PORT FE

SORCERERS USERS' GROUP

(Toronto)

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SORCERER

Newsletter

The Toronto Sorcerer Users' Group was founded in the Spring of 1979, a handful of willing and eager to learn members.

This newsletter shall at all times keep in mind the goal at its conception. To spread the seeds of knowledge.

Articles printed in this newsletter shall be free for all Sorcerer Users' groups to reprint or comment on as they see fit.

Articles submitted for this newsletter must be in no later than the beginning of the 1st of every month.

March 1981 ISSUE

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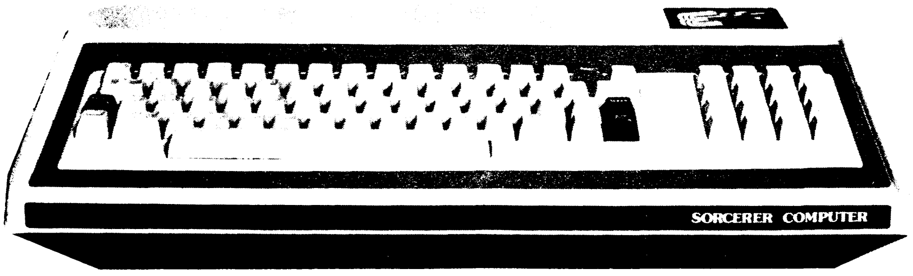
Next meeting will be held at Centennial College
March 13 /81 (Thursday) at 7:00 PM Room 1088
651 Warden Ave. Scarborough, Ont.



Latest From EXIDY

Good news sometimes travels fast,slow or sometimes it never even reaches you but for those of you who are interested in the more sopisticated UTL (Utility) programs, well I can only say hold onto your hats.

Exidy has some rather good programs that have just been realeased. Some hint of which was in the last issue of PORT FE. I am very glad to report to you these are not mythical as you might think. I have been going over some of those new releases and trying them out. Most of which are oriented more for the programer and business world. Still this is certainly a step in the right direction.

Here are a few of the many NEW programs being offered by Exidy. By the way they did manage to get the best software from Microsoft nearly all to themselves, and modified for the SORCERER !!!! So here goes.

EXBAS - (MBASIC 5.03) Full disk extended basic	DP 7310
Z80 Disk Development System	DP 7260
EXIDY CP/M full sceen EDITOR	DP 7280
EXIDY Precision PRINT driver Routines	DP 7221
CP/M Conversions (Lifboat to Exidy CP/M)	DP 7250
EXIDY ROM PAC BASIC to EXTENDED 19K BASIC	DP 7272
NEW - AUTO BOOT PROM PAC for CP/M	DP 2005

As you can see from some of these programs EXIDY haven't been sitting still during the past months.

EXIDY have now moved into their own new building and are getting back into the swing of things. Wait till you see the NEW SORCERER III. No on second thought better just get in line with the rest and wait your turn.

There are also of course some programs that I'm not even going to mention YET.

H.A. LAUTENBACH

PIRANHA CONTEST

Probably some of you thought it was rather mean of me to just publish half of the Piranha program in the last issue, but as I promised you'll find it in the back of this one.

Have fun trying to get the highest score - to date (high score 311,467) !!!! by me of course. It just seems improbable that anyone will beat my score sigh !

If anyone can top that score by April 30/1980 send in a witnesed high score to PORT FE c/o Tony Bagshaw, the highest score will receive one of the new D/A (DIGITAL TO ANALOG) audio cards FREE. (PLUGS DIRECTLY INTO THE PARALLEL PORT)
All entries must be postmarked no later than that date to be eligible. (members only)

H.A. Lautenbach

ON THE NEWS FRONT

In the SORCERER'S APPRENTICE newsletter of January/81 it was recommended that a STANDARD be adopted for Joystick/Keyboard control for future games etc... This is a very welcome thought, resulting in overall compatibility in software. The following have been adopted as standards by ARRINGTON SOFTWARE SERVICE and its representatives in AUSTRALIA. NORTHAMERICAN SOFTWARE will also follow this format.

Two joysticks may be attached to the INPUT of the parallel port. UNIT #1 uses the LOW - ORDER 4 BITS, and UNIT #2 uses the HIGH - ORDER 4 BITS. Each unit may steer in the four basic directions, LEFT, RIGHT, UP, DOWN, as well as in the four diagonal directions. Both units operate independently, and simultaneous operaton is permitted.

FIRE BUTTON control may be included, and has priority over directional control of joystick unit it is attached to.
FIRE BUTTON is activated by grounding both BIT 0 and BIT 1 for unit #1 and BIT 4 and BIT 5 for unit #2.

