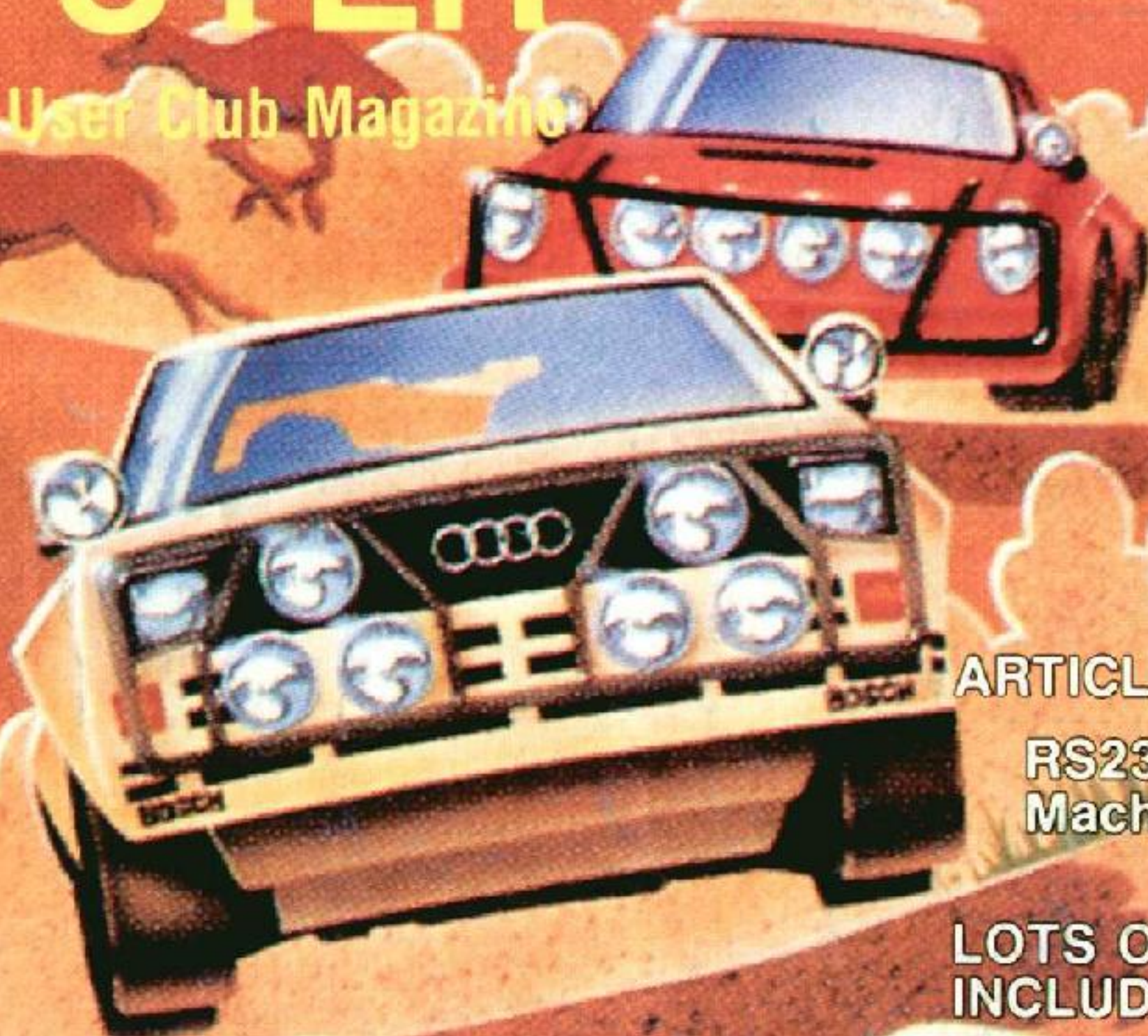


SEGA[®] COMPUTER

The Official Sega User Club Magazine

AUGUST ISSUE 1985



ARTICLES ON

RS232C
Machine Code

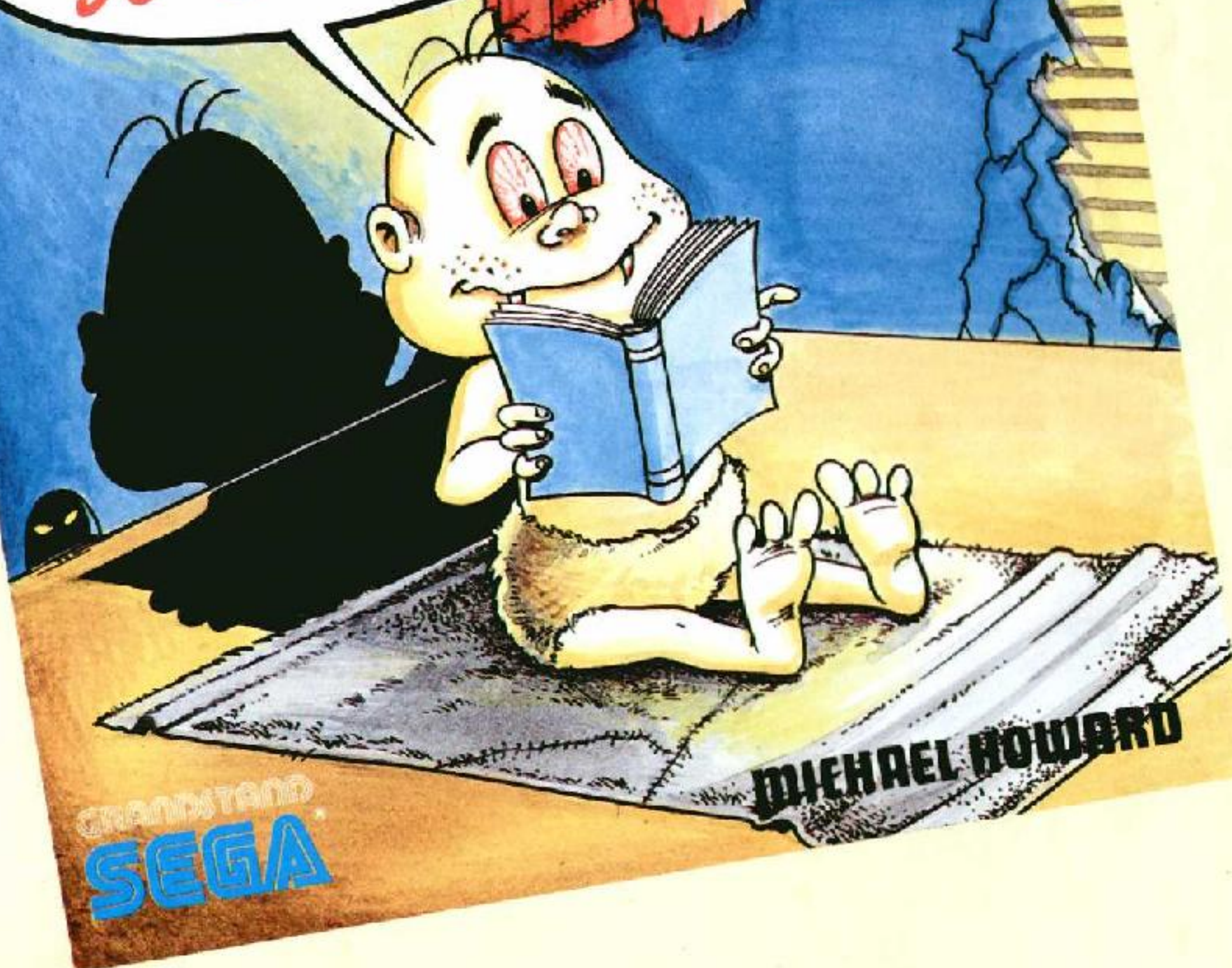
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MORE THAN FIFTY PROGRAMS

By MICHAEL HOWARD

So you want some more programs to key into your Sega? Well, this book has over Fifty for you to tap out covering everything from games to education, machine code and basic, short and long. (all programs will run on a 16k or 32k cartridge). Pages of programs, each one dissected and explanations of how and why it works!

INTRODUCTION

Dear Readers

With the start of a new year's subscription period we are introducing some new blood and some fresh ideas to the Sega User magazine.

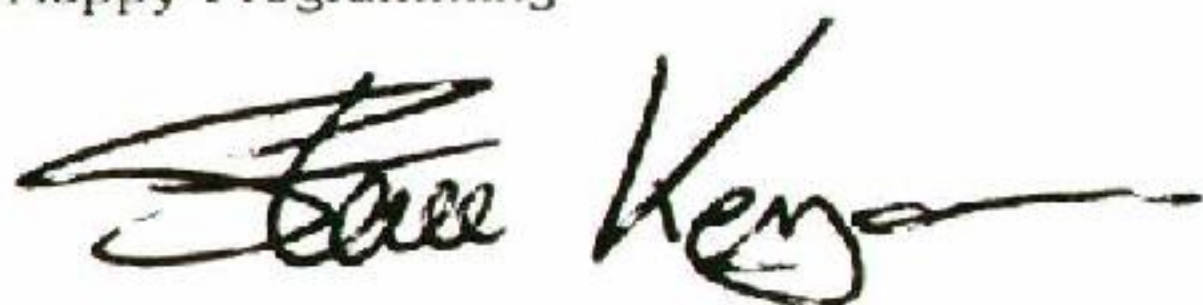
Michael Howard joins us on a full time basis and his lighthearted approach to programming and easy-to-read articles will be appreciated by all. Michael is, of course, a Sega celebrity and a legend in his own lunchtime being the author of such masterpieces as "Teach Yourself Basic Games Programming", and "More Than 50 Programs" to name but two.

Another new face on our magazine production team is Michael Greenan. Mike's claim to fame is practical applications and he was responsible for the burglar alarm article in our last issue and a useful little scheduling program in this issue.

You will also note with some glee that we are now attracting interest from third party software writers and judging by the advertisements placed there are some excellent new titles available.

Our theme for this year is less waffle — more useful programmes, and on that note I will stop waffling and close.

Happy Programming



Steve Kenyon
DIVISIONAL MANAGER

Contents

Readers Letters.....	2
High Score Table.....	3
Biorhythms.....	4
Contact Page.....	6
Machine Code Using ROM	
Routine.....	7
Simple Shuffling Routine.....	10
Rhonda's Dungeon.....	11
Addendum.....	18
Reviews.....	19
Hardware Review.....	20
Scheduler.....	21
Using RS232.....	28
Dazzle.....	32
Sound Effects.....	32

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If you have set up a local area user's club and you would like us to publish the details concerning your club please send them to us and we will publish the information for no charge.

