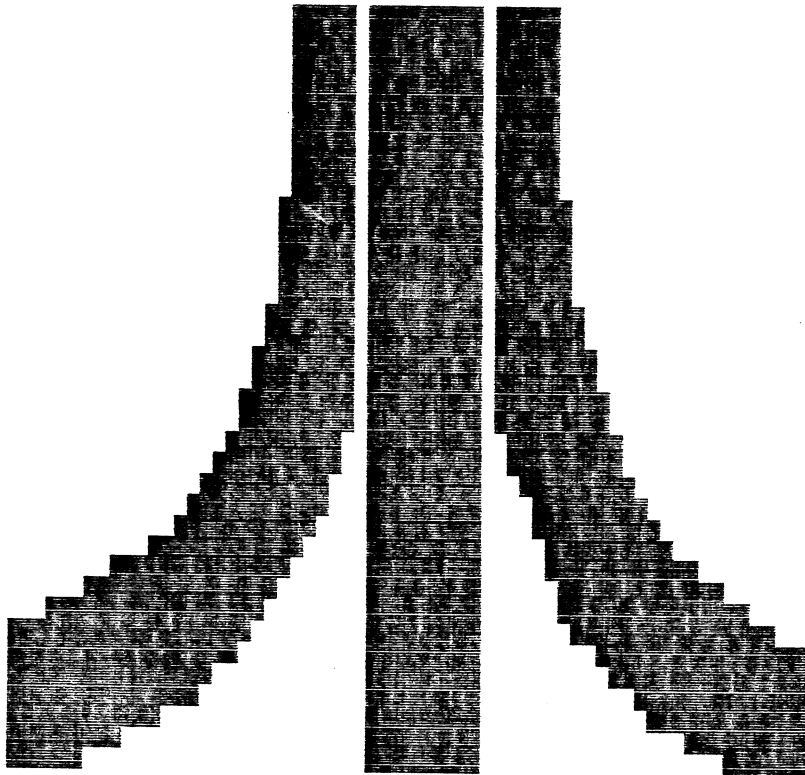


ATARI COMPUTER ENTHUSASISTS

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"First Look at the 520 ST", by Norman Knapp

"Machine Language: How Does It Know What It's Doing?", by
Dr. Warren G. Lieuallen

"Using the Atari Assembler: Part 3", by Charles Brown

"BYLAWS of Atari Computer Enthusasists of Columbus"



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for ACE of Columbus membership. Dues are on an annual basis and entitle the members to all club benefits (Newsletter, Disk or Tape of the month, group discounts, etc.). Monthly meetings, at St. Francis De Sales High School, 4212 Karl Road, Columbus, Ohio are open to nonmembers. Meeting dates are the second Monday of the month at 7:30 pm. Disk of the Month distribution from 7:00 to 7:30.

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FIRST LOOK AT THE 520 ST
by Norman Knapp

The monochrome version of Atari 520 ST computer has been available for several weeks. I decided that I would rather have the color monitor version and had my name put on the waiting list. When my name came up to the top of the waiting list, I took the chance to acquire the color ST.

The first impression you get is it's physical size; it's not much larger than the keyboard; only 3.5 inches deeper than the top row of keys. The disk drive is also small since it uses 3.5 inch diameter disks. A 12 inch monitor comes with the ST; neither too small or too large. These three pieces fit nicely on a small desk; my desk measures just 16 by 30 inches

Following the old rule of thumb of "don't read the manual until you get in trouble", the system was cabled together. This is pretty foolproof since all cables had different pin configurations and all sockets were clearly labeled. When the time came to turn on the power strip, then my nerve wavered and I started reading the manuals. The order in which the system is turned on is the monitor, disk drive and then the computer. However, at this point I came across something rather puzzling.

Instead of labeling the two positions of the power switches "ON" and "OFF", the manufacturer placed a vertical bar and a circle in their respective places; this I found by experimentation and by reading the manual later. These symbols are apparently icons since all the cable connectors are labeled by icons as well as by English names; their meaning escapes me but apparently they must be readily understood by the Oriental mind since both the ST computer and disk drive are made in Taiwan.

When the power was turned on, a message appeared on the monitor telling me to place a "systems" disk in the disk drive. After searching through the packing materials, it failed to turn up; it, as well as the Logo disk, were not packed with either the disk drive or the computer. Both disks were obtained after a phone call and another trip to my dealer. These two disks and a demonstration disk are all that may be available at your dealer. Other software will not be stocked until a number of ST's have sold and software has been evaluated and reviewed by early purchasers.