KEYBOARD has priority over JOYSTICK and overides both joysticks if used. KEYBOARD INPUT RESULT is returned as RESULT CODE of joystick UNIT #1, with UNIT #2 disabled.

Keyboard directional control is via the "arrow" (normally cursor control) keys. FIRE BUTTON on the keyboard is the NUMERIC-PAD '5' key (home). Optional FIRE BUTTONS may be SKIP/TAB or SPACE BAR. FIRE button overides directional keys on the keyboard.

In the event that both the left and right keys are pressed together, it is treated as NO INPUT. The same rule applies to depressing both UP and DOWN keys together. The UP/LEFT ('7'), UP/RIGHT ('9'), DOWN/LEFT ('1') and DOWN/RIGHT ('3') keys on the numeric-pad are optional.

For programming in Z80 machine code, the 8 bit INPUT RESULT CODE is returned in the 'A' register. No other registers are affected. If there is no input, the 'A' register must contain 00, and the Z-flag must be set.

BIT	PIN	FUCTION	BIT	PIN	FUNCTION
0	10	UNIT #1 LEFT	4	12	UNIT #2 LEFT
1	22	UNIT #1 RIGHT	5	24	UNIT #2 RIGHT
2	11	UNIT #1 UP	6	13	UNIT #2 UP
3	23	UNIT #1 DOWN	7	25	UNIT #2 DOWN
0 & 1	10/22	UNIT #1 FIRE	4 & 5	12/24	UNIT #2 FIRE
	8	GROUND		20	+5 VOLT SUPPLY

From: SORCERER'S APPRENTICE P.O. BOX 1131, TROY, MICHIGAN 48099

Taking a closer look at the above proposed format. Please take note, PROGRAM will have to interpret - SPEED - of movement and also DISTANCE

NORTHAMERICAN SOFTWARE have released this hookup c/w an audio D/A converter on the same printed circuit board. Joysticks plug into DIP sockets on board.
Two programs with audio sound effects are available also.

H.A. Lautenbach NORTHAMERICAN SOFTWARE

Review of Exidy Extended Cassette Basic

As Tony indicated in Port FE (Jan 13/81), Exidy has released a new version of Basic. The implementation is equivalent to MBASIC 5.03/1 for those who have a CP/M based system. The Basic is just what the Sorcerer needs to flex its muscles. It is a full version of Microsoft Basic with extensions for Exidy Hardware.

Moans & Groans

The only really bad thing about the package is that it is around 19K long, so you need at least a 32K Sorcerer to do anything with it. The other problems with it are minor but to clear the air, here they are. The Basic is not compatible with PAC Basic in syntax. This Basic requires spaces between keywords since variable names are up 34 characters in length, all of which are significant. EXCAS as it is called will not read a PAC Basic tape, so Exidy provides a utility called RM2EX. (I have no idea what it means.) Basically what it does is take a PAC Basic program and convert it into a format that EXCAS will understand. The program also adds spaces where necessary so that at least the syntax is the same. It then writes the file out on cassette again, so that EXCAS can use the file. The biggest irritant I have found using the Basic, is that the USR functions totally differently. No longer do you poke the start of your program, you define it using a statement called DEF USR. Also EXCAS resides from 0100H to 4EE5H, so it you want to use exsisting routines with it, they may need reworking. The last two things are also a pain, but I have conveyed the problems to Exidy and these they should be able to fix up. To clear the screen they use the monitor routine at E9B1H which also redoes the Exidy defined character set back to normal. They have another function called INKEY$ which gets a key from the keyboard, but because of the hardware configuration everything stops until you have lifted the key up.

The Good Things

EXCAS has everything that a programmer could dream of. It has a built-in editor which is line-orientated and very easy to use. It has limited (unfortunately) debug facilities which consist of being able to see the line numbers that are being executed currently. It has a PRINT USING plus it has an instruction called CURSOR which will move the cursor to an X,Y coordinate that you specify. It also has SERIAL command, so that if you have a serial printer, you can send your output to your printer. You have very powerful machine language capabilities. You can do hex and octal arithmetic plus conversions to and from those bases plus the DEF USR statement mentioned above. You can have 10 user routines with DEF USR all pointing to different routines. The bad thing about USR is that it only passes one argument, but Microsoft added another excellent command called CALL. Basically you can call your routine with as many parameters as you wish, and EXCAS will give you the first two plus pointers to all the rest. Ideal for something like CALL SORT(INFOLIST,"a") etc.