READER'S LETTERS

DEAR EDITOR,

Great Magazine but I can't get Candy Kid to work. I keep on getting a statement parameter error in 710. I have Checked and retyped this line at least 10 times and it still doesn't work. Is there something wrong with the program or is it just me?

L Shaw

EDITOR'S REPLY

As you can imagine it is very hard to work out what is causing an error without actually seeing the offending program. (Its sort of like being a doctor and diagnosing an illness without a patient! Very difficult. However, we do have some good news. The Candy Kid Program as published in the September 1984 Sega User's Club Magazine has no mistakes and if keyed in correctly will work. The only advice we can offer is that you check lines 720-770 carefully as they contain the data that is used on line 710. Somewhere in these lines you have probably got an I instead of a 1 of an O instead of a 0.

DEAR EDITOR

I have a Zeta datarecorder that I have been running off batteries for the last three months. Once I found the correct levels (after a bit of fiddling) I have had no problems loading GRANDSTAND cassette programs. Last week I went out and brought an adaptor from my local GRANDSTAND computer dealer because I was getting sick and tired of replacing the batteries. I wasn't too sure that I had got the right adaptor as it has a strange plug on the end with four prongs but I think its the right one as it has your logo on it.

To cut a long story short when I plugged the data recorder into the adaptor the thing went crazy! It seems to have a desire to destroy every cassette I own. As soon as I placed a cassette into the machine and Press the LOAD/PLAY or RECORD/SAVE button the tape develops an intense disliking to the plastic case. The magnetic tape "escapes" from the plastic case and ends up caught up in the moving parts off the data recorder. As a First-time-computer-owner please tell me what is going on. Am I doing anything wrong? Is it the cassettes I am using? Is my problem caused by the data recorder or the adaptor? (I have gone back to using batteries and everything is working correctly now.)

R Whittle, Papatoetoe Auckland

P.S. Thank you for a very imformative magazine.

EDITORS REPLY

The 6 volt adaptors that GRANTSTAND is selling are Dual Polarity adaptors. This means that you can run any 6 volt appliance off the adaptor. There is four plugs on the end of the adaptor so that it will fit as many different

appliances. The problems you are having are caused by the fact that your adaptor is on the wrong polarity. This means your data recorder is literally running backwards. (The tape is being unwound off the spools.) To stop this happening you must find the small black junction in the cable that runs from two ends apart (No don't unscrew them just pull gently and the junction will part.) To change the polarity of your adaptor to what it should be, turn one end of the junction over so that the pin labelled with the - sign goes socket marked with + and the pin marked + sign and the pin marked + goes to the - socket. ie + to - on both pins. This will stop the data recorders destructive tendencies.

DEAR EDITOR,

We were wondering whether you could supply us with a program to round a number to two decimal places (EG for Dollars and Cents calculatios.)

Yours Sincerely
Bob Simmons

EDITORS REPLY

Just add line 20 to your program where ever you want a number displayed to two decimal places.

```
10 A=123.45678
20 PRINT INT ((A+.005)*100)/100
```

DEAR EDITOR,

We live on an isolated farm and we are having a bit of trouble getting equipment for our SEGA. Our "local" retailer is over 100 km away and doesn't seem to have a good selection of all the latest programs and hardware (He doesn't have the new joysticks. Are these available yet?) Is it possible for us to purchase equipment directly from the club or from GRANDSTAND? If so how do we go about doing so?

W Johnson

EDITOR'S REPLY

Unfortunately it is impossible to have dealers everywhere so if you are having trouble getting equipment if you want you can buy directly from the Users Club. To do this send a letter or use the order form in each magazine. Send this to:

SEGA USER'S CLUB
P.O. Box 2353
Auckland 1
New Zealand

Do not forget to enclose your name and address (So we know where to send everything and a cheque, money order card information for the total cost of the required equipment.

DEAR EDITOR,

I am wondering if you could help me out with a problem I have. Could you please explain how to make a sprite go across the screen and when it gets to a certain point letters start coming out the back of it, to form words. Please write back, any information will be gratefully accepted.

I would also like to take the chance to congratulate you on a fine effort you have been doing on the SEGA Magazine. It was greatly accepted in this household. I would like to say that the program dissection is very useful

as it helps me a lot to understand the SEGA's basic commands more fully. Keep up the good work!!!

Yours Sincerely,
Alex Davidson
Upper Hutt

EDITOR REPLY

Here is a program that performs the tasks listed in your letter. (To change what comes up on the screen just alter A\$)

```
10 D$="FFFFFFFFFFFFFFFF"
20 FOR A=0 TO 3:PATTERN S#A,D$:NEXT
30 SCREEN 2,2:CLS:MAG 1
40 A$="Hello this is a demo"
50 X=1
60 FOR A=0 TO 255
70 SPRITE 0,(A,90),0,6
80 IF A MOD 6=0 THEN CURSOR X*6,94:PRINT MID$(A$,X,1):X=X+1
90 NEXT
```

HIGH SCORE TABLE

This month we have some highscores which are almost unbelievable (But somebody next week will send us a letter with photographs which will make these scores look ridiculously small!) Please keep the highscores rolling in with the title of the cassette you would like if your score is the highest when you go to print. Note that if your highscore is beaten by somebody else you will not receive a prize.

Unfortunately due to lack of space in the last issue we were unable to publish the highscores so here they are.

Last months Mega-Sega-Space-Invaderologists were:

Alan Keen of Dunedin with an incredible — 11 on Champion Golf (Yes, but can you play the real game as well?)

HOLE:	1	Par 4	- 2
	2	Par 5	- 3
	3	Par 3	- 2
	4	Par 4	- 4
	5	Par 4	- 3
	6	Par 4	- 3
	7	Par 5	- 3
	8	Par 3	- 2
	9	Par 4	- 3
		Total	- 11

Dale Winchester of Rothesay Bay, Auckland with 999,999 on Monaco GP.

Robert Ashcroft of Beachhaven, Auckland with 1,306,402 on Video Flipper.

B.A. Smaill of Dunedin with 1,141,650 (round 56!) on Flicky.

Gregory K Verhoef of Dunedin with 329,750 on Sinbad Mystery.

Alan Dodds of Christchurch with 874,860 on Borderline.

Carl Broadbridge of Renwick, Marlborough with 244,170 on Congo Bongo.

This months high scores are:

999,900 on Sinbad Mystery by L. Swanson of Wellington.

809,000 on Exerion by Daniel McVeagh of Huntly.

298,500 on Pop Flamer by Mark Timmermans of Papatoetoe Auckland.

98,000 on Orgus by Mark Timmermans of Papatoetoe Auckland.

64,500 on N-sub by Rudy Clavel of Papatoetoe Auckland

-13 on Champion Golf by Darren Cooper of Wiri Auckland.

Keep the scores coming in and remember you MUST supply photographic verification of your highscore.

Biorhythms

By Rod Cuckow

Want to find out how you are going to feel in about a week or so's time? Or want to join NASA, but don't want to go on the Physical test when you are feeling awful? ...



If you answered YES to one of the above questions then this programme is for you!! In fact, even if you didn't answer any of the above questions ... this programme will still be of interest.

Here is what it does ... Firstly enter your birthday eg 03/09/65 ... in other words if your birthdate is less than the 10th then enter 01, 02 ... 09 etc. Same applies to your month of hatching. Next enter the month and year in which you want the biorhythms to be calculated eg 08/1985 ... note the 08. Now that this data is entered your biorhythm will be calculated for that month.

The result given will show three traces, one for Physical activity another for Emotional activity and the other for Intellectual activity ... When Physical is low you will feel weak, when high you will feel strong, when intellectual is low you won't feel like going on University Challenge, when high you'll feel like doing a PhD in Metaphysics etc etc ...

Any way you should find this programme of great interest ...!

```

10 REM
20 ERASE
30 SCREEN 1,1:CLS:COLOR 4,15
40 INPUT "NAME :- ";N$:PRINT
50 CURSOR 0,2:PRINT "DATE OF BIRTH DD/M
M/YYYY "
60 CURSOR 13,2:INPUT B$
70 Y2=VAL(MID$(B$,7,4))
80 IF Y2<1582 THEN GOTO 830
90 M2=VAL(MID$(B$,4,2))
100 IF M2>12 THEN GOTO 870
110 D2=VAL(MID$(B$,1,2))
120 IF D2>31 THEN GOTO 900
130 IF M2=2 AND Y2 MOD 4=0 AND D2=29 TH
EN GOTO 930
140 IF M2=2 AND Y2 MOD 4<>0 AND D2>28 T
HEN GOTO 960
150 CURSOR 0,4:PRINT "BIORHYTHM FOR MONT
H AND YEAR"
160 CURSOR 18,6:PRINT "MM/YYYYY"
170 CURSOR 16,6:INPUT F$
180 M3=VAL(MID$(F$,1,2))
190 Y3=VAL(MID$(F$,4,4))
200 IF Y3<Y2 THEN GOTO 990
210 IF Y3<=Y2 AND M3<M2 THEN GOTO 1020
220 GOSUB 1060:IF F THEN FOR I=0 TO 200:
NEXT:GOTO 20
230 IF M3=2 AND Y2 MOD 4=0 THEN D=29
240 D9=VAL(MID$(B$,1,2))
250 M9=VAL(MID$(B$,4,2))
260 Y9=VAL(MID$(B$,7,4))
270 SCREEN 2,2:COLOR 3,1,,1:CLS
280 CURSOR 0,10:PRINT " BIORHYTHM FOR :
- ";N$:PRINT
290 PRINT " DATE OF BIRTH ";B$:PRINT
300 PRINT " BIORHYTHM FOR ";M$;" ";MID$(
F$,4,4)
310 LINE (255,110)-(9,110)
320 CURSOR 0,160:PRINT "LOW"
330 CURSOR 0,55:PRINT "HIGH"
340 CURSOR 0,106:PRINT "O"
350 GOSUB 710
360 F1=T
370 PSET (9,Y)
380 C=23
390 Y9=VAL(MID$(F$,4,4))

