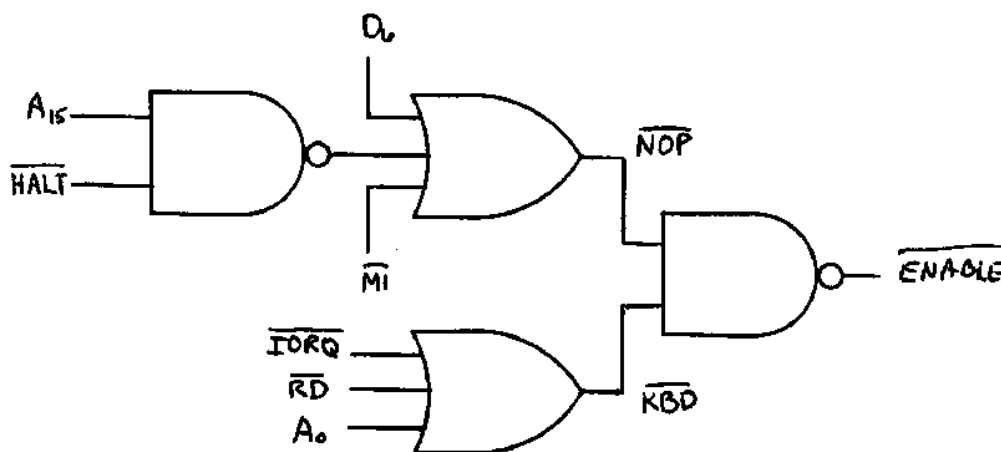
The flow of electrical signals through the resistors is always in the direction dictated by the read and write signals of the Z-80 processor. Thus the direction of propagation for the transceiver chip can be controlled by the Write Enable (\overline{WR}) signal from the processor.

The only hitch is that the transceiver must be tristated (electrically removed from the circuit) whenever either the keyboard buffer or NOP function are active. With the MicroAce, generation of the signal to tristate the transceiver requires only one chip. More logic is required with the ZX-81 and T/S 1000 computers because certain signals, specifically the keyboard scan and NOP signals, are not output by the ULA chip.



Above is a schematic of the required circuit for the MicroAce. The \overline{KBD} signal is available at chip U11 pin 15 on the MicroAce (this is the same signal as on IC 10, pin 15 on the ZX-80). The \overline{NOP} signal is available at U16, pin 1 (IC 15, pin 1 on the ZX-80). In the MicroAce it was possible to remove the resistors, bend the legs of a socket, and install the 74LS245 chip where the resistor network had been located. The 74LS00 chip can then be mounted dead bug style between the 74LS245 and the Z-80 chip. (A dead bug mounted chip is one that is turned upside down, with its feet sticking into the air--like the chip pictured in the last newsletter.)

The schematic below shows the circuit required for the ZX-81 or T/S 1000. It should work, but has not been tested.



REVIEW OF MASTER MATH by Jack Hill

Master Math is a series of high school math quizzes. The quizzes come on six tapes, four programs per tape, two programs per side. Each program is a quiz. Note that there is only one copy of the program on each tape, so if one doesn't load you will need to get a replacement. This, in fact, happened to me and the distributor, PMI, promptly replaced the tape.

The software was written by a Ms. G. Ludinski, a math teacher in England. Because the math curriculum in England is slightly different from that in the U.S., you will find the format of the tape slightly different from what you may be used to. I found this to be no problem. Each program contains two different problems. The program asks a question and, if not answered correctly, give the formula required for, or the method of, solving the problem. All that is then needed is to plug in the variables. If you still answer incorrectly, the program prints your score and asks if you would like to continue.

The subjects included are algebra, geometry, trigonometry, statistics, percentages, indices, and elementary calculus. These programs, for me, were invaluable in reviewing my high school math. But they do contain some minor software problems. One program required a number in scientific notation for an answer. It was nearly impossible to duplicate the exact number on my calculator. Another program would not accept the answer X when the computer's answer was 1X. All the programs scrolled correctly, except one that lacked the appropriate SCROLL statement. The programs are written in BASIC, but are unlistable due to a short machine code subroutine that is invoked. I discovered how to defeat the protection technique and listed the programs so that I could make the corrections. A salesman at PMI told me that they will be incorporating these changes.

