SORCERER'S APPRENTICE

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SORCERER'S APPRENTICE TAKES OVER THE SUN AND THE SOURCE-
REPORT TO THE MEMBERS- by Don Gottwald, Vice-president, Sorcerers Apprentice

It's been six months now since we've decided to formally organize as a User Group. A lot has happened since then. We've elected a president, vice president, editor, librarian, corresponding secretary, technical director, publications director and an advertising coordinator. In addition to the above, we have several other's involved in the production of the newsletter.

As most of you know, there aren't very many newsletters or magazines that have information directly applicable to the Sorcerer. A couple of newsletters that achieved national distribution were the Source by Aresco and the SUN published by Steve Long. Aresco's Source ceased publications because of the publisher's failing health. We have been assigned the copyrights to the Source and will be offering backissues to anyone interested. If you are interested please drop us a line and we will reply as soon as possible with all the pertinent details. We have also signed an agreement with Steve Long to publish the SUN for the remainder of volume II. In exchange we've received the copyrights to the SUN. Backissue information will be forthcoming in the next issue of The Sorcerer's Apprentice. Starting in January 1981 the only publication we will be offering is The Sorcerer's Apprentice. The subscription rate for the United States and Canada will be $12.00 (U.S.) per year and $18.00 (U.S.) per year for other foreign subscriptions. Single copy price will be $2.00 per issue.

The reason we have to start charging for subscriptions is the cost of producing and mailing the newsletter is escalating in direct proportion to the increase in requests for it. We have a large number of people involved on a volunteer basis but the actual printing and mailing costs exceed our income. We also hope that we can entice all present and former Source and SUN subscribers to try the Sorcerer's Apprentice. We feel confident that we will not be out of business in a few months due to the fact that we are formally organized as an educational organization with over 40 active members and as such do not depend on just one or two individuals to produce this newsletter. We will be offering library services and an SBBS in the near future. As a subscriber you will automatically become a member of the users group and will be entitled to all the additional services we will be offering. We do need your help in our endeavor to provide the type of support to enable us all to more effectively use our computer. We can all learn thru mutual exchange of information using the newsletter as the medium for the exchange. We welcome and solicit your ideas.

PRESIDENT'S CORNER- by Ed Heussner, President, Sorcerer's Apprentice

A lot of things have happened to the Sorcerer's Apprentice since my last column appeared in these pages. Because of the growth of this group over the past few months our monthly meetings have continued right through the summer. The executive board has been meeting the week after the regular meetings. Members are welcome to any of these meetings. Simply contact myself or one of the officers to confirm time and location. The executive meetings are strictly for the purpose of establishing policy and determining direction of the Sorcerer's Apprentice.

The board is in the process of learning how to set up and run an organization and resolve the business matters as they arise. Questions like... What should our organization chart look like? Do we need speakers at each meeting? Should we accept Aresco's back issues? Do we want to continue publishing the SUN? Should we charge dues? What is a computer club library? Who needs an attorney? ...have arisen during the past months.

Let's take the last question first. During the recent discussions with Steve Long of the SUN, it seemed like we opened a can of worms and we felt we couldn't find another can large enough to put them back into. We decided we needed an attorney. Luckily we found one within our group. Tom Beeby deserves a heartfelt thanks for his preparation of the contract formalizing our ownership of all rights to the SUN. This includes all copies of back issues and transfer of exclusive copyrights to the Sorcerer's Apprentice. In addition, we now have all back issues of Aresco's SOURCE, along with their list of subscribers.
Thus we need specialized talent, including legal, accounting, technical and programming, to fullfill our goals and serve the members in the best ways possible. Please contact one of our officers if you can volunteer any of these skills. We are urgently in need of someone with accounting skills and data base programming. The board position of treasurer is still open and must be filled with someone capable of setting up auditable books. Also, we must computerize our mail lists now. We need both the program and printer. Please call us if you know of someone who can help us in these areas.

As you will note elsewhere in this issue, we have a new mailing address, an established advertising policy (Tom Bassett is our new advertising coordinator--thanks, Tom), and a formalized subscription rate. In addition, future plans include implementing a Sorcerer's Bulletin Board Service, library and some very interesting meetings and informative speakers.