```



```

400 M9=VAL(MID$(F$,1,2))
410 GOSUB 710
420 FOR I=1 TO D
430 F2=T+I
440 GOSUB 750
450 CURSOR X+2,Y:PRINT "-"
460 GOSUB 770
470 NEXT
480 CURSOR X,Y:PRINT " "
490 PSET (9,Y)
500 C=28
510 FOR I=1 TO D
520 F2=T+I
530 GOSUB 750
540 CURSOR X+2,Y:PRINT "+"
550 GOSUB 770
560 NEXT
570 CURSOR X,Y:PRINT " "
580 PSET (9,Y)
590 C=33
600 FOR I=1 TO D
610 F2=T+I
620 GOSUB 750
630 CURSOR X+2,Y:PRINT ""
640 GOSUB 770
650 NEXT
660 CURSOR 0,170
670 PRINT "      Physical. Emotional. Intel
lectual."
680 PRINT "      -----+++++++" : CURS
OR 150,180:PRINT "*****"
690 A$=INKEY$:IF A$="" THEN 690
700 GOTO 10
710 X$=""
720 IF M3=2 THEN X$="L"
730 IF X$="L" THEN T=365*(Y9)+31*(M9-1)+
INT((Y9-1)/4)-INT(3/4*(INT((Y9-1)/100)+1
)):RETURN
740 IF X$<>"L" THEN T=365*Y9+31*(M9-1)-I
NT(.4*M9+2.3)+INT(Y9/4)-INT(3/4*(INT(Y9/
100)+1)):RETURN
750 A=SIN(360*(ABS(F1-F2)/C-INT(ABS(F1-F
2)/C))*PI/180)
760 RETURN
770 H=A*7
780 X=I*B
790 Y=110-H*6
800 LINE (X,105)-(X,115)
810 RETURN
820 END
830 PRINT "INVALID INPUT calender change
d before that date.Year to be greater th
an 1582
      Press a key to continue"
840 A$=INKEY$:IF A$="" THEN 840
850 CURSOR 0,3:PRINT SPC(160)
860 GOTO 50
870 PRINT "INVALID INPUT There are only
12 months in the year
      Press a key to continue"
880 A$=INKEY$:IF A$="" THEN 880
890 GOTO 850
900 PRINT "INVALID INPUT no month has mo
re than 31 days
      Press a key to continue"
910 A$=INKEY$:IF A$="" THEN 910
920 GOTO 850
930 PRINT "INVALID INPUT February had 29
days      that year
      Press a key to continue"
940 A$=INKEY$:IF A$="" THEN 940

```



```

950 GOTO 850
960 PRINT "INVALID INPUT
                                February only has
28 days
    Press a key to continue"
970 A$=INKEY$: IF A$="" THEN 970
980 GOTO 850
990 CURSOR 0,6:PRINT "INVALID INPUT that
    YEAR is before the YEAR of BIRTH
                                Press a
key to continue"
1000 A$=INKEY$: IF A$="" THEN 1000
1010 GOTO 1040
1020 CURSOR 0,6:PRINT "INVALID INPUT tha
t MONTH is before theMONTH of BIRTH
                                Press
a key to continue"
1030 A$=INKEY$: IF A$="" THEN 1030
1040 CURSOR 0,6:PRINT SPC(160)
1050 GOTO 150
1060 DATA January,31,February,28,March,3
1, April,30,May,31,June,30,July,31,August
,31,September,30,October,31,November,30,
December,31
1070 F=0: IF M3<1 OR M3>12 THEN PRINT "Wha
t?..Invalid month (1-12)!!":F=1:RETURN
1080 RESTORE 1060
1090 FOR I=1 TO M3:READ M$,D:NEXT
1100 RETURN

```

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Some examples of Machine Code using ROM routines . . .

Many people have been wondering how to program in machine code, and rightly so . . . you just can't beat it for speed and efficiency. Of course the main problem is the difficulty of learning the stuff. Well to clear things up and hopefully make life a little easier for those who ARE finding machine language a little hard to swallow, here are a few routines that are already in the ROM and how to use them with ease . . .

Firstly . . . What is a ROM routine? Well imagine this . . . when you type in a command such as . . .

LINE (10, 20) — (50, 60)

The computer thinks "Um this programmer wants to draw a line," the computer then takes the data that follows the word "LINE" (which in this case is 10, 20, 50 and 60). Now that it is armed with all the relevant data the computer calls (another way of saying executes) a small machine code program in it's ROM. The routine that is used actually does the drawing of the line. With machine code it is possible to by-pass all the analyzing that the computer has to do, by calling the routine yourself and supplying all the data, this leads to great speed. Well that just about explains what a ROM routine is. It is important to note that there are literally hundreds of routines in the ROM, things such as moving sprites, drawing circles, plotting points, saving a program to tape or disc etc etc the list is massive . . .

Now to explain how to use some of the ROM routines. The first one I'll demonstrate is the LINE routine. I may as well . . . because we can relate to it quite well . . .

Okay, what data is needed for the routine? We have to know the coordinates for the line; ie where the line goes from, and to the what point, we'll stick to the coordinates used above, which are 10, 20, 50 and 60.. To use this data use the following machine code.

Mnemonics	Hex data	Meaning
LD D, &h14	16, 14	let d = &h14 (20 decimal)
LD E, &h0A	1E, 0A	let e = &h0A (10 decimal)
LD H, &h32	26, 32	let h = &h32 (50 decimal)
LD L, &h3C	2E, 3C	let l = &h3c (60 decimal)
LD A, &H01	3E, 01	let a = &h01 (1 decimal)
LD B, &h00	06, 00	let b = &h00 (0 decimal)

As the bit of information stands it'll do nothing noticable, just load a few of the machines 'registers' (a register is almost identical to a variable, you know . . . the things you use in BASIC eg: LET A=33 is similar to LD A, 33 "LET" is used in BASIC, "LD" is used in machine code).

The registers now contain the data needed to draw a line . . . the data is as follows . . .

Register	Contents	Use
D	&h14	Holds the start Y-coordinate
E	&h04	Holds the start X-coordinate
H	&h32	Holds the end Y-coordinate
L	&h3C	Holds the end X-coordinate
A	&h01	When set to '0' means erase a line When set to '1' means draw a line
B	&h00	When set to '0' means dot connection When set to '1' means side connection

Don't worry about the B-register just yet . . . but always set it to '0' as this is quicker if B is set to '1'.

Okay, now that we have the registers set up how do we use this info to draw the actual line? Well we use the 'CALL' instruction in machine code, and call the routine in the ROM. The routine in the ROM is at address &H39F1. If you have a disc drive the routine starts at &H009C.

Now to actually execute the program in the ROM . . . this is what we have . . .

Mnemonics	Hex Data	Meaning
LD DE, &H1404	11, 0A, 14	This takes the place of LD D and LD E
LD HL, &H3C32	21, 32, 3C	This takes the place of LD H and LD L
LD A, &H01	3E, 01	
LD B, &H00	06, 00	
CALL &H39F1	CD, F1, 39	Call the ROM routine
RET	C9	Return back to BASIC

NOTE: if you have the SF-7000 Disc Drive alter the CALL &H39F1 to CALL &H009C.

We now have a M/C program and it must now be stored somewhere in memory. I generally like to store my stuff at location &HF000 onwards. To store M/C it is best to use the POKE command thus we get...

PROGRAM 1

```
10 DATA 11, 0A, 14, 21, 32, 3C, 3E, 01, 06, 00, CD,
F1, 39, C9
20 FOR A=&HF000 TO &HF00D: READ A$: POKE A, VAL (
"&h"+A$): NEXT
30 SCREEN 2, 2: CLS: CALL &HF000
40 GOTO 40
```

Lines 10 and 20 are known as 'Hex Loader' as the data held at line 10 is in hexadecimal and it is loaded into memory by line 20.

Now run this program ... see what happens? You get a line!! WOW!! It may not seem very exciting at first but it has shown you how to use a ROM routine. Let's face it you have to start somewhere!!

Well now that that is done let's modify the program a little. How about creating a fancy little pattern on the screen by using the ROM routine just covered?!

Look at this BASIC program.

PROGRAM 2

```
10 SCREEN 2, 2: CLS
20 FOR A=0 TO 255 STEP 3
30 LINE (128, 90) - (A, 0)
40 NEXT A
50 GOTO 50
```

As you can see the program isn't really all that fast ... so why not speed it up with a bit of M/C?? Here is the M/C to do just that.

Mnemonics	Hex date	Meaning
LD DE, &H5A80	11, 80, 5A	Set data DE, HL are coordinates of line A, B are type of line C is a counter
LD HL, &H0000	21, 00, 00	
LD A, &H01	3E, 01	
LD B, &H00	06, 00	
LD C, &H56	0E, 56	call the routine in the ROM
CALL &H39F1 <	CD, F1, 39	
INC L	2C	L contains the end X coordinate this section is the same as LET L=L +3 ie: move X position along by 3 decrease counter by 1
INC L	2C	
INC L	2C	
DEC C	0D	
JP NZ >	C2, 0C, F0	if C is Not Zero then jump to FOOC return back to BASIC
RET	C9	

To store the program in memory use the following program.

PROGRAM 3

```
10 DATA 11, 80, 5A, 21, 00, 00, 3E, 01, 06, 00, 0E,
56, CD, F1, 39, 2C, 2C, 2C, 0D, C2, 0C, F0, C9
20 FOR A = &HF000 TO &HF016: READ A$: POKE
A, VAL("&h"+A$): NEXT
30 SCREEN 2, 2: CLS
40 CALL &HF000
50 GOTO 50
```

Don't forget to alter the address to &H009C if you have the Disc Drive.

You should (when you RUN the program!!) see the same display as given by the program written in BASIC, but of course, it is much quicker to produce in M/C.

In M/C you use a wierd way of looping. Take this bit of BASIC.

```
10 FOR A = 1 TO 100: NEXT A
```

To do this in M/C you do this.

LD A, 100	... set A to 100 (Note this is decimal)
DEC A	... decrease A by 1 ie; A=A-1
JP NZ >	... if A is Not Zero then jump back to DEC A
RET	... return back to BASIC

What happens is whenever you decrement any register (ie; A, B, C, D, E, H or L) a check is made automatically to see if it equals 0 or not, and that is how the loop is implemented in the above two lots of M/C. Understand?? Good!!

Now onto something a little different . . . moving of sprites.

If you found drawing lines a little difficult then you should find this bit very easy AND a lot more useful!! Loops will be used so it is fairly important you get to grips with them.

Firstly what data do we need . . . ? Here it is . . .

- A register holds sprite plane number (range 0-31 decimal)
- D register holds Y-coordinate of sprite (range 0-191 decimal)
- E register holds X-coordinate of sprite (range 0-255 decimal)
- Address of routine is &H4292 (&H00BA on SF-7000)

Try this program in BASIC

PROGRAM 4

```
10 SCREEN 2,2:CLS
20 PATTERN S#0,"828080E692929297"
30 FOR A=191 TO 0 STEP -1:SPRITE 0,(128,
A),0,1:NEXT A:GOTO 30
```

When you RUN the program you see a sprite travel up the centre of the screen albeit a little slowly!!