When the "systems" disk was placed in the drive and booted up, the Graphics Environment Management (GEM) screen was displayed on the monitor. This consisted of a menu bar across the top of the screen and two floppy disk and trash can icons along the left side. Using GEM just to see what is on a disk and to run selected programs are the two most important aspects of GEM for the new user. Place the disk of interest in the drive. Move the arrow to the drive A icon using the mouse and then click the mouse. Moving the arrow to the File icon of the horizontal bar menu displays a

pull-down menu; moving the arrow to the OPEN option and then clicking the mouse displays files, folders, and programs on that disk. Moving the arrow to a program icon and double clicking the mouse loads and runs that program. My description sounds rather complex, but in practice the process is simple and is mastered by practice rather than by reading about it. The demonstration at the meeting tonight will illustrate this process. Double clicking was successful only when done quickly enough; it takes a little practice. The arrow may also be moved about the screen using the cursor control keys, but that method is considerably slower than using the mouse.

The demo disk of both versions illustrate mainly the graphics capabilities. However, one program on the color demo disk shows a screen of a spreadsheet with pull-down menus which I could not get to work; this may be a demo for commercial program to be released. The other files on the color demo disk illustrate the multicolor medium graphics of the ST. The high resolution mode is available for the monochrome version; a digitized photograph of Sam Tramiel is comparable to photos in newspapers, very impressive.

The only software that Atari offers for the ST is LOGO with pull down menus. The accompanying documentation just shows how to use GEM and and Logo menus. The new Logo programmer will have to search out other sources to learn how to program in Logo. Most of the Logo manual is comprised of appendices listing Logo commands, primitives, variables, error messages, and the ST ASCII character set. The last appendix has just 3 pages of sample Logo procedures.

How does the ST compare to its competition, Commodore's Amiga and Apple's Macintosh? The Amiga promises higher resolution color graphics, but will come in a bulkier package. The Macintosh, at this time, is available in a monochrome version; upgrades to color graphics, more memory, and additional drives will probable be expensive. GEM has fewer icons than the Macintosh; the meaning of Mac's desktop/office icons were not that obvious to me. I prefer GEM's combination of several icons and English pull down menus. The ST is the most economically priced machine of the 3 68000 microprocessor based computers.

Summing up, the ST is an exciting new machine for adventuresome programmers. Applications programs such word processors, spreadsheets, art and drawing software are on the horizon which make the ST a much more practical machine.

Machine Language: How Does It Know What It's Doing?

By Dr. Warren G. Lieuallen

In past articles, I have attempted to demonstrate just what machine language (or assembly language) is, how and why it works, and how it can be used to accomplish some tasks simliar those done via BASIC routines, but much faster. This article will further discuss the mechanism of machine language, and the methods used by the microprocessor to carry out the commands indicated by the hexadecimal "op-codes" that make up the machine language program.

The 6502 microprocessor uses variables, very similar to those used by any BASIC programmer. However, certain differences do exist. First of all, the variables (which are called "registers") are very limited in number--there are essentially only three of them: X, Y, and A. The "A" register is called the accumulator; the other two are simply referred to as the X- and Y-registers. Other registers do exist, but their use is much more limited. Included amongst these are: the program counter, which keeps track of the memory locations being executed (fairly analagous to the line numbers of a BASIC program); the status register, which acts as a set of "flags" to indicate various conditions, such as mathematical overflow, enabled interrupt vector, decimal versus hexadecimal arithmetic, etc.; and the stack pointer, which allows items of data to be stored within memory in the form of a "stack" (last-in, first-out [don't worry if that makes no sense!]).

These variables are used just as you might expect; they are used to hold items of data, as do string or numeric variables in BASIC. However, a machine language register is limited to numeric data, and only whole numbers between 0 and 255 (Any idea why? It's because that's all that can fit in one byte!). Perhaps because they seem to be so limited, these registers can be used in quite a number of way, and with several variations, so that in the end, they really are quite useful.

The way this works is that there are a number of different addressing modes available on the 6502 microprocessor. And although these are very versitile variations, they are also the single most confusing topic dealing with machine language (at least, they were to me!), so bear with me.