PMI plans a series of quizzes for the T/S 1000 and the upcoming T/S 2000. The tapes sell for \$9.95 apiece or \$50.00 for the entire set. Because of the large investment, it might have been better if PMI grouped all similar problems together, instead of offering a sample from each category on each tape. The tapes can be ordered from PMI, Inc., P.O. Box 87, Buckfield, Maine 04220, telephone 1-800-227-1836.

REVIEW OF VOTEM by Burt Fisher

VOTEM is an analog to digital converter which allows you to measure voltages, temperatures, and frequencies, and display the results on the television screen. Additionally, it is a signal conditioner.

My main purpose for the purchase of the unit was in measuring temperature. The probe is sensitive to temperature changes as small as 1/100 of a degree. To give an example of the precision of the unit, the high temperature on one day was 79.81 degrees Fahrenheit and the low was 60.07. You can automatically record temperature at any interval from 1 second to hours, retain 50 readings in 2K of RAM memory (more with extra RAM), and plot the readings against time. All calibration is done in software. The manual is well done, with sample programs.

The operating principle of VOTEM is simple--it uses a frequency converter. Thus, for example, a dc voltage of 1 volt input will cause the VOTEM to output a 10,000 Hz signal (10,000 pulses per second). The computer, through software, counts and converts these pulses to a reading of temperature or voltage. If the input voltage goes up (down), the frequency goes up (down) as well. The temperature probe and its associated circuitry simply produce a

small voltage that is proportional to temperature. Thus, VOTEM can be used as a thermometer, voltmeter, or frequency counter for pulse rates up to 30 kHz. Potential applications of VOTEM include hooking it to a photocell to measure solar intensity or using it as a smart thermostat for heating/cooling control.

In addition to the frequency converter, VOTEM is also a tape conditioner. The conditioner function allows you to use a much lower setting on your tape recorder, potentially improving tape loading. It also has a light emitting diode and earphone output for monitoring tapes and pulses. VOTEM is made of quality components and took me just 90 minutes to assemble. It is available for \$39.95 (kit) and \$59.95 (assembled and tested) from Down East Computers, Box 3096, Greenville, North Carolina 27834.

ON THE TIMEX PRINTER/MEMOTECH MEMORY COMPATIBILITY PROBLEM

Some of you with the Memotech 64K RAM pack and the Timex printer have found an incompatibility between these peripherals. Bob Smith talked with a technician on Memotech's information number about the problem and was given the following explanation and solution. The symptom of Bob's problem is that the keyboard would lock up after a period of time when he was running with both the T/S 2040 printer and the Memotech 64K memory. It was necessary to reset (unplug) the computer, resulting in loss of program and data, to clear the fault. Memotech's technician said the problem was with the printer, not the RAM pack! He said the problem was caused by filtering capacitors added to the printer to reduce radio frequency interference. The Memotech solution is to clip the lead on end of the capacitors C4, C5, and C6, thus removing them from the circuit. These are large, well-marked components. Bob has not tried this fix as yet, so if you attempt the modification, make the cuts such that you can repair the damage in case it doesn't work.

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COMPUSERVE IS TERRIFIC by Jack Hodgson

It is perhaps best to think of CompuServe as a great big electronic library accessed by a computer and modem. This is gonna sound like a sales pitch anyway, so let me quote from their brochure:

Press a few buttons, and find out about the latest advances in home management and nutrition, recent business mergers, and high school sports scores. Gather updated information-- a process that used to require hours of painstaking research--directly from your home or office. Communicate with business associates in other parts of the country, instantly and economically. Match wits with CIS (CompuServe) in computer game competition. We think you'll agree the capabilities of CIS are almost endless.

CompuServe is very easy to use. Everything is accessed with a pyramid of easily understood menus. After a couple of times on the system, you'll be able to save time by GOing directly to the subject or page number you want. You can look at all kinds of information from the AP News wire and stories from the Washington Post to CompuServe's own movie reviews and magazine, Today.