Now try this . . . it will really show off the speed of M/C!!

Mnemonics	Hex data	Meaning
LD A, &H00	3E, 00	set sprite plane
LD DE, &HC080	11, 80, C0	set original coordinates of sprite
CALL &H4292	CD, 92, 42	place sprite on screen
DEC D	15	D=D-1, ie move sprite up screen
JP NZ >	C2, 05, F0	if E is Not Zero then jump to &HF005
RET	C9	return to BASIC

PROGRAM 5

```
10 DATA 3E,00,11,80,C0,CD,92,42,15,C2,05
,F0,C9
20 FOR A=&HF000 TO &HF00C:READ A$:POKE A
,VAL("&h"+A$):NEXT A
30 PATTERN S#0,"828080E692929297":SPRITE
0,,0,1:SCREEN 2,2:CLS
40 CALL &HF000:GOTO 40
```

RUN it and you will see a sprite move on the screen . . . the only problem is that it is so fast you can only see the sprite flash!! (to go from the bottom of the screen to the top takes about 1/20th of second . . .), so we need to slow it down. Make these following modifications.

Mnemonics	Hex data	Meaning
LDA,00	3E, 00	
LD DE, &HC080	11, 80, C0	
CALL &H4292	CD, 92, 42	
LD B, &HFF	06, FF	small delay loop. The B-register is used to count down from 255 (&HFF) to 0 and when B reaches 0 the loop ends, otherwise the computer jumps to address &HF00A
DEC B	05	
JP NZ >	C2, 0A, F0	
DEC D	15	
JP NZ >	C2, 05, F0	
RET	C9	

Now enter the following hex loader and program

PROGRAM 6

```
10 DATA 3E,00,11,80,C0,CD,92,42,06,FF,05
,C2,0A,F0,15,C2,05,F0,C9
20 FOR A=&HF000 TO &HF012:READ A$:POKE A
,VAL("&h"+A$):NEXT A
30 PATTERN S#0,"828080E692929297":SPRITE
0,,0,1:SCREEN 2,2:CLS
40 CALL &HF000:GOTO 40
```


Now RUN the program and you will see a sprite ZOOM up the screen . . . and this is with a delay in it . . . As you can M/C is extremely quick!!

Hopefully this little section will show you a few of the in's and out's of M/C. To finish off I'll give you another few ROM routines and what they do.

Address		Description
Normal :	Disc	
&H39EE	&H0099	Dot plot on graphics screen . . . D hold Y coordinate, E holds X coordinate, if A holds 0 then erase dot, if A holds 1 then plot a dot.
&H4298	&H00AE	Set the colour of a sprite . . . A holds plane number (range 0-31 decimal), C holds colour (0-15 decimal).
&H4A2D	&H00F3	Print a character on the graphics screen . . . D holds Y position, E holds X position, A holds character code (range 32-255 decimal).
&H42D2	&H0165	Read in a character from the keyboard . . . similar to INKEY\$ statement in BASIC. No data is sent to the routine . . . data is only read out. After CALLing the routine, the A register will hold the character that was pressed, eg if when you call the routine the 'Z' key is being pressed, the A register will hold 90 decimal.
Oh well that wraps things for the time being . . . Happy Progging!!		

A Very Simple Shuffling Routine

Many people would like to be able to write a small program to shuffle cards the only problem is that many programs are slow and/or ineffective. Well hopefully this routine will help those who are having a little difficulty with such matters!

The program works as follows.

LINES 10-50 . . . sets up initial deck of cards. They are not shuffled at this stage.

LINE 60 . . . tell the user to wait a moment whilst the computer shuffles.

LINES 80-110 . . . do the actual shuffling. It works by generating a random number, and selecting the card held at that point, it then swaps over two cards thus getting a random arrangement!! This is repeated a couple of times.

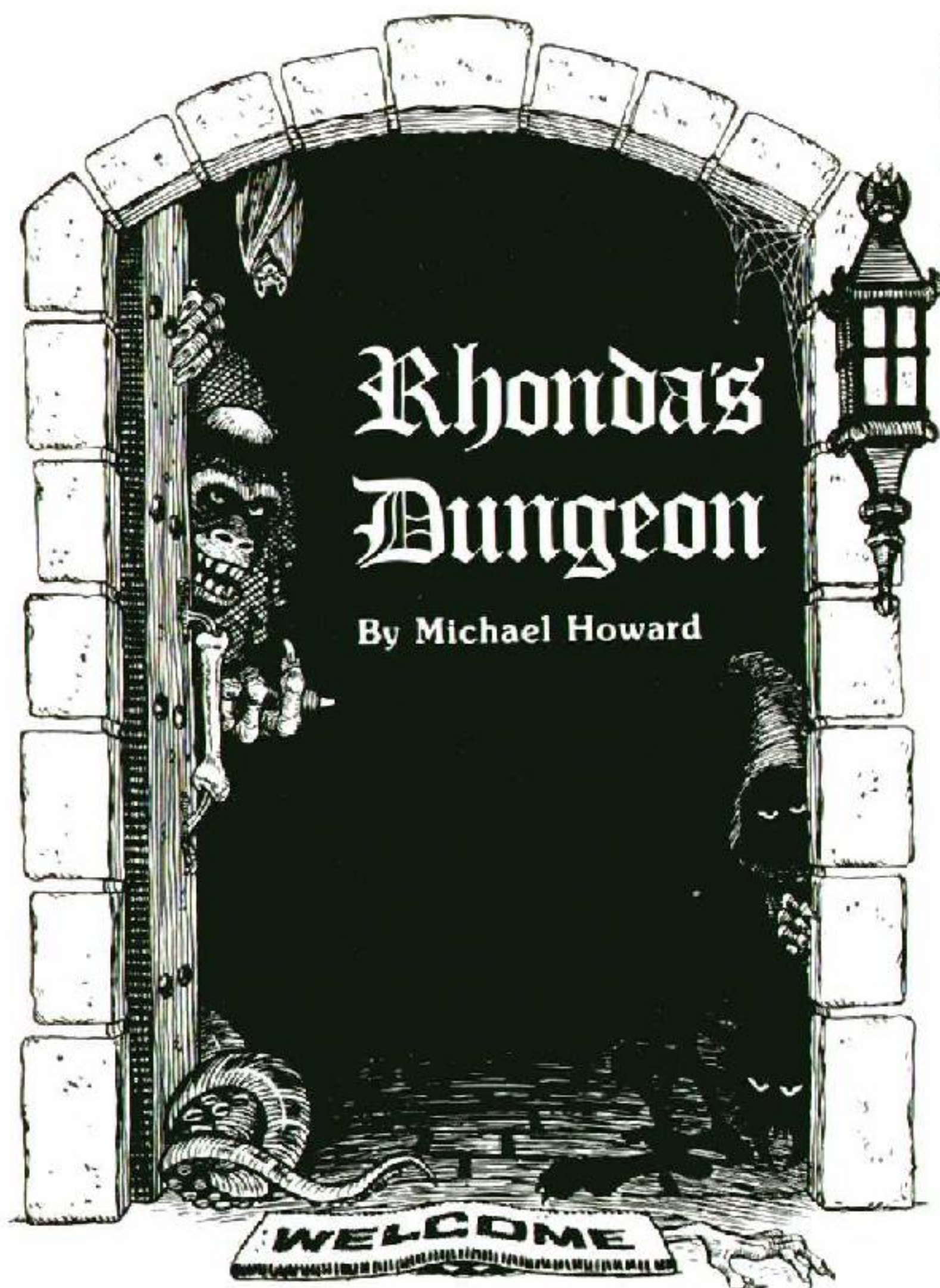
LINES 120-. . . prints out deck when you press a key.

Oh well that's it . . . I hope you find it useful.

```

10 DATA 2,3,4,5,6,7,8,9,T,J,Q,K,A
20 DATA Spades, Clubs, Diamonds, Hearts
30 DIM C$(52)
40 FOR A=1 TO 52 STEP 13: RESTORE: FOR B=0 TO 12: R
EADC$(A+B)
50 C$(A+B)=C$(A+B)+RIGHT$(STR$(AMOD 4), 1)
: NEXT B, A
60 CLS: X=RND(-1)
70 PRINT "Shuffling"
80 FOR B=1 TO 2: FOR A=1 TO 52
90 Z=INT(RND(8)*52)+1
100 T$=C$(A): C$(A)=C$(Z): C$(Z)=T$
110 NEXT A, B
120 FOR A=1 TO 52
130 PRINT "Card#"; A; TAB(12); LEFT$(C$(A), 1)
); " of "; : RESTORE 20: FOR I=0 TO VAL(RIGHT$(C
$(A), 1)): READ A$: NEXT I: PRINT A$
140 IF INKEY$="" THEN 140
150 NEXT A

```

Dungeon is an adventure fantasy game in which you must fight monsters, encounter thieves, empty chambers, trap doors, secret doors leading to corridors, grottos, vials of liquid which may heal or harm, teleport traps, maps, keys, stairways and pools. The dungeon is in two layers, and the object is to get from level one to level two and from level two out!!! With as much gold as possible! and I'll say it now it isn't at all easy!

After you RUN the program enter your name or a fantasy characters name (eg Bilbo or Frodo or Aragorn from 'The Lord of the Rings') to start your trip into fantasy. Then enter the level of difficulty. For level 1 you get a typical hit point value of 25, on level 2 about 15. When fighting, if a baddy hits you, your hit points (HP) are slowly wittled away. If your HP are zapped to zero you get wasted! Each monster encountered has differing strength and may be easy or extremely difficult to kill.

After a short pause you will be teleported into a random part of the dungeon. You now have a choice of commands . . . they are . . .

N)orth, S)outh, E)ast, W)est, U)p, M)ap, G)old, H)it points.

You can move North through the dungeon except if you are at the North wall or in an East-West corridor. Similarly for South, East and West . . . with their respective walls and corridors.

To move up you must be at a stairway AND have a key. To find a key you must first kill a random number of monsters. Also there is a different key for each level.

If you have found a map you can look at it whenever you like. Here is a key for the symbols on the map.

M-monster
O-empty chamber
?-thief or trap
C-grotto

UP-stairway
NS-North-South corridor
EW-East-West corridor
*-You

A '?' represents a thief or trapdoor . . . there is no way of knowing which is there short of entering the chamber. If you encounter a thief, you may surprise her and thus nick some gold, on the other paw she may surprise you and nab some of your gold off you! After you encounter a thief the chamber becomes empty.

If you activate a trap-door, you can fall through or catch yourself from falling. If you fall you lose gold and may die! If you are on level 1 you may fall through to level 2 (which is REALLY annoying!).