The addressing modes are: immediate, implied, absolute, relative, page zero, "indexed" page zero, "X-indexed" absolute, "Y-indexed" absolute, "indirectly X-indexed" and "Y-indexed indirect". The immediate mode is the most

straightforward. It simply indicates that the instruction is executed immediately, using the numerical data provided, with no additional modifications. The implied mode is used by several commands which differ only in that they perform certain "housekeeping" functions, rather than actual computations. The absolute mode is nearly identical to the immediate mode, but in this case the numerical data is obtained from the indicated memory location, rather than directly from the value of the following byte in the code. The relative mode is used to indicate that the processing depends on the values of certain bits in the status register byte--the result is "relative" to the indicated flags. The page zero mode deals with certain commands which require a memory location on page zero for use, or for easy access to page zero counters. The "indexed" page zero is similar, but increments the memory location by the number contained in the X-register (In this way, "indexing" the page zero command in terms of the X-register.).

The X- and Y-indexed absolute modes use the same approach. Here, the command is processed just as in the absolute mode, but the memory location is first "indexed" by either the X- or Y-register. These addressing modes are very useful to create a finite loop, using one of the registers as the counter, incrementing it each time through the loop, and so on. For an example, examine the screen-fill routine in last month's column.

Finally, the indirect modes (which may be combined in several ways with the indexed modes) differ in that they allow the use of memory location pointers, as they will proceed to the memory location specified by the contents of an indicated RAM byte, thus allowing even more sophisticated loops and logical branching structures within the code. This is the method used in the screen-fill routine, which combined with the indexing mode, allows a pointer to the start of screen memory to be incremented and serve as a pointer to the memory location to be "filled" on the next pass. Then, by examining the value of this pointer, it can be determined when one full screen has been completed, and execution can be halted.

If all this seems a little incomprehensible, don't worry; it seems that way because it is incomprehensible, or at least nearly so! But with a little patience, and a little more effort, you'll soon find that suddenly things begin to make some sense and then you'll wonder what all the fuss was about, anyway! Good luck.

USING THE ATARI ASSEMBLER EDITOR PART 3

In the past I have tried to explain to you how machine language programming works. The best way that I know how is to give you an example.

In Basic language if you want to print something to the screen, you would use the Print command like this:

```
Print "HELLO ATARI USERS"
```

Anything that you put in between the quotation marks would be printed. It could be any combination of letters or numbers or special characters. It also does not matter how long it is.

I have listed below an actual machine language program. This program does the same thing as the one line of Basic code listed above:

1	2	3	4	5
0000		10	*= \$3000	
3000	A200	20	LDX #0	;CHANNEL OFFSET
3002	A909	30	LDA #9	;WRITE command
3004	9D4203	40	STA \$342,X	;ICCOM
3007	A921	50	LDA #MESS&255	;LOW BYTE OF MESSAGE
3009	9D4403	60	STA \$344,X	;ICBAL
300C	A930	70	LDA #MESS/256	;HIGH BYTE
300E	9D4503	80	STA \$345,X	;ICBAH
3011	A911	90	LDA #17	;LENGTH OF MESSAGE
3013	9D4803	0100	STA \$348,X	;ICBLL
3016	A900	0110	LDA #0	;H.B. OF LENGTH
3018	9D4903	0120	STA \$349,X	;ICBLH
301B	2056E4	0130	JSR \$E456	;CIOV
301E	4C1E30	0140	JMP STOP	
3021	48	0150	MESS	y.BYTE "HELLO ATARI USERS"
3022	45			
3023	4C			
3024	4C			
3025	4F			
3026	20			
3027	41			
3028	54			
3029	41			
302A	52			
302B	49			
302C	20			
302D	55			
302E	53			
302F	45			
3030	52			
3031	53			
0 ERRORS				

As you can see you have a lot more than one line to type. In fact you have 15 lines to type in order to do the same thing. Also you have to be more specific in what you are doing.

Whenever you put or get something to or from another device besides the computer, you have to use the I/O control blocks. Other devices include the disk drive, program recorder, printer, TV screen or monitor, modem, keyboard, or the RS232 ports. These blocks are like channels that data goes back and forth on. You must be able to understand them in order to better understand programming. When you print to the screen you automatically use I/O block 0. This channel is always open for your use. If you do a Lprint to the printer (in Basic) the computer will automatically open channel 7, do the printing and then close the channel. In machine language you would have to go through all the steps. You would first have to open the channel. Then send your data over it. Then close the channel. You can easily see that Basic is much simpler.