EXCAS supports four data types, real, integer, double and string. There are statements in the language for declaring variable ranges of these types. Integers are especially useful because they help speed up program execution. The double precision variables return 16 digits! Strings are limited to 255 characters. Reals are the same as in PAC Basic.

Another excellent extension to the language is the WHILE ... WEND construct which allows for a more structured enviroment in programming. Once you start using it, you'll wonder how you ever lived without it.
Here is a list of commands available in EXCAS:-
A. Commands and Statements

AUTO	[<line number>[,<increment>]	BAUD	<integer expression>
CALL	<variable name>[(<argument list>)]	CLEAR	[,[<expression1>][,<expression2>]]
CLOAD	[<filename>] (Loads a program)	CLOAD?	[<filename>] (Verifies a file)
CLOAD*	<array name>	CONT	
CSAVE	<string expression>	CSAVE*	<array variable name>
CURSOR	<x>,<y>	DATA	<list of constants>

DEF FN	<name>[(<parameter list>)]=<function list>	
DEFINT	<variable range>	(Declares range as integers)
DEFSNG	<variable range>	(Declares range as single precision float)
DEFDBL	<variable range>	(Same as above except double precision float)
DEFSTR	<variable range>	(Declares variable range as strings. Means that) ($ does not have to follow variable)

DEF USR	[<digit>]=<integer expression>	DELETE	[<line number>][-<line number>]
DIM	<list of subsripted variables>	EDIT	<line number>
END		ERASE	<list of array variables>

ERR	(Tells error number of last error)
ERL	(Tells line number of where error happened)
ERROR	<integer expression>

FOR..NEXT		GOSUB..RETURN	
GOTO	<line number>		
IF...THEN[...ELSE]		IF...GOTO	

```
 INPUT   [;][<"prompt string">;]<list of variables>
[LET]   <variable>=<expression>
LINE INPUT      [;][<"prompt string">;]<string variable>
LIST    [<line number>[-[<line number>]]]
LLIST   [<line number>[-[<line number>]]]
PRINT   <list of expression>
 .RINT USING <"format string"><list of expressions>
MID$    (<string exp1>,n,[m])=<string exp2>
NEW
NULL    <sint expression>
ON ERROR GOTO   <line number>
ON..GOSUB <list of line numbers>
ON..GOTO  <list of line numbers>
OPTION BASE     (Set where arrays start, either 0 or 1)
OUT     <sint exp1>,<sint exp2>
POKE    <sint exp1>,<sint exp2>
PRINT   <list of expressions>
PRINT USING <"format string"><list of expressions>
RANDOMIZE [<integer expression>]    (Randomize RND function)
READ    <list of variables>
REM     <remark>
RENUM   [[<new number>][,<old number>][,<increment>]]]
RESTORE [<line number>]
RESUME  <line number> ¦ NEXT ¦ 0 ¦
RUN     [<line number>]
STOP
SWAP    <variable>,<variable>
SERIAL
TRON    (Turn trace on)
TROFF   (Turn trace off)
WAIT    <port number>,I[,J]
WHILE   <expression>
WEND
WIDTH   [LPRINT] <integer expression>
```

B. EXCAS functions

```
ABS(X)    ASC(X$)   ATN(X)    CDBL(X)   CHR$(I)   CINT(X)   COS(X)
CSNG(X)   EXP(X)    FIX(X)    FRE(0)    FRE(X$)   HEX$(X)   INP(I)
INSTR([I,]X$,Y$]    INT(X)    LEFT$(X$,I)         LEN(X$)   LOG(X)
 POS(X)   MID$(X$,I[,J])      OCT$(X)   PEEK(I)   POS(I)    RIGHT$(X$,I)
 ND[(X)]  SGN(X)    SIN(X)    SPACE$(X) SPC(I)    SQR(X)    STR$(X)
STRING$(I,J$)       STRING$(I,J)        TAN(X)
 USR[<digit>](X)
VAL(X$)   VARPTR(<var name>)
```

C. BOOLEAN FUNCTIONS

AND OR XOR IMP EQV NOT

There is single stroke entry of the entire language, well sort of, all the functions are actually double stroke entry. As you can see, there are a wide variety of commands and since there are so many, the single stroke entry uses the graphic and graphic-shift to get all the commands. Functions use the same system except that they require graphic-shift-255, then the function designator. The problem with the CLEAR key has also been cleared up. When you hit CLEAR and then return, you don't get a syntax error.