One thing that is particularly exciting on CompuServe are the Special Interest Groups or SIGs. There are SIGs covering topics from medical and legal through health, environment, and food. There are also computer SIGs for all types of machines and applications. And, if you think there's one they've left out, tell them. They may let you start it.

The SIGs have three main parts. First, there is a message section where you can read, leave, and reply to messages. You'll find an active exchange of information relating to the particular interest. Second, there is a database containing articles, lists of resources, and, in computer SIGs, public domain software. And in the third, and perhaps the most exciting, part there is an on-line conference area. You can hold live conversations with other SIG members from around the country. Patterned after Citizen's Band radio (CB) open channel, the transmissions of participants scroll up your screen and you are able to speak by simply typing on your keyboard.

Especially exciting to us Sinclair-Timex fans is that there is a SIG subgroup specifically for Sinclair and Timex computers (GO CEM-450). In addition to the message board and database area, this SIG holds a regular weekly meeting on Wednesdays at 10:30 p.m. (Eastern Time) where users get together to exchange information and gossip about the Sinclair-Timex community. There are many lighter moments. Although few members have met face to face or talked by phone, they know each other fairly well and often engage in some friendly, non-computer related, banter.

One Wednesday night recently, after our regular monthly BCS meeting, Sue Mahoney, Cliff Danielson, and I adjourned to my home where we logged onto CompuServe and joined the SIG meeting in progress. We spoke with Sinclair-Timex users in New Jersey, Colorado, Oklahoma, Arizona, California, and Virginia, simultaneously. Taking turns at the keyboard, Sue, Cliff, and I participated in a lively conversation about the Sinclair-Timex community and how it is evolving.

My only reservation about CompuServe is that the cost (\$5 per connected hour) can add up quickly, especially on the CB channels. But, with a little discipline, it can be a real valuable resource and lots of fun.

As far as ZX-81 and T/S 1000 arcade games have gone, I haven't seen a whole lot of intriguing fast action. Bouncy, for one, can perform on the arcade level.

Here's the setup of Bouncy: Your ship is trapped within the confines of the screen and you must fight off the bouncing attack balls while your oxygen supply is constantly depleting. You fire by hitting any key other than the direction arrows. Horizontal motion of the ship is achieved using right and left arrow keys. Points are accrued through destruction of the attack balls. Up to five balls appear on the screen at any one time. The balls reflect off the walls of the screen. They are slow but challenging moving targets. You can replenish your oxygen supply by seizing one of the oxygen ships as it periodically moves across the top of the screen. The game ends when you have either exhausted your oxygen supply or your supply of three ships. The top of the screen indicates round, high score, current score, and oxygen level.

Bouncy requires 16K RAM memory. It runs automatically after loading. I had some difficulty replaying, which may have been due to the computer I was using. Written instructions are not necessary because the instructions on the screen are sufficient to begin playing. The game starts and runs quickly. The startup display--the head of Count Von Der Bouncy--is impressive. But unfortunately it is only seen upon loading, not for replays. The author makes very good use of moving graphics. I recommend this game.

Bouncy can be obtained for \$7.95 from Infinity Research Development, 845 Via de la Paz, Suite A120, Los Angeles, California 90272. Infinity also has a number of other fast action games.

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FOR MORE INFORMATION

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DIRECTIONS TO THE SEPTEMBER MEETING: The Sinclair-Timex User Group meets in the Large Science Auditorium (Room 8/2/009) of the University of Massachusetts of Boston, Harbor Campus. The Harbor Campus is only 3 miles from downtown Boston and easily accessible by public and private transportation. From the north or west, take the Southeast Expressway to Exit 17. Turn left onto Columbia Road. Follow construction signs to Morrissey Boulevard in the direction of UMASS and the Kennedy Library. Turn left at the light into the Campus. From the south, take Morrissey Boulevard northward to the campus. On the MBTA, take the Red Line (Ashmont Train) to Columbia Station. Transfer to the free University shuttlebus in the T parking lot.

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