We hope you are getting added value out of your Sorcerer from your affiliation with the Sorcerer's Apprentice.

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NEW SORCERER ROM PAC BASIC- VERSION 1.1 AND MONITOR- VERSION 1.1

The following text describing updated versions of Sorcerer BASIC and the Sorcerer Monitor is reprinted from the newsletter of the Sorcerer Program Exchange Club of Liverpool, England. It was copied by them from an "Exidy" internal memo. Ed Heussner of the Sorcerer's Apprentice called the Marketing Division of Exidy's Data Products Division and they said that these items were "in-house projects only", inferring that they have no definite plans for marketing them. If you Sorcerer owners out there are interested in these versions of BASIC and the Monitor write to Exidy and put some heat on them to make them available. After I put this article together I received a copy of The Sorcerer Computer User of Australia newsletter which had a similar article by D. Trussel who got this information from Exidy during his recent visit to their facility.

New Sorcerer ROM PAC BASIC Version 1.1

A new Sorcerer ROM PAC BASIC has been developed to fix the various and sundry bugs in the original ROM PAC. This new BASIC will be called Version 1.1. This document is intended to describe the bugs that existed in Version 1.0, their symptoms, the fixes implemented in Version 1.1, and any ramifications these modifications will have. All known bugs in version 1.0 have been fixed.

Important note: These modifications were made without moving any routine or subroutine in the ROM PAC. All the code which was added was done in the free space at the end of the ROM PAC in "patch" format. Thus the new ROM PAC should be totally upward compatible with existing software with one exception: array data CSAVE*/CLOAD* tape files, which will be explained later.

PROBLEM 1- CLEAR, ESCAPE, and HOME produce syntax errors when entered before a command or statement in BASIC. Also a CLEAR or HOME placed in a PRINT statement will garble the listing during a list command.

BUG: The keyboard routine incorrectly put all the entered characters in the BASIC input buffer.

FIX: The 1.1 keyboard input routine performs the action required by CLEAR, ESC, and HOME and then throws these characters away. To put a CLEAR or HOME in a PRINT statement the user should use the CHR$(12) or CHR$(17) functions, respectively.

PROBLEM 2- The cursor "flips" to the next line before reaching column 64.

BUG: The input routine counted RUBs as characters on the screen. The buffer contents are correct but the display is disturbed.

FIX: 1.1 routines increment the cursor position count for all characters but RUB, which decrements the count.

PROBLEM 3- Cannot CLOAD a BASIC tape file program whose name begins with "G".

BUG: CLOAD processing checks for a "G" character after a CLOAD command. This checking throws away the first character of any filename starting with a "G". A circumvention could be stated as follows: if the filename is "GATE", then CLOAD GGATE will work "correctly" and load GATE.

FIX: 1.1 cleans up the check for "G" in the LOG context without wiping out the filename.

PROBLEM 4- If lower case characters are used in the CSAVE and CLOAD program tape file commands they act unpredictably (throw the user into the monitor with weird messages, etc,). BASIC is supposed to be transparent to upper/lower case distinctions.

FIX: CLOAD/CSAVE code folds all lower case to upper case.

PROBLEM 5- The keyboard input routine allows the user to type more input characters than there is buffer space. This can cause program destruction.

BUG: The keyboard input routine has a test for buffer overflow, but does not branch on it!

FIX: 1.1 has the branch and stops echoing characters when the buffer is full.

PROBLEM 6- CSAVE* and CLOAD* are so unreliable that they are useless. This is by far the worst problem with ROM PAC BASIC.

BUG: This problem is caused by two independent bugs:

a) CSAVE*/CLOAD* do their own I/O to the Z80 ports (FC/FD). They do not use monitor TAPEIN and TAPEOUT routines which work correctly.

b) CSAVE*/CLOAD* dumped data to tape with an insignificant header of 4 bytes of hex D2. No interfile leader was generated, so the beginning of data always came too fast. No CRC checking was done.

FIX: New CLOAD* and CSAVE* routines were implemented with file format similar to program file format (100 0's, 01, 16 byte header + CRC, 100 0's, 01, data + CRC's). Old array files cannot be loaded by 1.1 however, an assembly language program, called ARRAY, has been developed to change old files to the new format.