The error messages are full messages and when EXCAS detects a syntax error, it jumps into edit mode, so you can correct the problem. The error trapping is excellent, so you can make literally dummy-proof programs. You can even use the ERROR command to make your own error messages.

Another very important thing about EXCAS is that line can be 255 characters in length with tabs placed inline so that you cant structure your programs EXCAS, when working with integers rounds them and then takes the integer portion which has some unusual effects in programs In the PAC Basic this does not occur and one place where it becomes a minor irritant is in array subscripts. It will evaluate the integer and round up causing problems if you are at the edge of the array. The best way to get around this is use INT when you need to convert something without rounding. CINT does the same thing except that rounding is forced.

My Evaluations:

I think EXCAS is an excellent piece of software. If you have the memory to use this it will make life so much more easier. The execution speed is slightly slower than with PAC Basic, but by using integers, you can get around this very easily. The conversion routine works well. The addition of a serial driver to the Basic must mean that Exidy is thinking about the user more. When you get a CRC error, EXCAS will not exit into the monitor, but rather return tc the user ith a BAD FILE message. The documentation is good as a reference manual, it assumes that you now how to program in Basic already. The parameter passing to machine language is a little bit cryptic, but a little playing around yields amazing results. I would recommend this package very highly to anyone who is thinking of using his Sorcerer for any serious programming work.

CURSORS......FOILED AGAIN!!!

After scanning thru lots of material to find something to fit on one page, I came across this little nifty program, which was published in the Sorcerer Computer Users of Australia, monthly newsletter of July 1980 by a Ian Macmillan.

He states in the article that a certain John Quirk handed him a slip of paper with the HEX DUMP of a short, clever Z-80 routine that replaces the cursor with a space, or any other character at a Users' Group Meeting sometime in June. In operation, the output vector, normally set to 'VIDEO', is reset to the address of the routine, which does its thing, then calls 'VIDEO' and returns normally.
The program is completely relocatable, which means that you start entering the code anywhere in memory without affecting the operation of the program A convenient area for utility programs is between 0000Hex and 00FFHex, but it is best to avoid locations 0000 and 0001 as these may be clobbered if you have to press <RESET>. The listing given is shown as having its origin at 0050Hex, which is as good a place as any. In this version, the ASCII character replacing the cursor (in this case a space, 20Hex) is to be found in location 0060Hex, which is the first byte in line (d) below.

To enter and use the program:-
a) Type BYE <CR>
b) Type EN 50 <CR>
c) Type FD E5 CD A2 E1 E5 D5 F5 C5 CD 1B E0 CD D6 E9 36 <CR>
d) Type 20 C1 F1 D1 E1 FD E1 C9 / <CR>
e) Type SE O=50 <CR>

To restore the cursor.....Type SE O=V <CR>

A disassembly shows PUSH IY, CALL 'GET IY',PUSH HL, DE, AF, BC; CALL 'VIDEO', CALL 'PTRSET'; LD(HL),N; POP all registers PUSHed; RETURN.

ONE-LINER PRINTS CHARACTER / ASCII CODE TABLE

The following one line program was published in the Sorcerer Computer Users of Australia, monthly newsletter of May 1980 by7Ian Macmillan

What it does is print out a handy reference chart that can be temporarily incorporated into a program as a tool:

```
    1 FOR X=191 TO 32 STEP -1: PRINT X; CHR$(X); SPC(3): NEXT X
```

CUTE GRAPHICS from SORCERER COMPUTER USERS OF AUSTRALIA - JAN 1980

Dynamic bit control in a programmable character enables movement generated in one character cell of eight bytes to be displayed on the screen wherever that character is printed!
Here is a listing that demonstrates the possibilities:-

```
    10 FOR X=-512 TO -504:POKE X,0:NEXT X

    20 FOR X=1 TO 64:PRINT"graphic shift 1";:NEXT X

    30 REM That means the one character you get doing that.

    40 FOR X=0 TO 7

    50 POKE-510,2^X:POKE-511,2^(7-X)

    60 NEXT X

    70 GOTO 40
```

Well was it worth typing in!

TIDBYTES

For those of you who have the audio card from Arlington or from Northamerican or your own type audio card that takes its information from the Sorcerer parallel connector, try it out on the game called CHASE. You just may be in for a very pleasent surprise.

COMPUTERS ~~~~ VIA ~~~~ COMPUTERS

In today's society, with all of the new types and models of computers emerging from the various manufacturers it seems a pity that one of the foremost linkage methods is not being researched into more heavily. The private industry sector, if it should wish to be able to compete in the near future with a very few large companies that have taken the lead in the development of computer to computer comunications via satellite, should investigate this field now.