If you wish to know how many HP you have left press H. If you wish to know how much gold you have stolen then press G.

When it comes to combat with monsters you may fight or run. If you fight you swing your sword and hit every time. When a monster strikes there is a chance that it may miss . . . but some monsters, such as Purple People Easters, very rarely miss and are to be avoided!

The number of HP that you deplete from a monster increases with the number of monsters you have killed. So, generally, the more monsters you brutally destroy, the easier it will be to maim the next. . (Nice eh?!)

Several things happen in grottos. Often you find vials of liquid, they may be good or bad or have no affect at all. You can also meet Doom Spiders and Wizards but the worst you can meet is Wretched Rhonda. They all hit hard and are pretty hazardous to your health! If you are lucky you might meet the Wind Wizard. You can also find pools . . . but watch out as these may contain 'orrible Gill Monsters.

In corridors you may activate teleport traps, or encounter weak monsters.

If you die, there is a small chance that you may meet the Wind Wizard, and he will resurrect you, giving you a second chance. Your HP will be restored, and you will be given a limited number of turns to complete the quest. If you die again, YOU ARE ABSOLUTELY, COMPLETELY, UTTERLY AND IRRECOVERABLY DEAD!!!

If you complete the game you are given a score . . . thus.

SCORE	TITLE
-401 or less	cannon fodder
-101 to -1	serf
-100 to -1	apprentice
0 to 99	learner
100 to 199	soldier
200 to 599	knight
600 to 899	Paladin
900 to 1499	knight in pink armour
1500 or more	smart aren't you?

All-in-all, the program is an addictive and complex adventure. It will just squeeze into level III A BASIC. Those with level III B BASIC or Disc BASIC could add more monsters or more rooms. I was going to add poisonous astrally projected vapour rats . . . if one bites you, you must find a vial of healing potion inside a random number of goes or die. The reason I didn't add them is that the name took up too much memory . . . I hope you like it. .!!


```

10 DEFFNR(X)=INT(RND(B)*X):DIMA(B,B,2)
20 CLS:PRINT"Rhonda's Dungeon"
30 DY=0:MD=1:GOSUB3000
40 MA=0:CA=0:G=500:M1=1:K=0:HI=20+FNR(15)+1
50 H1=HI:INPUT"Name >";A$
60 GOSUB70:GOSUB90:GOSUB340
70 BB=1
80 FORZZ=1TO200*BB:NEXT:RETURN
90 FORX=1TO8:FORY=1TO8:FORZ=1TO2:A(X,Y,Z)=FNR(7)+1:NEXTZ,Y,X
100 H=FNR(3)+1
110 FORA=1TO2:FORN=1TOH:X=FNR(8)+1:Y=FNR(8)+1:A(X,Y,A)=8:NEXTN,A
120 S=FNR(4)+3
130 FORA=1TO2:FORN=1TO5:X=FNR(8)+1:Y=FNR(8)+1:A(X,Y,A)=9:NEXTN,A
140 RETURN
150 L1=L1-1
160 PRINT"You go up the stairs":GOSUB70
170 PRINT"The key opens the lock":GOSUB70
180 IFL1=0THEN270
190 MA=0:K=0:K4=FNR(4)+2:IFH1<H1THEN210
200 GOTO240
210 H1=HI
220 PRINT"You feel better":GOSUB70
230 PRINT"Your hp are now";HI
240 PRINT:CB=CA+K4
250 PRINT"You are at level 1":BB=4:GOSUB80
260 GOTO370
270 PRINT"You found your way out of the Dungeon You have";G;" gold coins":GOSUB280:GOTO840
280 GG=G+1
290 R=INT((GG*CA-7000+1)/M1)
300 PRINT:PRINT"Rating is..":R
310 PRINT:IFG<=0THEN1470
320 PRINT"You took";M1;" turns to find the exit":PRINT"& killed";CA;" monsters"
330 RETURN
340 C=FNR(8)+1:D=FNR(8)+1
350 A(C,D,2)=1
360 L1=2:K4=FNR(4)+2
370 F$="":CLS
380 A=A(C,D,L1):GOSUB70
390 ONAGOSUB980,1940,1670,1670,1010,1180,1190,1200,1300
400 IFTE=1THENTE=0:GOTO370
410 PRINT:IFH1<=0THEN800
420 IFDY=1THENMD=MD-1
430 IFDY=1ANDMD=0THEN800
440 IFF$="R"THEN370
450 PRINTA$;" , what now?":PRINT:PRINT"N)oorth, E)ast, S)outh, W)est, U)p, M)ap, G)old, H)it points"
460 M1$=INKEY$:IFM1$=""THEN460
470 M1=M1+1:TL=0:C1=C:D1=D
480 IFM1$="N"THEN570
490 IFM1$="E"THEN600
500 IFM1$="S"THEN630
510 IFM1$="W"THEN660
520 IFM1$="U"THEN690
530 IFM1$="M"THEN740
540 IFM1$="G"THEN760
550 IFM1$="H"THEN1520
560 BEEP2:GOTO410
570 IFA=7THEN780
580 IFD-1=0THEN880
590 D=D-1:GOTO370

```



```

600 IFA=6THEN790
610 IFC+1=9THEN900
620 C=C+1:GOTO370
630 IFA=7THEN780
640 IFD+1=9THEN910
650 D=D+1:GOTO370
660 IFA=6THEN790
670 IFC-1=0THEN920
680 C=C-1:GOTO370
690 CLS:IFA<>9THEN720
700 IFK=1THEN150
710 PRINT:PRINT"You cant go up the stairs":PRINT"You have no key!!":GOSUB70:PRINT:GOTO410
720 PRINT"You're not at the stairs":GOSUB70:GOTO410
730 GOTO410
740 CLS:IFMA=1THEN930
750 PRINT"You don't have a map":PRINT:GOSUB70:GOTO410
760 CLS:PRINT"You have";G;" gold coins":PRINT:IFKTHENPRINT"and a Key"
770 GOTO410
780 CLS:PRINT"You are in an East-West corridor":PRINT"You can only go East or West":PRINT:GOTO410
790 CLS:PRINT"You are in a North-South corridor":PRINT"You can only go North or South":GOTO410
800 BB=2:GOSUB80:CLS:IFDY=1THEN2990
810 PRINT"Your hp have been zilched!!":PRINT:G=0:PRINT"You have just died!!":BB=5:GOSUB80
820 PRINT:W=FNR(6)+1:IFDY=0ANDW>=3THEN2940
830 CLS:PRINT"You lost all your gold & were... another victim of Rhonda!!!":PRINT:PRINT:PRINT"Better luck next time!":GOSUB280:PRINT
840 PRINT"Another go?(Y/N)"
850 INPUTF$:IFF$="Y"THEN870
860 END
870 CLS:GOTO20
880 CLS:PRINT"You are at the North wall"
890 PRINT"You can't pass through":PRINT:PRINT"try again":GOTO410
900 CLS:PRINT"You are at the East wall":GOTO890
910 CLS:PRINT"You are at the South wall":GOTO890
920 CLS:PRINT"You are at the West wall":GOTO890
930 CLS:PRINT"Ye Map...Level: ";L1
940 PRINT:FORQ=1TO8:FORN=1TO8
950 IFC=NANDD=0THENPRINT"* ";GOTO970
960 S1=A(N,Q,L1):ONS1GOSUB1310,1340,1320,1320,1330,1350,1360,1370,1380
970 NEXTN:PRINT:NEXTQ:GOTO410
980 W=FNR(2)+1:IFW=2THEN1000
990 PRINT:PRINT"You are in a cold and damp":PRINT".....empty chamber":PRINT:RETURN
1000 PRINT:PRINT"You are in a damp and misty":PRINT".....empty chamber":PRINT:RETURN
1010 CLS:PRINT"There is a thief in here":A(C,D,L1)=1:GOSUB70
1020 G4=FNR(500)/L1+1:IFG-G4<=0THENG4=G
1030 G4=INT(G4):Y=FNR(8)+1
1040 IFY<=3THEN1120
1050 PRINT:PRINT".....he surprises you"

```



```

:GOSUB70:PRINT"as he quickly passes you
he":PRINT"snatches...";G4;" gold coins":
PRINT
1060 G=G-G4
1070 IFMA=1THENRETURN
1080 MA=FNR(4)+1:IFMA<=2THENMA=1
1090 IFMA=1THEN1110
1100 RETURN
1110 GOSUB70:PRINT"You search the chambe
r &":GOSUB70:PRINT"You find a map":RETUR
N
1120 PRINT:PRINT"You surprise the theif.
.":GOSUB70:PRINT"as he runs he drops.."
1130 G4=INT(FNR(400)/L1+1):PRINT"..";G4;
" gold coins"
1140 PRINT"You pick them up quickly":G=G
+G4
1150 MA=FNR(4)+1:IFMA<=2THENMA=1
1160 IFMA=1THEN1110
1170 RETURN
1180 CLS:PRINT:PRINT"You enter an..North
-South corridor":PRINT"Through a..secret
door":PRINT:GOSUB1480:RETURN
1190 CLS:PRINT:PRINT"You enter an..East-
West corridor":PRINT"Through a..secret d
oor":PRINT:GOSUB1480:RETURN
1200 PRINT"You triggered a...trap door":
GOSUB70
1210 TD=FNR(4)+1*PL:IFTD>4THENPRINT"You
fell through":GOSUB70:GOTO800
1220 IFTD=4THEN1240
1230 PRINT:PRINT"But you caught yourself
":PRINT"and stopped your fall":RETURN
1240 IFL1=2THEN1290
1250 L1=L1+1:PRINT:K=1
1260 PRINT"You fell through to level 2..
.and"
1270 G=0
1280 GOSUB70:PRINT:PRINT"You lost all yo
ur gold!! ha ha!!":RETURN
1290 PRINT"You fell into a deep pit":PT=
1:GOSUB70:PRINT"But you didn't get hurt"
:PRINT:GOSUB70:PRINT"But in climbing out
":GOTO1270
1300 PRINT"You are at a stairway..Going
up":RETURN
1310 PRINT"D "":RETURN
1320 PRINT"M "":RETURN
1330 PRINT"? "":RETURN
1340 PRINT"C "":RETURN
1350 PRINT"NS "":RETURN
1360 PRINT"EW "":RETURN
1370 GOTO1330
1380 PRINT"UP "":RETURN
1390 H=1:O=9:W=8:B=0:E=5:R=14:C=0:FR=0:G
OTO11030
1400 RETURN
1410 GOSUB70
1420 K=1:PRINT:PRINT"You look to the gro
und....":PRINT"and find a key":GOSUB70:R
ETURN
1430 GOSUB1420
1440 GOTO480
1450 IFCA=CBTHEN1410
1460 RETURN
1470 PRINT"You killed";CA;" monsters":PR
INT"...in";M1;" turns":RETURN
1480 PRINT"The door closes & locks behin
d you":GOSUB70
1490 W=FNR(8)+1:IFW>=7THEN1540
1500 W=FNR(8)+1:IFW=8THEN1560