Another fix which was especially needed by the array processing changes is: All errors reported by BASIC (i.e. the message ?xx ERROR) will also cause the tape motors to be switched off.

New Sorcerer Monitor, Version 1.1

A new Sorcerer Monitor program has been developed to fix the various and sundry bugs of the original Monitor. This new Monitor will be called Version 1.1. This document is intended to describe the bugs that existed in Version 1.0, and any ramifications these modifications will have. All known bugs in Version 1.0 have been fixed, with the exception of the bug described in PROBLEM 9.

Important note: These modifications were made without moving any major routine or subroutine in the monitor. All code which was added had a corresponding compression of existing code. The only exception to this is the subprocessor which supports the "T=n" parameter of the SET command, which was moved two bytes. Thus the new monitor should be totally upward compatible with existing software such as the ROM PACs, CP/M, etc.

PROBLEM 1- Neither the Sorcerer I or II seem to work with an RS232 device on the serial port. For example, serial printers appear to hang or print garbage at any print rate.

BUG: The keyboard scan routine reset the serial port from RS232 mode to cassette mode every time it was invoked to get a character. Thus the RS232 signal was immediately set to the idle state, and the UART was shut down. Also, in Sorcerer I, due to a problem in the UART control hardware which caused RS232 idle to be a space (+9v) and not a mark (-9v), the serial device was sent a long string of invalid inverted data bits, hanging it up. Sorcerer I's required a hardware modification to reverse this idle state logic. In Sorcerer II the above hardware was fixed, but the reset of the port to cassette still shut the UART down before a byte could be completely sent, causing lost characters and framing errors. This occured at both 300 and 1200 baud. Note: the Dumb Terminal and the Word Processor work correctly (with the hardware modification to the Sorcerer I) because they contain their own keyboard routine.

FIX: The 1.1 keyboard routine maintains the RS232/cassette mode in its proper state. Sorcerer I's no longer need the above hardware modification.

PROBLEM 2- 1200 baud sometimes loses characters or does not work at all, even with the above hardware modification to the Sorcerer I.

BUG: The keyboard routine, error processing, motor control and elsewhere always reset the baud rate to 300 baud when invoked. The Dumb Terminal program and WP PAC work correctly because they do not use these routines.
FIX: The 1.1 routines maintain baud rate at all times. Note: 1200 baud still cannot work with printers with slow carriages due to data overruns unless the application program sends nulls at the end of the line or Sorcerer is redesigned to handshake on the serial port. Using SE S=6 can be an expediant circumvention.
ADDITIONAL FIX: The 1.1 cassette motor on and off processing was updated and fixed to maintain the serial port baud rate and the RS232/cassette modes.

PROBLEM 3- There is no convenient way to set RS232 mode from the Monitor command level to use serial devices assuming the serial devices work correctly.

BUG: The SET T=n command only sets the baud rate. There is no command for choosing RS232 or cassette mode.
FIX: The 1.1 SET T=n command has two new parameters.

SET T=0 is 1200 baud cassette
SET T=1 is 300 baud cassette
SET T=2 is 1200 baud RS232
SET T=3 is 300 baud RS232

Note: The baud rate and the mode are now set immediately upon completion of these commands, not later when the motor is turned on as in Version 1.0.

PROBLEM 4- SET O=S (serial) only works at 300 baud, no matter what SET T=n parameter was used.

BUG: SET T=n did not actually set the baud rate, just "remember" it. Turning the cassette motor on actually set the baud rate. If the cassette wasn't used then the baud rate didn't get set.
FIX: The 1.1 SET routine sets the mode and the baud rate. Thus to use a serail printer from the 1.1 monitor the following sequence is used:

SET T=2 (1200 baud, RS232. Use SET T=3 for 300 baud)
SET O=S (all output now goes to printer)

Note: The 1.1 cassette and RS232 operations are mutually exclusive. The 1.1 monitor together with Exidy CP/M Versions 1.42/3 and higher will allow CP/M communication with the serial RS232 port. Use the Monitor SET T=2 or 3 command and then use the CP/M standard punch device PUN. Eg. to list a file on CP/M, SET T=2 or 3, boot CP/M, and isue: A)PIP PUN:=FILENAME.EXT

PROBLEM 5- A user program initiated by the GO command hangs the Monitor on RETURN if register IY was modified.