Don't think for a minute that this is beyond the reach of the normal computer hobbyist. The Canadian Government (DOC) has had a very close interest in Canada becoming a forerunner in this field. It established some two years ago a method by which the computerist can develop and join in. Right now there are approximately two dozen or so active computer hobbyists that have become HAM operators through the DOC'S new class license which they call the DIGITAL OPERATORS LICENSE. This will take the normal hobbyist about six months to a year to get.

This will enable the serious computer hobbyist (one with technical background) to formulate the protocol of computer communications in the years to come. Sounds like this just doesn't happen to the normal individual, well this is very serious and it means that if one gets involved its a new ballgame for that individual.

Upward speeds of 24,000 baud are being practiced by those few, think of how much this will change the mode of operation in the industry.

The old fashioned modem which just isn't practical over long distance on a common line will be a thing of the past within the next TEN YEARS, yes this is in fact the truth. Right now it is just a matter of time. In Geneva a world wide comunications regulatory body that meets every 25 Years held the WARAC conference there two years ago to decide which frequencies would be set aside for just this purpose. They decided to set certain spectrum ranges which would be used in the next 25 years aside for computer to computer links.

The main advantage is that from experimental systems that are in use today, it has been determined that 300 users could share ONE frequency channel simultaneously without conflict. This is the equivalent of saying that three hundred companies could use the same piece of wire to communicate with one another simultaneously and everyone not so much as miss one BIT during the exchange of data.

THINK - this is brain food. I will continue this in a future issue.