```



```

1510 RETURN
1520 CLS:PRINT"You have";H1;" hp"
1530 GOTO410
1540 W=FNR(18)+1:FORAA=1TOW:READMS$,HP,H
M:NEXT:RESTORE:PRINT:PRINT"There is some
thing":PRINT"in this corridor..":GOSUB70
1550 PRINT:GOTO1720
1560 TE=1:TL=1
1570 IFK=1THEN1600
1580 K=1:PRINT:PRINT"You notice a shiny
object..":PRINT"...at your feet":GOSUB70
1590 PRINT"You pick it up and find that"
:PRINT"it is a Key...":GOSUB70
1600 PRINT:PRINT"But you weren't careful
..":GOSUB70:PRINT"You activated a trap":
GOSUB70
1610 C=FNR(8)+1:D=FNR(8)+1:BB=5:GOSUB80:
CLS
1620 PRINT"You suddenly feel dizzy,& pas
s out"
1630 PRINT:BB=2:GOSUB80:GOSUB1650
1640 PRINT"When you woke up..you find":P
RINT"That you are now in an unknown area
":BB=5:GOSUB80:RETURN
1650 FORAA=1TO100:CUSORFNR(34),23:PRINT
"*":NEXT
1660 GOSUB70:CLS:RETURN
1670 IFA=4THEN1690
1680 W=FNR(18)+1:GOTO1700
1690 W=FNR(12)+6
1700 FORAA=1TOW:READMS$,HP,HM:NEXT:RESTO
RE
1710 PRINT:PRINT"There is something":PRI
NT"In this chamber..":GOSUB70
1720 PRINT"Beware....":GOSUB70
1730 PRINT"It's a...":MS$;"..":GOSUB70
1750 GOTO2290
1760 DATA Purple People Eater,10,25
1770 DATA Ghoul,5,10
1780 DATA Minotaur,4,15
1790 DATA Lich,9,25
1800 DATA Kobold,2,4
1810 DATA Golem,4,20
1820 DATA Nasty Imp,5,10
1830 DATA Goblin,3,7
1840 DATA Putrid Orc,1,3
1850 DATA Skeleton,1,2
1860 DATA Ghost,3,10
1870 DATA Vampire Bat,3,6
1880 DATA Green Slime,3,17
1890 DATA Big Spider,3,10
1900 DATA Vampire Plant,1,10
1910 DATA Shadow,2,10
1920 DATA Giant Rat,1,2
1930 DATA Spectre,8,20
1940 PRINT"You found a..":PRINT"a hidden
grotto":GOSUB70
1950 PRINT:GOSUB2070:IFH1<=0THENRETURN
1960 W=FNR(9)+1
1970 GOSUB70:IFW>3THENPRINT:PRINT"The pl
ace seems empty":RETURN
1980 GOSUB70:GOSUB2280
1990 GOSUB70:PRINT"But wait..before you
proceed":GOSUB70:PRINT
2000 PRINT"You hear a noise in the dista
nce":GOSUB70
2010 PRINT"Cautiously you walk towards t
he sound"
2020 BB=3:GOSUB80:W=FNR(4)+1:IFH1<H1THEN
2040
2030 IFW=1THEN2730

```



```

2040 IFW=2THEN2810
2050 IFW=4ANDL1=2THEN3070
2060 GOTO2840
2070 PRINT:PRINT"You look around...":GOS
UB70
2080 V=FNR(7)+1
2090 IFV>=5THEN2110
2100 RETURN
2110 PRINT"On the ground, is a vial":BB=2
:GOSUB80:PRINT"You pick it up and see":P
RINT"it contains....a liquid":PRINT:PRIN
T"Would you like a drink? (Y/N)"
2120 DL=FNR(6)+1
2130 D$=INKEY$:IFD$<>"Y"ANDD$<>"N"THEN21
30
2140 IFD$="Y"THEN2160
2150 RETURN
2160 PRINT:PRINT"You take a sip..":BB=2:
GOSUB80:CLS
2170 IFDL>=3THEN2240
2180 IFDL=2THEN2270
2190 H3=FNR(6)+1+PL:H1=H1-H3
2200 PRINT"You feel wierd.":GOSUB70:GOSU
B70
2210 IFH1<=0THENRETURN
2220 PRINT:PRINT"It was a Death Potion":
PRINT"Which drained your hp"
2230 RETURN
2240 H3=FNR(10)/(PL+1)+(6/PL):H1=H1+H3
2250 PRINT"It was a White potion":PRINT"
it increases your hp by":H3
2260 RETURN
2270 PRINT"The potion had no effect":RET
URN
2280 GOSUB70:PRINT:RETURN
2290 PRINT:W=FNR(4)+1
2300 IFW<=2THEN2320
2310 GOSUB70:GOSUB2510
2320 IFH1<=0THENRETURN
2330 PRINT:PRINT"Do you F)ight or R)un?"
2340 F$=INKEY$:IFF$<>"F"ANDF$<>"R"THEN2340
2350 CLS:IFF$="F"THEN2370
2360 GOTO2430
2370 CLS:PRINT
2380 PRINT"You attack the..":MS$:GOSUB70
2390 PRINT"With a swing of your sword"
2400 N=FNR(5)+1+(FNR(CA)/2+1):HM=HM-N
2410 IFHM<=0THEN2610
2420 PRINT"You do":N;" points of damage"
:PRINT:GOTO2310
2430 W=FNR(4)+1:C=C1:D=D1
2440 PRINT"You quickly run out..":IFTL=1
THEN3040
2450 N=FNR(9)+1:BB=2:GOSUB80:IFW>=3THEN2
910
2460 H1=H1-N
2470 PRINT"as you leave the",,MS$;" atta
cks"
2480 IFH1<=0THENRETURN
2490 PRINT"& it does":N;" points of dama
ge"
2500 BB=3:GOSUB80:RETURN
2510 PRINT:W=FNR(7)+1
2520 PRINT"....it attacks you":IFW<=2THE
N2920
2530 W=FNR(6)+1:IFW>=3THEN2560
2540 N=(FNR(HP)/L1)*2
2550 GOTO2570
2560 N=FNR(HP)*PL+1
2570 N=N+1:IFHM<=2THENN=1
2580 H1=H1-N:GOSUB70:IFH1<=0THENRETURN

```



```

2590 PRINT"& it does";N;" points of dama
ge"
2600 PRINT"You have..";H1;" hp left":PRI
NT:RETURN
2610 PRINT:GOSUB70:PRINT"You kill the ";
MS$:PRINT
2620 IFA(C,D,L1)>=6THEN2650
2630 IFA(C,D,L1)=2THEN2650
2640 A(C,D,L1)=1
2650 G8=500:IFA(C,D,L1)>=6THENG8=250
2660 G4=FNR(G8/L1)+76:IFA=2THENG4=G4*2
2670 G=G+G4:GOSUB70
2680 PRINT"You search the area and find"
:GOSUB70:PRINTG4;" gold coins"
2690 CA=CA+1:IFK=1THENRETURN
2700 IFL1=1THEN1450
2710 IFCA=K4THEN1410
2720 RETURN
2730 GOSUB70:GOSUB70:GOSUB2880
2740 PRINT"I am the Wind Wizard":PRINT"I
will not harm you...":GOSUB70
2750 PRINT:G4=FNR(300)+101:G=G+G4:PRINT
2760 PRINT"I give you..";G4;" gold coins
"
2780 H4=FNR(1)*10/PL+1+(6/PL):H1=H1+H4
2790 PRINT"I will heal your wounds also"
:PRINT>Your hp are now";H1
2800 GOSUB70:RETURN
2810 GOSUB2880
2820 MS$="Doom Spider":HP=9:HM=20
2830 PRINT"It's a huge man-sized crawlin
g":PRINT"...Spider of Doom..":GOSUB70:P
RINT"...and..":GOTO2310
2840 GOSUB2880
2850 MS$="Wretch":HP=12:HM=39:CLS
2860 PRINT"Do not pass sucker, for I am",
,"Wretched Rhonda"
2870 BB=2:GOSUB80:GOTO2310
2880 CLS:PRINT"Suddenly...something jump
s..":PRINT"In front of you..."
2890 BB=3:GOSUB80:CLS
2900 RETURN
2910 GOSUB70:PRINT"as you leave...":PRIN
T"The ";MS$;" strikes..":GOSUB70
2920 GOSUB70:PRINT"But misses":BB=2:GOSU
B80
2930 RETURN
2940 BB=2:GOSUB80:GOSUB1650:DY=1:H1=HI
2950 PRINTA$:PRINT"You have entered a zo
ne":PRINT"betwixt Life and Death":PRINT:
BB=3:GOSUB80:PRINT:PRINT"I...The Wind Wi
zard":PRINT"Will restore your life":PRIN
T"and you have one more chance."
2960 PRINT:MD=(FNR(15)+1)*CA+10:H1=HI
2970 PRINT"You shall have but";MD;" move
s":PRINT"to exit this dungeon":BB=9:GOSU
B80
2980 GOSUB1650:GOTO400
2990 PRINTA$;" you have no more time":GO
TO810
3000 PRINT"Enter level of difficulty"
3010 INPUT"1-hard      2-really hard ";PL
3020 IFPL<>1ANDPL<>2THEN3010
3030 PRINT:RETURN
3040 TL=0:BB=2:GOSUB80
3050 PRINT"You activated the teleport tr
ap":BB=2:GOSUB80:GOSUB1650
3060 PRINT"You end up back in the area w
here":PRINT"...You last teleported from!"
:GOSUB70:RETURN
3070 CLS:PRINT"You fall into a deep,dark

```



```

":PRINT"pool of murky water":BB=4:GOSUB8
0
3080 W=FNR(6)+1:IFW>=5THEN3110
3090 IFW>=3THEN3140
3100 PRINT"It is warm & soothing":GOSUB7
0:RETURN
3110 MS$="Kraken":HP=8:HM=23:CLS
3120 PRINT"Suddenly you feel something w
arm":PRINT"rub against your legs":BB=4:G
OSUB80:PRINT"& you see that it is a slim
y":PRINT".. ";MS$;"..ready to attack":GOS
UB70
3130 PRINT:PRINT"As you climb out..":GOS
UB70:GOTO2310
3140 PRINT:PRINT"The water is steaming h
ot":GOSUB70:PRINT:PRINT"As you jump out,
you loose"
3150 G4=FNR(500)+101:IFG-G4<0THENG4=G
3160 G=G-G4:PRINTG4;" gold coins":PRINT"
Which fall into the pool....lost":BB=5:G
OSUB80:RETURN

```

SEGA BREAKTHROUGH

THREE GREAT NEW GAMES FOR YOUR SEGA

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(See review in last issue)

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Addendum

This must be the most read part of any
magazine . . . which is a little unfortunate really . . .
But never mind . . . to err is human to forgive a com-
puter programmer is divine!