BUG: Command completion processing assumes IY is OK.
FIX: 1.1 will do a full warm start after all command completion (including GO) to reset IY.

PROBLEM 6- If tape is read with the tape positioned in the middle of a file containing a string of zeroes a CRC error is generated.

BUG: The "TAPWT" routine looks for at least 10 zeroes in the file leader but does not check for an 01 following the zeroes.
FIX: 1.1 checks for the 01 after the 0's before processing the file

PROBLEM 7: Standard graphics are refreshed when the CLEAR key is depressed. This destroys any programmed graphics when the screen is cleared.

BUG: Refrsh should only occur during a Monitor Cold Start.
FIX: The 1.1 video processing was fixed to refresh on the cold start only, not on screen clear.

PROBLEM 8- The command level keyboard does not allow lower case input.
BUG: The 1.0 Monitor has no foldover routine.
FIX: The 1.1 Monitor includes a "FOLD" routine at address E845. The PR command was removed from the new monitor to make room for "FOLD". The "FOLD" routine takes a character in register A and if it is lower case it converts it to upper case. Note: lower case now echoes as upper case also.

PROBLEM 9- The TAB/SKIP key generates horizontal tab (Control I, 09H) only when shifted. Lower case incorrectly generates vertical tab (Control K, 0BH). This is very inconvenient since vertical tab is seldom used (not supported by any current Exidy software) while horizontal tab is used heavily in editors, etc.
BUG: The key font definition table is incorrect for the non-shifted TAB/SKIP key.
THIS BUG WAS NOT FIXED: The table should be updated from 0B to 09 codes but then it would not be compatible with the Word Processing PAC which looks for Control K (0B), the incorrect code, to initiate horizontal tab.

PROBLEM 10- Cannot rubout graphics on Monitor command line. This is not actually a BUG. The graphics are only on the screen not in the command (they can't be RUBd out because they are not there). They are ignored and they do not need to be RUBd out.

INPUT STRINGS CONTAINING COMMAS- routine from Bob Nowacki, 19427 Craigchester Lane, Spring, TX, 77373

Here is a routine which will allow entering a string with commas as legitimate data as an input variable. Normally the comma is a delimiter and anything following the comma is not accepted. The listing includes the routine (program steps 100 to 160) and a demonstration (program steps 1000 to 1110). Use a PRINT statement to prompt and GOSUB to call the routine instead of a INPUT statement.

```
LIST

100 POKE 260,1:POKE 261,0:FOR I=1 TO 10:READ N:POKE I,N:NEXT
110 DATA 205,24,224,202,1,0,50,0,0,201
115 GOTO 1000: REM: GO TO THE START OF YOUR PROGRAM
120 X$=" ": REM: COME BACK HERE WHEN CALLING SUBROUTINE
130 X=USR(X): IF PEEK(0)=13 THEN PRINT: RETURN
140 IF PEEK(0)=127 THEN 160
150 X$=X$+CHR$(PEEK(0)): PRINT CHR$(PEEK(0));: GOTO 130
160 PRINT CHR$(8);: X$=LEFT$(X$,LEN(X$)-1): GOTO 130
1000 CLEAR 100: REM: OR WHATEVER YOUR PROGRAM NEEDS
1010 REM: DEMONSTRATION OF INPUT WITH COMMAS
1020 PRINT CHR$(12): PRINT: PRINT
1030 REM: PROMPT THE INPUT WITH A PRINT STATEMENT
1040 PRINT "Input something with commas- ";
1050 REM- CALL THE ROUTINE WITH A GOSUB
1060 GOSUB 120
1070 REM- DID IT WORK?
1080 PRINT: PRINT "You input-";X$: PRINT: PRINT
1090 REM- DEMONSTRATE THE NORMAL INPUT
1100 INPUT "Normal INPUT (enter the same input)- ";Y$
1110 PRINT: PRINT "You input- ";Y$: PRINT: PRINT: END
READY
```

THE WORD PROCESSING CORNER #8

The more I do of this, the more I discover that no one seems to be reading the manual. I grant you, the Exidy manual is not poetry but it does have some worthwhile information. As they say, it helps if you read the instructions. For that reason, I am sticking with basics. If any of you want more complicated material, let me know or tell Larry Kobylarz and I will accomodate you.