by H.A. Lautenbach

```
04F9 02                 STAX    B
04FA C9                 RET
04FB C5        CONVERT  PUSH    B
04FC 21800F             LXI     H,-DTV
04FF 19                 DAD     D
0500 11C0FF             LXI     D,-LENL
0503 061E               MVI     B,NLINES
0505 19        FINEG    DAD     D
0506 05                 DCR     B
0507 7C                 MOV     A,H
0508 B7                 ORA     A
0509 F20505             JP      FINEG
050C 58                 MOV     E,B
050D 7D                 MOV     A,L
050E C640               ADI     LENL
0510 57                 MOV     D,A
0511 C1                 POP     B
0512 C9                 RET
0513 3E64      TRACK    MVI     A,64H
0515 CDE202             CALL    RANDOM
0518 47                 MOV     B,A
0519 3A1107             LDA     LSTRK
051C B8                 CMP     B
051D D8                 RC
051E CDBF06             CALL    BUMP3
0521 E5                 PUSH    H
0522 56                 MOV     D,M
0523 23                 INX     H
0524 5E                 MOV     E,M
0525 CDFB04             CALL    CONVERT
0528 42                 MOV     B,D
0529 4B                 MOV     C,E
052A 3A7F08             LDA     VPOS
052D 57                 MOV     D,A
052E 3A8008             LDA     VPOS+1
0531 5F                 MOV     E,A
0532 CDFB04             CALL    CONVERT
0535 78                 MOV     A,B
0536 92                 SUB     D
0537 57                 MOV     D,A
0538 FE7F               CPI     7FH
053A DA3E05             JC      POS1
053D 2F                 CMA
053E 47        POS1     MOV     B,A
053F 79                 MOV     A,C
0540 93                 SUB     E
0541 5F                 MOV     E,A
0542 B7                 ORA     A
0543 F24705             JP      POS2
0546 2F                 CMA
0547 B8        POS2     CMP     B
0548 DA5A05             JC      TRKLIN
054B 7B                 MOV     A,E
054C B7                 ORA     A
054D FA5505             JM      MOVEUP
0550 3E40               MVI     A,LENL
0552 C36605             JMP     SETDIR
0555 3EC0      MOVEUP   MVI     A,SUBL
0557 C36605             JMP     SETDIR
055A 7A        TRKLIN   MOV     A,D
055B B7                 ORA     A
055C F26405             JP      MOVELFT
055F 3E01               MVI     A,ONE
0561 C36605             JMP     SETDIR
0564 3EFF      MOVELFT  MVI     A,0FFH
0566 E1        SETDIR   POP     H
0567 2B                 DCX     H
0568 47                 MOV     B,A
0569 7E                 MOV     A,M
056A B8                 CMP     B
056B C8                 RZ
056C 2F                 CMA
056D B8                 CMP     B
056E CA7305             JZ      OPPOS
0571 70                 MOV     M,B
0572 C9                 RET
```

```
0573 FEC0      OPPOS    CPI     SUBL
0575 CA8005             JZ      MOVRHT
0578 FE40               CPI     LENL
057A CA8005             JZ      MOVRHT
057D 3640               MVI     M,LENL
057F C9                 RET

0580 3601      MOVRHT   MVI     M,ONE
0582 C9                 RET

0583 CDC406    HITBOR   CALL    DEC4
0586 7E                 MOV     A,M
0587 FE85               CPI     VICTIM
0589 CA9105             JZ      VHIT
058C 2B                 DCX     H
058D CDF305             CALL    KILL
0590 C9                 RET

0591 3E00      VHIT     MVI     A,0
0593 23                 INX     H
0594 23                 INX     H
0595 77                 MOV     M,A
0596 C9                 RET

0597 CDC306    BANG4    CALL    DEC5
059A CDF305             CALL    KILL
059D CD1706             CALL    FIND
05A0 CDF305             CALL    KILL
05A3 210100             LXI     H,ONE
05A6 09                 DAD     B
05A7 CDC505             CALL    BANG
05AA 21FFFF             LXI     H,0FFFFH
05AD 09                 DAD     B
05AE CDC505             CALL    BANG
05B1 214000             LXI     H,LENL
05B4 09                 DAD     B
05B5 CDC505             CALL    BANG
05B8 21C0FF             LXI     H,-LENL
05BB 09                 DAD     B
05BC CDC505             CALL    BANG
05BF C9                 RET

05C0 2B        DIE      DCX     H
05C1 CDF305             CALL    KILL
05C4 C9                 RET

05C5 7E        BANG     MOV     A,M
05C6 FE20               CPI     BLANK
05C8 CADC05             JZ      EMPTY
05CB FEB1               CPI     BORDER
05CD C8                 RZ
05CE FE2A               CPI     BOOM
05D0 C8                 RZ
05D1 E5                 PUSH    H
05D2 C5                 PUSH    B
05D3 EB                 XCHG
05D4 CD1706             CALL    FIND
05D7 CDF305             CALL    KILL
05DA C1                 POP     B
05DB E1                 POP     H
05DC EB        EMPTY    XCHG
05DD C5                 PUSH    B
05DE CD0006             CALL    ALIVE
05E1 C1                 POP     B
05E2 3A0F07             LDA     LTIME
05E5 77                 MOV     M,A
05E6 23                 INX     H
05E7 3658               MVI     M,MARKED
05E9 CDBF06             CALL    BUMP3