The listing shown above is from an assembled program. It shows both the source code (the code typed in by the programmer) and the resultant object code created by the computer). In column #1 you see the memory location for that line of code. In column #2 you see the hexadecimal value for the object code of that line. In column #3 you see the source code line number. In column #4 you see the actual source code command. Finally in column #5 you see the comments that explain what is going on. The semicolons that you see in the beginning of column #5 are the same as a Rem statement in Basic.

Now I will try to explain the program line by line. In line #10 I am telling the computer to store the object code in 3000 hex. This location would be 12288 in decimal. You have to know where to store the code. You could write over some important data and crash the computer. In line #20 I load the x register with the number 0. The x register is used as an offset. By using #0 I am telling the computer to go that I want to use I/O channel 0, so the computer will know I want to print to the screen. This channel is always open, so I won't have to go through the trouble of opening it. In line #30 I am loading the accumulator with the #9, the number for the write command. In line #40 I store the contents of the accumulator into location 342 hex(834 decimal). This is called the iccom where the computer will find the command for the type of action to be taken on this channel. Since we put the 9 there, the computer will know it is supposed to do a write. In line 50 I load the accumulator with the low byte of the message to be printed. Then in line 60 I store the contents of the accumulator into location 344 hex(836 decimal). This is called the icbal. It is the low byte of the buffer address for the data that is to be transferred. In line #70 I store the high byte of my message in the accumulator. In line #80 I store the contents of the accumulator in location 345 hex(837 decimal). This is the icbah the high byte of the data buffer address. In line #90 I load the accumulator with the number #17. This is the number of characters in my message. You have to know exactly how big your message is. If your number is too small then your whole message won't be printed. If you have too big of a number then you will have a bunch of garbage at the end of your message. In line #100 I store the contents of the accumulator into location 348 hex(840 decimal). This is

BYLAWS of Atari Computer Enthusiasts of Columbus

Article 1. NAME

The name of this organization shall be the Atari Computer Enthusiasts of Columbus, herinafter referred to as ACEC.

Article 2. PURPOSE

The purposes of this organization are to:

1. Promote the use and understanding of Atari computers.
2. Assist members to achieve an understanding of how Atari computers operate.
3. Provide a library of public domain software for use by its membership.
4. Publish a newsletter containing tips on the use of Atari computers, the latest news about Atari computers, and reviews of hardware and software for Atari computers.
5. Promote any other activities which the club may deem appropriate.

Article 3. MEMBERSHIP

1. Membership in ACEC shall be open to anyone who wishes to further the purposes of the organization as stated in Article 2 of the BYLAWS.
2. Membership to the organization entitles the immediate family of the member to attend any of the member meetings and to exercise the privileges provided by ACEC.
3. Members in good standing shall have the right to vote at all general meetings at which they are present and have access to the services of ACEC.
4. Good standing shall mean that a person shall have paid dues for a period including the month that he or she wishes to vote or utilize privileges provided by ACEC and has not had privileges or the right to membership withdrawn by a vote of the members as defined by these BYLAWS.
5. Any member whose conduct has a detrimental impact or discredits ACEC, may have privileges or membership suspended or cancelled by a two-thirds affirmative vote of the members present at a general meeting.

Article 4. DUES

1. Membership dues shall be for a period of 1 year from the date which they were paid and shall be due and payable with an application for membership.
2. The amount of the annual dues shall be established by the officers of ACEC and must be approved by a two-thirds majority vote of the members present at any monthly meeting.

BYLAWS of Atari Computer Enthusiasts of Columbus

Article 5. OFFICERS and MINISTERS

1. The elected officers of ACEC shall be the President, Vice-president, Secretary, Treasurer, Disk Librarian, Newsletter Editor, and Membership Chairman.
2. Ministers shall be persons elected or appointed to supervise an activity of ACEC identified as a special interest or given as a function of the organization in the BYLAWS.
3. The term of each officer shall commence one week after the election of officers at the annual meeting of the membership and shall continue for one week after the next annual meeting of the membership.
4. The election, establishment, or disbanding of any temporary ministerial position may be decided by a simple majority vote of the membership at a monthly meeting.

Article 6. Duties of OFFICERS

1. The President shall:
 - A. Preside over all meetings of ACEC.
 - B. See that all regulations of the organization are enforced and have general supervision of the work of ACEC.
 - C. Appoint or remove temporary ministers subject to a vote of the members as detailed in article 8 of these BYLAWS.
 - D. Perform all such other duties as customarily pertains to the office of president.
 - E. Call a meeting of the officers and ministers of the club at least once a month for the purpose of planning the activities of the club in consultation with club officials and those members whose skills can aid in that endeavor.