Today we will spend some time on the search and replace routine. It is one of the most powerful in the system and there are some tricks to it which speeds things up a bit.

The basic convention is "nS/oldstring/newstring/" or "nS/oldstring/*newstring/" (don't forget the closing /). "n" is the number of times you want to do the search, i.e. if n=2 then the routine will stop after it finds the second "oldstring" or if it gets to the end of the file before finding 2 "oldstring"s. "*" changes the search from automatic to discretionary. If the "*" is not included, the search and replace are fully automatic and you get to find out that you have replaced some strings you didn't want to replace when it is too late. If the "*" is included, the search stops when it encounters the old string and waits for instructions. If you hit the space bar, the old string IS NOT replaced. If you hit the return key, the old string IS replaced and the search continues.

In our office, we very rarely use the automatic search and replace and the asterisk is in 99 times out of 100. The reason is that there is too much risk of screwing yourself up. Suppose you want to change "cat" to "rat". The system will also replace "cate" with "rate". Remember, it is a totally blind operation. It goes hunting for the old string without reference to anything else which precedes it or which follows it.

You can use the period (.) as a wildcard. The system plugs in anything as a substitute for the period.

Suppose you have a fairly complicated search and replace, maybe something with a lot of spaces in it. Very handy to move over a column of numbers (change five spaces to six), etc. As you are progressing down the text you notice a typo error. If you terminate the search operation (by pressing ESC), you lose the strings you keyed in. Instead, use a macro. At the end of the text, key in the search convention, just as though it was on the COMMAND line, with "n"=1, like so:

1s/oldstring/*newstring/

Then, put the cursor on the beginning of the line and insert it in the macro buffer with the "a" command in the COMMAND mode. Go to the top of text and type "a1" (or a bigger number if you wish). Keep on going. The point is that any time you want to terminate the search, press ESC. To start it up again, type "aI" again and continue. Very handy for complicated searches.

I would be interested to get a count of how many people are using disk systems with their WP PACs, possibly with the Exidy DISKDRIV program. Send the information to the Newsletter's address.

Steven Guralnick
15 Southgate Ave., # 246
Daly City, CA 94015

STOP DEVELOPMENT PAC LISTINGS- by Giuseppe Zollo, Milano, Italy

A short routine that can be useful to to those, who like me, use the DEV PAC without a printer. When the Assembler runs, it produces a list on the screen that quickly scrolls up without giving time to examine it. The RUN/STOP key does not stop the listing. So put at the address 0000H the following:

```
CD 15 E0  IN        CALL      QUIKCK
20 FB               JR        NZ,IN-$
7A                  LD        A,D
CD 1B E0            CALL      VIDEO
FE 0A               CP        0AH       ;LF
C0                  RET       NZ
CD 1B E0            CALL      VIDEO
C9                  RET
```

Under DDT80 change the vectors for S0 and C0 to 0000H as follows:

```
.M :S0 0000 (CR)
(.)
.M :C0 0000 (CR)
(.)
```

Now holding down the RUN/STOP key will halt the listing.

REVIEW OF ARRINGTON'S GRAPHIC'S PACKAGE- by Roger Harrison, Jr., 59 Momar Drive, Bergenfield, NJ, 07621

What do I think of Arrington's Graphics Package? SUPER!! It gives 90 row by 128 column resolution. For those of you into unit pricing that's 11,520 dots for $25.00. I have not incorporated it in any of my own programs yet, but his dynamic demo shows line and circular drawings, 3-D, inverse video, screen shifting up/down/right/left (weird!), rapid screen page saving and restoring for animation and flashing (no raincoat required), varying shades of white, and screen fill. I cannot compare it to other graphics packages, but for my money, this graphics package certainly seems capable. Besides, the 2x3 character resolution (instead of 8x8 like the CRT) gives me a chance to write a driver for printing the CRT screen in a graphics mode on my IDS-225 printer which is 7x7. The key information for doing this is described for the Apple II in the new magazine, NIBBLE (Mag. No.3).