Here's the boobos . . .

Firstly, on page 20 in the previous mag, line 10 should
read.

```

10 DATA 0,0,0,ED,5B,0,FO,CD,51,4A,FE,0,C-
O,ED,5B,0,FO,1C,AF,BB,20,A,14,3E,CO,BA,2
0,4,32,2,FO,C9,ED,53,0,FO,C3,3,FO

```

For those who have a SF-7000 disc unit alter line 10
to . . .

```

10 DATA 0,0,0,ED,5B,0,FO,CD,14,1,FE,0,CO,
ED,5B,0,FO,1C,AF,BB,20,A,14,3E,CO,BA,20,
4,32,2,FO,C9,ED,53,0,FO,C3,3,FO

```

Next error . . . page 29 in the previous mag. A lot
of people were having trouble with Delta
Race . . . they seemed to crash for no apparent
reason. All you need to do is place the following in . . .

```

530 TIME$="00:00:00"

```

The next blunder was made in the Black Jack pro-
gram, line 9170 on page 25 should read . . .

```

9170 COLOUR1,3:CLS:GOSUB 9500

```


REVIEWS

ONE DAY CRICKET

Now for all you budding Richard Hadlees' and Jeremy Coneys' out there here is a game to wet your appetite. Grab the family, neighbours grandma and all, and get a team together. For 2 to 22 players this is a cricket bonanza.

The game has the New Zealand and Australian teams built in but you can input your own teams. To begin you set your field and your away. An excellent game for learning the rules of cricket as it has practically every

rule as well as comprehensive instructions. Your chance to bowl like Richard Hadlee or bat like Lance Cairns. Good practice for the oncoming cricket season. This has to be the best sports stimulation but must take the cake for being the best 22 players game on the market! All the thrills and spills of International Cricket. Animation and graphics are superb. You have to see it to believe it! OH NO!! The family is calling me to the crease. I'm facing Denise Lilly (GULP)!

FROGGY By David Harvey

From the maker of DUNGEONS BENEATH CAIRO and CUBERT comes FROGGY.

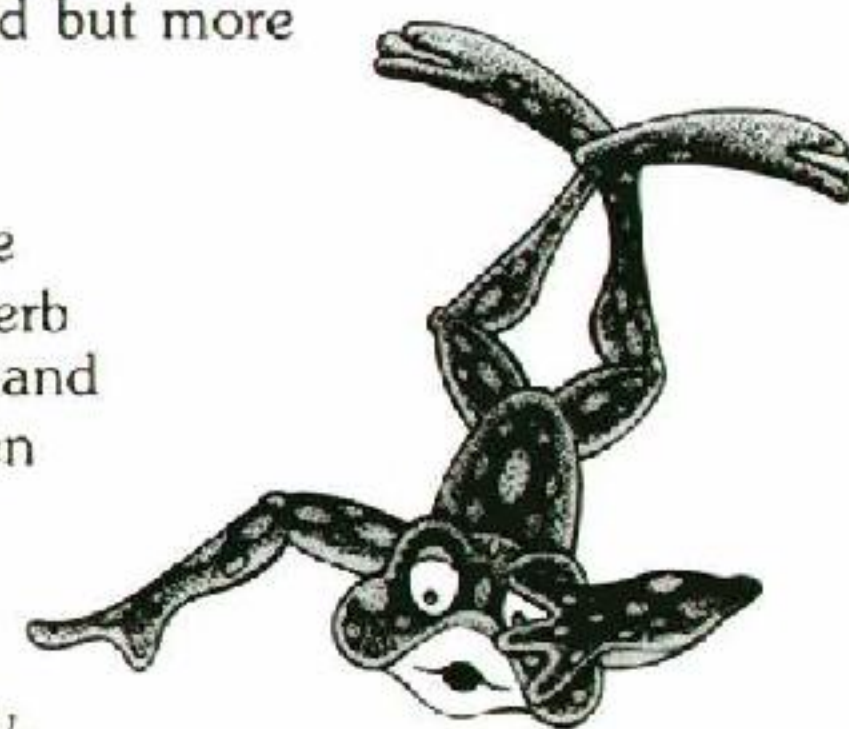
If you are a frogger fanatic or just looking for a good game, you'll leap for joy over FROGGY. This is an excellent version of your arcade favourite which in many ways rivals the original. Froggy features two fast action screens and a Hall of Fame high score table. The first screen sees poor Froggy trying to cross an extremely busy road. If that is not daunting enough there is also a deadly cobra to worry about!

The second screen sees Froggy leaping logs, turtles and lillys as well as speedboats. To top this off Froggy has to worry about the nasty crocodile!

Do not stop for flies or Froggy will croak for sure. Froggy has to travel through both screens to fill one of the frog houses (twice as hard but more importantly twice as much fun!).

Fast exciting machine code game with superb animation, garphics and sound. Double screen action thats double the fun.

Fun for all the family.



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Action Arcade Game for the SEGA
Vortex Blaster



Written by
Trident Technicological Systems
Sydney

For Poseidon Software
New Zealand

HARDWARE REVIEW

A Power controller is now available for your Sega SC-3000. Up till now, power controllers have only been available for larger machines and costing well over \$400.00, but at last somebody has come up with one at a decent price.

The unit comes nicely packaged, with everything you need to start including power supply, full instructions, example of wiring applications, LED indicators built into the fascia to tell the user which controller is in use, audio in, audio out facilities and finally the expansion socket.

The unit will cost \$220.00 and will only be available from the address below.

This power controller will enable you to connect up to four different appliances at once, the unit itself puts out a voltage of 5 volts thus 5 volts could be used for turning on relays, opto coupler and inputs of logic gates. (relays not included due to different voltages for different applications). The controller takes full advantage of the Sega's BASIC sound commands and plugs directly into the Video port at the back of the computer. The unit can be used with or without the SF-7000 Disc Drive connected. Turning on a device by the power controller is only a matter of sending data out from the computer through the sound port, a tone of approximately two seconds. The tone is a particular frequency in the range of 500 Hz to 5KHz. Each tone represents one of the four controlled outputs. To turn again. The maximum No of devices which one unit can control is four, however, by using the Power controller expansion unit in conjunction with the power controller, the user can control a total of ten appliances.

Power controllers open up the outside world to your computer with applications ranging from controlling simple robots, lighting effects, controlling electrical appliances such as television etc for a home burglar alarm system (using the Sega's inbuilt time function you can make a would be thief think there is someone still at home) etc, etc.

A product that you can use in conjunction with the power controller is an opto switch, which allows the user to turn off 230 volt ac appliances. As the name implies, a light source that is incased in a ceramic package turns on an electronic switch which turns the appliance on or off accordingly. Because an electronic switch does the switching there is no relay contact arcing and points bounce. The reason a light source is used in this type of switch is purely for safety. If a fault develops with the opto switch, or the appliance, 230 volts is not passed down through the interfacing cable to the computer outputs or any other controlling device. There is no electrical connection between the electronic switch and the controlling device, only between the light source and the controller. Both the opto coupler and triac are incased in ceramic packages. The electrical break-down voltage of this package is several thousands of volts.

There are many uses for the opto-switch open to the user, direct control is possible for various 230 volt appliances, provided the load is not greater than 100 watts.

These units will not be available in Retail shops so if you want information regarding specifications and full price list etc, write to the address below.

User Tronics Developments LTD
P.O. Box 29124
Greenwoods corner
Epsom
Auckland 3

The power controller connected to the Sega Sc-3000

There is also a Speech Synthesiser available for the Sega SC-3000 & SF-7000. The speech processor is based on an "allophonic" system which allows the user to select individual speech sounds and string these together to fabricate words. The processor has a allophonic set, which is an inventory of sixty four English sounds. This type of system provides an unlimited vocabulary, since the stored units correspond to sounds not words. The emphasis in this approach shifts to the programmer, to select the appropriate sounds to represent the word.

The unit simply plugs into the centronics printer port of the SF-7000, although speech processor uses TRI-STATE inputs, so that the processor and printer may be connected in parallel and the one that is not used may be switched to standby mode.

Sending data out to the Speech synthesiser is only a matter of addressing the printer port, ie LPRINT CHR\$(a); command, as used in micro soft basic. Where "a" is the decimal value of the allophonic set.

The unit has a standby switch which enables you to use the printer or speech synthesiser off the same printer port.

As well as a speaker socket which enables you to listen to your speech through a set of headphones or external speakers. Or alternatively you can use the AMP socket to run the unit through your hi fi system!!

A program which converts words to allophonic sets comes supplied with the unit as well as a sample program.

Please note: This unit works off the centronics printer port on the Sega SF-7000, so unless you have this disc drive or the centronics parallel interface you cannot use this product. (alternatively, you could buy a parallel centronics interface which plugs into the Sega printer port and then the speech synthesiser will work

USER TRONICS DEVELOPMENTS
P.O. BOX 29124
GREENWOODS CORNER
AUCKLAND 3

Speech synthesiser is connected to a Sega SC-3000 plus SF-7000.

Scheduler

GRANDSTAND

This program is for use in workstudy/production control. Being implemented on a micro, it should be applicable to the practically minded manager who would normally be intimidated by trying to get to grips with a large company computer terminal.

The program will provide an efficient method for determining a sequence for processing a set of jobs, or maybe a customer, either of which will place demands on organisational resources. Under certain conditions the problem will be solved, or at least an optimum solution will be found.

The specific application may not be exactly tuned to your requirements, but you may well be able to tailor the format to suit a wide variety of planning applications in commercial (and private) situations.

Sequencing

Sequencing is the order in which jobs are placed for processing. Sequencing jobs involves the ordering of jobs through one or more processes, so that specific performances, (optimum performances), such as minimal idle time, total machine time, and time delivery dates are reached, variations of which can produce significant results in costs and productivity.