05EC 72                 MOV     M,D
05ED 23                 INX     H
05EE 73                 MOV     M,E
05EF 3E2A               MVI     A,BOOM
05F1 12                 STAX    D
05F2 C9                 RET
```

```
05F3 23        KILL     INX     H
05F4 364F               MVI     M,DEAD
05F6 CDBF06             CALL    BUMP3
05F9 46                 MOV     B,M
05FA 23                 INX     H
05FB 4E                 MOV     C,M
05FC 3E20               MVI     A.BLANK
05FE 02                 STAX    B
05FF C9                 RET

0600 218208    ALIVE    LXI     H,FTABL+1
0603 061F               MVI     B.MAXFISH
0605 7E        MORDEAD  MOV     A,M
0606 FE4F               CPI     DEAD
0608 CA1506             JZ      FNDEAD
060B CDBC06             CALL    BUMP6
060E 05                 DCR     B
060F C20506             JNZ     MORDEAD
0612 210100             LXI     H,ONE
0615 2B        FNDEAD   DCX     H
0616 C9                 RET

0617 217B08    FIND     LXI     H,VTABL
061A 0620               MVI     B,MAXFISH+1
061C CDBE06    LOOK     CALL    BUMP4
061F 7E                 MOV     A,M
0620 23                 INX     H
0621 BA                 CMP     D
0622 C22E06             JNZ     NOFIND
0625 7E                 MOV     A,M
0626 BB                 CMP     E
0627 C22E06             JNZ     NOFIND
062A CDC306             CALL    DEC5
062D C9                 RET

062E 23        NOFIND   INX     H
062F 05                 DCR     B
0630 C21C06             JNZ     LOOK
0633 210000             LXI     H,0
0636 C9                 RET

0637 2180F0    SETUP    LXI     H,DTV
063A 061E               MVI     B,NLINES
063C 0E40      BLKCH    MVI     C,LENL
063E 3620      BLKEH    MVI     M,BLANK
0640 23                 INX     H
0641 0D                 DCR     C
0642 C23E06             JNZ     BLKEH
0645 05                 DCR     B
0646 C23C06             JNZ     BLKCH
0649 2180F0             LXI     H,DTV
064C 1180F7             LXI     D,ETV-2*LENL
064F 0640               MVI     B,WIDTH
0651 3EB1               MVI     A,BORDER
0653 77        SETBOR   MOV     M,A
0654 12                 STAX    D
0655 23                 INX     H
0656 13                 INX     D
0657 05                 DCR     B
0658 C25306             JNZ     SETBOR
065B 061C               MVI     B,NLINES-2
065D 11C0F0             LXI     D,DTV+LENL
0660 77        NXTROW   MOV     M,A
0661 0E3F               MVI     C,WIDTH-1
0663 23        SETSIDE  INX     H
0664 0D                 DCR     C
0665 C26306             JNZ     SETSIDE
0668 77                 MOV     M,A
0669 0E01               MVI     C,LENL+1-WIDTH
066B 23        PADSIDE  INX     H
066C 0D                 DCR     C
066D C26B06             JNZ     PADSIDE
0670 05                 DCR     B
0671 C26006             JNZ     NXTROW
0674 217B08             LXI     H,VTABL
```

```
0677 3617               MVI     M,VMAXS
0679 23                 INX     H
067A 3685               MVI     M,VICTIM
067C 23                 INX     H
067D 3617               MVI     M,VMAXS
067F 23                 INX     H
0680 3600               MVI     M,0
0682 23                 INX     H
0683 0120F4             LXI     B,DTV+LENL*NLINES
                                  /2-LENL+WIDTH/2
0686 70                 MOV     M,B
0687 23                 INX     H
0688 71                 MOV     M,C
0689 3E07               MVI     A,VSYM
068B 02                 STAX    B
068C 161F               MVI     D,MAXFISH
068E 23        NOFISH   INX     H
068F 23                 INX     H
0690 364F               MVI     M,DEAD
0692 CDBE06             CALL    BUMP4
0695 15                 DCR     D
0696 C28E06             JNZ     NOFISH
0699 21E7F7             LXI     H,STV-25
069C 0614               MVI     B,14H
069E 11E906             LXI     D,SCRMSG
06A1 1A        PTRSCR   LDAX    D
06A2 F600               ORI     BIAS
06A4 77                 MOV     M,A
06A5 13                 INX     D
06A6 23                 INX     H
06A7 05                 DCR     B
06A8 C2A106             JNZ     PTRSCR
06AB 3EFF               MVI     A,0FFH
06AD 320807             STA     SCRFLG
06B0 3E00               MVI     A,0
06B2 320A07             STA     PHASE
06B5 CD3F01             CALL    SETPHA
06B8 CD8601             CALL    GETPHA
06BB C9                 RET

06BC 23        BUMP6    INX     H
06BD 23                 INX     H
06BE 23        BUMP4    INX     H
06BF 23        BUMP3    INX     H
06C0 23                 INX     H
06C1 23                 INX     H
06C2 C9                 RET


06C3 2B        DEC5     DCX     H
06C4 2B        DEC4     DCX     H
06C5 2B        DEC3     DCX     H
06C6 2B                 DCX     H
06C7 2B                 DCX     H
06C8 C9                 RET


06C9 01        NBTB1    DB      1
06CA C00102    NBTB2    DB      SUBL,1,2
06CD C10204             DB      SUBL+1,2,4
06D0 010408             DB      1,4,8
06D3 410810             DB      LENL+1,8,10H
06D6 401020             DB      LENL,10H,20H