Editor's note: I am learning how to use the Graphics Package and I hope to incorporate it into some programs for further comments in the next issue.

I also have a copy of Arrington's new CROSS REFERENCE program which I will review next issue. It produces a cross reference listing of all the various types of variables used in your BASIC program. The listing includes the line numbers that use each variable. This program can be run by itself or it can be patched into Arrington's EDITOR FOR BASIC. Price= $10. Order from:

Howard Arrington, 9522 Linstock, Boise, Idaho, 83704

BOOK OF SORCERY- Program listings from Exidy/University Software
review continued by L. Kobylarz

My first impressions of this five volume set of program listings haven't been changed since I started this review in the last issue. It's nice to have some support for the Sorcerer, the books are overpriced, and the editing is bad.

Some members of the SA User Group have keyed in programs and after various amounts of editing have gotten them to run. To be fair, University Software does preface the books with warnings like "First, the programm may need to be translated (or "converted") to "Microsoft BASIC", if it was not originally written for a Microsoft Computer." editors note: I left "programm" misspelled as I found it in the text; a typical example of the quality of editing.

The programs that were run seemed to be worth the effort to key them in and do the editing. At our SA User Group meeting this month (Sept.18) we will be discussing how we will exchange programs or otherwise make them available. If anyone is interested in participating (keying in, making copies, editing) write to me.

Vol.2- Presidents Quiz, English Education, Astronomical Computations, Simultaneous Equations, Disassembler, Renumber, Hex/Decimal, Word Search, Multiple Linear Regression, Speed Reader, Define Graphics, Quantum Chemistry, Music Note Names, Pythagorean Theorem, Truth Table, Kinematics, Cardiac Cath, Tide Table, Program Manager, Math Tutor, and others.
Vol.3- Reversi, Mastermind, Kadath, Combat, Life, Spell, Biorhythm, Music Machine, Slots, Alien, Pijanowski, Merchant of Venice, Space Race, and others.
Vol.4- Scramble, Black Box, World War III, Caves, Black Jack, Tic Tac Toe, Snake, Battlestar Galactica, Life, Credit Monopoly, Yahtzee, Target Practice, Secret Agent, Block'em, Space Hunt, Laser Fire, and others.
Vol.5- Text Editor, Retirement, Temp Conversion, Word, Metric Conversion, Utilities, Recipe Book, Julia, Checking Account, Budget, Eternal Calendar, Time Teacher, and others.

MAKE THE CURSOR DISAPPEAR- from Colin Morle, SPEC, Formby, England

Some graphic or game displays would look more professional if you didn't see the cursor moving around when writing on the screen or see it after the writing is done even if it is parked in some corner. Here is a routine to make it disappear. Enter the machine language routine anyplace convenient; I chose 0050H.

```
EN 0050
0050 CD 1B E0 D5 E5 CD D6 E9 /
0058 FD 7E 67 /
005B 77 E1 D1 C9 /
SET 0=0050 (or whatever address you use to start the routine at)
```

To use this routine to change the cursor to any ASCII character change the following addresses as shown:

```
0058 00
0059 3E
005A xx (hex value of any ASCII character)
```

SET 0=V will return to the normal cursor.

LOGICAL OPERATIONS- from Microsoft BASIC Reference Manual, 1977, MITS, Inc.

Logical operators may be used for bit manipulation and Boolean algebraic functions. The AND, OR, and NOT operators convert their arguments into 16 bit, signed, two's complement integers in the range -32768 to 32767. After the operations are performed, the result is returned in the same form and range. If the arguments are not in this range, an FC error message will be printed and execution will be terminated. Truth tables for the logical operators appear below. The operations are performed bitwise, that is, corresponding bits of each argument are examined and the result is computed one bit at a time. In binary operations, bit 7 is the most significant bit of a byte and bit 0 is the least significant.