2. The Vice President shall:
 - A. Advise and consult with the President and perform other duties as requested by the President.
 - B. In the absence or the inability of the President to act, the Vice President shall perform the duties of the President.
 - C. Coordinate all committees.

3. The Secretary shall:
 - A. Act as secretary at all general membership or officers meetings and keep the minutes of those meetings.
 - B. See that all notices required to be given by ACEC are duly given and shall have charge of all records other than financial records.
 - C. Perform all duties incident to the secretary and other such duties as requested by the President.

BYLAWS of Atari Computer Enthusiasts of Columbus

4. The Treasurer shall:

- A. Have general charge of all monies belonging to ACEC.
- B. Deposit all monies received in the name of and to the credit of ACE of Columbus in such bank as designated by the officers of the organization.
- C. Disburse all monies as directed and all such checks shall bear the signature of two officers of the organization.

5. The Disk Librarian shall:

- A. Be responsible for the care of the clubs library of computer disk programs and the preparation of the "Disk of the month" which shall contain programs and information of general interest to the members of the ACEC.
- B. Prepare a quantity of copies to fill the anticipated demand for the "Disk of the month" and make copies of other disks in the program library for members in good standing.
- C. Turn over all monies collected from the sale of disks to the treasurer to be placed in the clubs' account and all monies shall be collected in the name of ACE of Columbus.

6. The Newsletter Editor shall:

- A. Be responsible for publishing the ACEC newsletter. This shall include the collection of suitable materials as outlined in Article 2 of these bylaws.

7. The Membership Chairman shall:

- A. Be responsible for the collection of applications for membership and membership dues.
- B. Ensure that a listing of members in good standing is maintained.
- C. Update the membership list before each monthly meeting and the list shall be made available to those officials of ACEC that have need of such information to carry out their duties.
- D. Turn over all monies collected for membership dues to the treasurer to be placed in the clubs' account and all monies shall be collected in the name of ACE of Columbus.

Article 7. MEETINGS

- 1. General membership meetings shall be held monthly in a location convenient to the majority of the membership.
- 2. The annual meeting shall coincide with the September monthly meeting of ACEC and shall be for the election of officers and for the transaction of such other business that may come before the meeting.

BYLAWS of Atari Computer Enthusiasts of Columbus

Article 8. ELECTIONS

1. All persons who are candidates for any office or position of responsibility must be a member in good standing at the time the election is held.
2. A nominating committee of at least three persons including a committee chairman shall be selected by the membership in a general vote for the purpose of nominating a slate of candidates for offices. The committee shall be elected at the July meeting each year. The committee shall accept requests from the members of the club that any member in good standing be considered for nomination as a candidate for office.
3. At the annual meeting for the election of officers the nominating chairman shall present a slate of candidates for office. The nominating chairman shall then announce the names of persons who have expressed interest or willingness to serve in particular offices. The nominating chairman shall then ask for any additional nominations from the floor and shall present all names of candidates for each office prior to the vote for that office.
4. Any officer may resign at any time by giving notice to the President or Vice-President as necessary. The resignation shall be effective upon receipt of the notice. In the case of the vacancy of the office of President, the Vice-President shall assume all duties and responsibilities of the President for the remainder of the term. All other vacancies shall be filled by an election held at the next monthly general meeting if it is not the annual meeting.
5. Elections shall be awarded to the candidate receiving the largest number of votes, except that in the case where two or more persons are tied for the largest number of votes, then there will be another vote for that office at the same meeting including only those persons tied for the largest number of votes.
6. An election for the removal of any official of ACEC may be called for by a majority of the members present at any monthly meeting, the person being considered for removal from office shall be provided an opportunity to speak in his or her defense prior to the vote. A two-thirds majority of those voting shall be required for removal from office which will take effect immediately.

Article 9. AMENDMENTS

1. The bylaws may be amended or revised by an affirmative vote of all members present at a general meeting designated for that purpose. Copies of the proposed amendments shall be given to the members in writing at least one month prior to the meeting at which the vote will be taken.
2. No amendment shall be accepted for a vote that changes or removes this article or would limit or remove the memberships right to vote on any area of the conduct of the business of ACEC.