06D9 3F2040             DB      LENL-1,20H,40H
06DC FF4080             DB      0FFH,40H,80H
06DF BF80               DB      SUBL-1,80H
06E1 08        LCTR     DB      8
06E2 00        COUNT    DB      0
06E3 0000      RPTR     DB      0,0
06E5 00        BIGONE   DB      0
06E6 000000    BIGTWO   DB      0,0,0
06E9 53434F5245SCRMSG   DB      'SCORE '
```

```
06EF 2020202020          DB       '        00       '
06FD 5048415345PHAMSG    DB       'PHASE           '
0708 FF        SCRFLG    DB       0FFH
0709 3E        GOODCAL   DB       WIDTH-2
070A 00        PHASE     DB       0
070B 64        LNEWF     DB       100
070C 01        LSIDE     DB       1
070D 14        LMINS     DB       20
070E 50        LSRNG     DB       80
070F 28        LTIME     DB       28H
0710 01        LTRACK    DB       1
0711 01        LSTRK     DB       1
0712 00        LBONUS    DB       0
0713 1607      CTLPTR    DW       CONTROL
0715 16                  DB       22
0716 4001026030CONTROL   DB       40H,1,2,60H,30H,10,1,50
071E 4801265C30          DB       48H,1,26H,5CH,30H,20,4,75
0726 500124582C          DB       50H,1,24H,58H,2CH,30,7,100
072E 580122542C          DB       58H,1,22H,54H,2CH,40,10,125
0736 6002205028          DB       60H,2,20H,50H,28H,50,13,150
073E 68021E4C28          DB       68H,2,1EH,4CH,28H,60,16,175
0746 70021C4824          DB       70H,2,1CH,48H,24H,70,19,200
074E 78021A4424          DB       78H,2,1AH,44H,24H,80,22,225
0756 8004184020          DB       80H,4,18H,40H,20H,90,25,250
075E 8804163C20          DB       88H,4,16H,3CH,20H,100,28,255

0058 =         MARKED    EQU      58H
0004 =         FRATE     EQU      4
0001 =         MRATE     EQU      1
0080 =         RDA       EQU      80H
E009 =         INDAT     EQU      0E009H
E015 =         INSTAT    EQU      0E015H
0049 =         FTRK      EQU      49H
E003 =         MONIT     EQU      0E003H
0041 =         NOTRK     EQU      41H
0017 =         VMAXS     EQU      17H
0007 =         VFAST     EQU      7
0085 =         VICTIM    EQU      85H
0040 =         LENL      EQU      64
0040 =         WIDTH     EQU      64
0020 =         SCORSP    EQU      20H
00C0 =         SUBL      EQU      0C0H
0000 =         BIAS      EQU      0
0020 =         BLANK     EQU      ' '+BIAS
0030 =         ZERO      EQU      '0'+BIAS
0000 =         BINO      EQU      0
0001 =         ONE       EQU      1
0007 =         VSYM      EQU      7+BIAS
004F =         DEAD      EQU      4FH
002A =         BOOM      EQU      '*'+BIAS
0012 =         FISH      EQU      12H
00B1 =         BORDER    EQU      0B1H
F080 =         DTV       EQU      0F080H
001E =         NLINES    EQU      30
F800 =         ETV       EQU      DTV+LENL*NLINES
F800 =         STV       EQU      ETV-LENL+WIDTH
001F =         MAXFISH   EQU      (NLINES+WIDTH)/3
0800                     ORG      800H
0800 03E0      JUMPS     DW       MONIT
0802 9803                DW       ESC
0804 0001                DW       RESTART
0806 5803                DW       UP
0808 6203                DW       DOWN
080A 6703                DW       LEFT
080C 5D03                DW       RIGHT
080E 6C03                DW       UL
0810 7103                DW       UR
0812 7B03                DW       LL
0814 7603                DW       LR
0816 8B03                DW       HALT
0818 8501                DW       STOP
081A 8F03                DW       AUTO
081C 3B03                DW       RETURN
```

```
081E FF01      CHARS     DB       0FFH,01H
0820 1B1B                DB       1BH,1BH
0822 530D      CHARGO    DB       'S',0DH
0824 5538                DB       'U','8'
0826 4A32                DB       'J','2'
0828 4834                DB       'H','4'
082A 4B36                DB       'K','6'
082C 5937                DB       'Y','7'
082E 4939                DB       'I','9'
0830 4E31                DB       'N','1'
0832 2C33                DB       ',','3'
0834 2035                DB       ' ','5'
0836 502E                DB       'P','.'
0838 4130                DB       'A','0'
083A FF        ENDCH     DB       0FFH

001C =         CHARL     EQU      ENDCH-CHARS
083B 20454E5445STRING    DB       ' ENTER NEW VALUES FOR:
0855 552D38              DB       'U-','8'
0858 442D32              DB       'D-','2'
085B 4C2D34              DB       'L-','4'
085E 522D36              DB       'R-','6'
0861 554C2D37            DB       'UL-','7'
0865 55522D39            DB       'UR-','9'
0869 4C4C2D31            DB       'LL-','1'
086D 4C522D33            DB       'LR-','3'
0871 482D2E              DB       'H-','.'
0874 502D30              DB       'P-','0'
0877 412D2B              DB       'A-','+'
087A FF                  DB       0FFH
087B 17        VTABL     DB       VMAXS
087C 85                  DB       VICTIM
087D 17        VSPEED    DB       VMAXS
087E 00        VDIREC    DB       0
087F 20F4      VPOS      DW       DTV+LENL*(NLINES-1)/2
0881           FTABL     DS       MAXFISH*6
093B                     END
```