AND

X	Y	X AND Y
1	1	1
1	0	0
0	1	0
0	0	0

OR

X	Y	X OR Y
1	1	1
1	0	1
0	1	1
0	0	0

NOT

X	NOT X
1	0
0	1

Some examples will serve to show how the logical operations work:

63 AND 16 = 16	63= binary 11 1111 and 16= binary 10 0000, so 63 AND 16 = 16.
15 AND 14 = 14	15= binary 1111 and 14= binary 1110 so 15 and 14 = 14.
-1 AND 8 = 8	-1= binary 1111 1111 1111 1111 and 8= binary 1000, so -1 AND 8 = 8
4 OR 2 = 6	4= binary 100 and 2= binary 10, so 4 OR 2 = 6.
10 OR 10 = 10	10= binary 1010, so 10 OR 10 = 10
-1 OR -2 = -1	-1= binary 1111 1111 1111 1111 and -2= binary 1111 1111 1111 1110, so -1 OR -2 = -1
NOT 0 = -1	the bit complement of 16 zeroes is 16 ones, which is the two's complement representation of -1.
NOT X = -(X+1)	the two's complement of any number is the bit complement plus one.

How can you use these logical operators? Try this neat routine which was sent in by Richard Legault, 63 E. James, River Rouge, MI, 48218. It uses the NOT operator to provide the inverse video character set. This program would be a good one to use as a quiz in a BASIC programming course. If you can supply the REM statements to document it you will get a passing grade and will be promoted out of the novice class.

```
10 FOR I= -1024 TO 0: D= (NOT PEEK(I-1024))+256
20 POKE I,D: NEXT
30 FOR I= 1 TO 30: PRINT: NEXT
40 FOR I= 0 TO 255: POKE I-3200,I: NEXT
50 END
```


SORCERER SOFTWARE

SYSTEM 2 by Richard Swannell, loads into the top of available RAM and becomes an integral part of the BASIC language. All commands are single keystroke. SYSTEM 2 is written in Z80 and provides the following features:

1. **SCREEN EDITOR.** Use the editor to insert, replace, delete or rubout characters in your BASIC program. Watch the line change on the screen! Gone are the days of typing in a whole line to change one character!
2. **FUNCTION KEYS.** SYSTEM 2 allows 12 keys to be programmed to represent one or more characters or up to several lines of text each! After a key is programmed, by simply hitting key, all the text is sent to the processor just as if you typed it in on the keyboard! Function keys may be used in all modes of operation, including the editor. This feature is handy for lengthy and/or often used commands and may include multiple statements.
3. **RENUMBERING ROUTINE.** With a single keystroke your program is renumbered. Starting line number and increment may be changed.
4. **BASIC BUFFER PROTECTOR.** SYSTEM 2 sends a (CR) when the BASIC BUFFER is full. This prevents BASIC from crashing.
5. **PRINTER DRIVER.** Simply hit CTRL P to direct output to Centronics printer.
6. **RAVIVAL ROUTINE.** If NEW or CLOAD are typed, or RESET is hit by mistake, your program may be recovered. This is a safety device.

OTHER FEATURES

- RUNSTOP stops execution until any other key is hit.
- CLEAR clears screen then sends a (CR). Hit CLEAR to start on 'new page'.
- CTRL characters such as ESC, LF and CLEAR don't return ?SN ERROR.
- RUB doesn't require the SHIFT key to be depressed. This quickens editing.
- Includes a Real Time Random Number Generator.
- Returns automatically to BASIC after TAPE CRC ERROR while CLOADing.
- Suppresses premature CRLF. Normally, if RUB is used extensively while typing in a BASIC line, the cursor will drop down to the next line before reaching the end of the current line. SYSTEM 2 prevents this.
- SYSTEM 2 requires 2K of memory and is available in 8, 16, 32 & 48K versions. $35.50

RS232 PRINTER DRIVER. Requires 250 bytes of memory and is relocatable. Suitable for MONITOR, STANDARD BASIC, WORD PROCESSOR PAC & DEVELOPMENT PAC. Stores each character in a buffer then sends the whole line at once, which solves timing problems. $10.00

COMBINED SYSTEM 2 & RS232 PRINTER DRIVER. SYSTEM 2 with the RS232 printer driver instead of Centronics printer driver. $40.00

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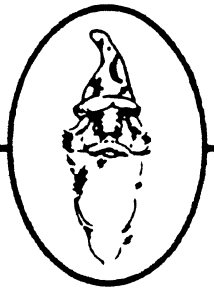

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