The sequential ordering of the start and finish of jobs is called a schedule. This schedule is only formed when the processing sequence has been established, noting that a job does not start until the previous job has finished. The machines provide the process by which the jobs are completed, and machines need not be mechanical, they could be human, (visual quality check, and so on). It is also important to note that all jobs must go through the same process.

The process time is the amount of time that a machine will need to complete that process, the times for these processes are then collected. These times are then manipulated to obtain the configuration requiring the least amount of processing time: maximum efficiency. Assuming that the least amount of processing time is the result required!

Total facility processing time is the total machine time plus the machine idle time. Therefore reducing the total facility processing time also reduces the machine idle time.

The method used to solve this problem was developed

by S.A. Johnson and later extended by W.A. Stark, (number of jobs — 1 method). These two algorithms are used in the program to obtain the results.

The Johnson algorithm finds the shortest processing time for two machines, the Stark algorithm is then used to get the shortest processing time from the total number of jobs. By using the Johnson algorithm on the first two times and the last two times, another sequence is obtained. Stark's algorithm is repeatedly applied to the Johnson algorithm, (1 to number jobs-1).

This procedure will develop several sequences, allowing some discretion as to the best sequence for one's purposes, considering that holidays and maintenance must be accounted for.

The program itself

The program will ask for the number of jobs you have to process, say 4 cars for service at a garage — or four items for assembly into a final product.

Then the program asks for the number of operations: the example garage operations are: service, oil change, wash/clean, polish [Really? You must let me have the name of your garage:ed]

The assembly operations are:

Assemble and cable into roverpoint, seal roverpoint, attach plug and test. Next enter a brief description of the operations, service, oil change, wash/clean and polish. Now enter the job name: for the garage it might be a CORTINA.

Then enter the times the cortina has to spend in each operation.

The computer then asks for the units of time you are using.

The computer now presents a summary of the data input, together with the finish times. Another prompt invites you to proceed to check times for the initial sequence.

Next comes the schedule itself, and you can list all the options, or select only the best ones.

Having decided how you want to view the results, the program goes through its paces to list the best results for you to examine, and then finally to determine the recommended schedule, sequence and the time involved.

```
10 CLS
20 COLOR 15,1
30 PRINT:PRINT:PRINT
```



```

40 INPUT "HOW MANY JOBS (10 OR 15) "; QW
100 CLS:COLOR 15,1
110 DIM M(QW,QW),J$(QW),M$(QW),A(QW)
120 DIM B(QW),C(QW),SE(QW,QW),PS(QW)
130 DIM MT(QW),T1(QW,QW),T2(QW,QW)
140 DIM IT(QW),KL(QW)
150 GOTO 410
160 REM
170 T1(1,1)=0
180 FOR I=1 TO NM
190 T2(1,I)=T1(1,I)+M(C(1),I)
200 IF I=NM THEN 220
210 T1(1,I+1)=T2(1,I)
220 NEXT I
230 TI=T2(1,1)
240 FOR J=2 TO NJ
250 T1(J,1)=T2(J-1,1)
260 T2(J,1)=T1(J,1)+M(C(J),1)
270 NEXT J
280 REM
290 FOR J=2 TO NJ
300 FOR I=2 TO NM
310 T1(J,I)=T2(J,I-1)
320 IF T2(J-1,I)>T2(J,I-1) THEN T1(J,I)=T2(J-1,I)
330 T2(J,I)=T1(J,I)+M(C(J),I)
340 NEXT I,J
350 REM
360 RETURN
370 CLS:COLOR 14,4:PRINT:PRINT:PRINT
380 REM
390 REM
400 REM
410 PRINT SPC(10); "MACHINE SCHEDULING"
420 PRINT
430 PRINT SPC(12); "BY GRANDSTAND."
440 PRINT:PRINT:PRINT "PROGRAM CAN BE USED FOR UP TO 20"
450 PRINT "JOBS AND 20 MACHINE OPERATIONS." :PRINT
460 PRINT:PRINT, "NOTE: "
470 REM
480 PRINT, "-----"
490 PRINT, "COMPLETE ALL DATA"
500 PRINT, "ENTRIES BY HITTING"
510 PRINT, "THE RETURN KEY"
520 REM
530 REM
540 GOSUB 110
550 REM
560 DY=0
570 PRINT:INPUT "TYPE IN THE NUMBER OF JOBS"; NJ
580 PRINT
590 INPUT "HOW MANY MACHINE OPERATIONS "; NM
600 CLS
610 PRINT "BEGIN BY DESCRIBING THE MACHINE OPERATIONS."
620 PRINT "THESE OPERATIONS ARE ASSUMED TO BE SEQUENTIAL."
630 PRINT
640 FOR I=1 TO NM
650 PRINT:PRINT
660 PRINT "DISCRIPTION OF MACHINE OPERATION No "; I
670 PRINT "(USE UP TO 7. CHARACTER). "
680 INPUT M$(I)
690 IF LEN(M$(I))<=7 THEN 730
700 PRINT

```



```

710 PRINT"USE ONLY SEVEN CHARACTERS PLEASE"
720 PRINT:GOTO660
730 NEXTI
740 CLS
750 PRINT"NOW BRIEFLY, (6 CHARACTERS OR LESS) DESCRIBE EACH JOB, AND THE TIME IN EACH MACHINE OPERATION FOR THAT JOB."
760 PRINT
770 FORJ=1TONJ
780 PRINT"TYPE A DISCRPTION OF JOB ";J
790 INPUTJ$(J)
800 PRINT
810 PRINT"FOR THIS JOB, ENTER THE TIME (TO THE NEAREST TENTH UNIT) REQUIRED FOR EACH OF THE MACHINE OPERATIONS LISTED BELOW."
820 PRINT
830 PRINT"USE THE SAME TIME UNITS FOR ALL OPERATIONS."
840 PRINT
850 FORI=1TONM
860 PRINT"TIME IN OPERATION ";M$(I); " = ";
870 INPUTM(J, I)
880 PRINT
890 NEXTI
900 CLS
910 NEXTJ
920 REM
930 PRINT"INPUT COMPLETE"
940 PRINT
950 PRINT"TYPE IN THE UNITS OF TIME, (E.G, MINUTES, HOURS, ETC.)"
960 INPUT UNIT$
970 NS=1
980 NF=NS+3
990 IFNF>NMTHENNF=NM
1000 CLS
1010 IFNS=1THENGOTO1040
1020 PRINT, "MACHINE OPERATIONS (CONT."
1030 GOTO1050
1040 PRINTSPC(10); "MACHINE OPERATIONS"
1050 REM
1060 PRINTSPC(11); "(TIMES IN ";UNIT$; ")"
1070 PRINT: PRINTSPC(17); "JOB":PRINTSPC(17); "ggg"; , ,
1080 FORI=NSTONF
1090 PRINTM$(I); , ,
1100 NEXTI
1110 PRINT
1120 FORJ=1TONJ
1130 PRINTJ; ". "; , , J$(J); , ,
1140 FORI=NSTONF
1150 PRINTM(J, I); , ,
1160 NEXTI
1170 PRINT
1180 NEXTJ
1190 PRINT:PRINT"DO YOU WISH TO CHANGE ANY OF THE DATA"
1200 A$=INKEY$: IFA$="" THEN1200
1210 IFA$="Y"THENGOSUB2720:GOTO1000
1220 IFA$<>"N"THEN1200
1230 PRINT"DO YOU WISH TO RE-ARRANGE YOUR SCHEDULE."
1240 FORB=1TO100:NEXT
1250 B$=INKEY$: IFB$="" THEN1250
1260 IFB$="Y"THENGOSUB3830:GOTO970
1270 IFB$<>"N"THEN1250
1280 IFNF=NMTHEN1300
1290 NS=NF+1:GOTO980

```



```

1300 FORJ=1TONJ:C(J)=J:NEXTJ
1310 GOSUB2980
1320 GOSUB160
1330 CLS
1340 PRINT:PRINT"INITIAL SEQUENCE"
1350 PRINT:PRINT"ORDER                                JOB
NAME                                F/TIME"
1360 PRINT
1370 FORJ=1TONJ
1380 PRINTJ:;:J$(J):;:T2(J,NM)
1390 NEXTJ
1400 GOSUB110
1410 KK=0
1420 GOSUB3080
1430 LETBT=NM*T2(NJ,NM)
1440 DY=0
1450 FG=1
1460 GOSUB3390
1470 GOSUB110
1480 IFNM=2THENGOTO1570
1490 PRINT"TO VIEW ALL LOADING SEQUENCES
AS THEY ARE DETERMINED,"
1500 PRINT"TYPE AN <A>, TO VIEW ONLY THE
BEST SCHEDULE(S),"
1510 PRINT"TYPE A <B>."
1520 PRINT"YOU MAY RETURN LATER TO REVIEW
ALL SCHEDULES."
1530 PRINT:PRINT"A OR B"
1540 A$=INKEY$:IFA$=""THEN1540
1550 IFA$="B"THENDY=1:GOTO1570
1560 IFA$(">")A"THENGOTO1540
1570 FORKK=1TONM-1
1580 RPT=0
1590 GOSUB1920
1600 GOSUB2040
1610 IFRPT(">")1 THENGOSUB 2550
1620 GOSUB160
1630 IF FG=0THEN1670
1640 IFNM(">")2THEN1650
1650 GOSUB2410
1660 GOSUB3080
1670 GOSUB3390
1680 IFFG=0THEN1710
1690 GOSUB110
1700 IFRPT=1THENGOTO1840
1710 NEXTKK
1720 IFNM=2THEN1840
1730 GOSUB3640
1740 FORLL=0TOLM
1750 KK=KL(LL)
1760 DY=0
1770 CLS
1780 PRINT"A GOOD JOB SEQUENCE IS:"
1790 PRINT
1800 PRINT"ORDER                                JOB NAME                                F/TIME"
1810 IFNM=2THENRETURN
1820 LETRPT=1:GOTO1590
1830 NEXTLL
1840 GOSUB2830
1850 ONFGGOTO1880,1900
1860 PRINT:PRINT"THEN GOODBYE!":PRINT
1870 GOTO1910
1880 FG=0:CLS
1890 GOTO970
1900 GOTO560
1910 END
1920 REM**COMBINE DATA
1930 FORJ=1TONJ
1940 A(J)=0:B(J)=0
1950 NEXTJ
1960 FORI=1TOKK

```



```

1970 FORJ=1TONJ
1980 A(J)=A(J)+M(J,I)
1990 B(J)=B(J)+M(J,NM-I+1)
2000 NEXTJ
2010 NEXTI
2020 RETURN
2030 REM
2040 NF=0:NL=NJ:L=0
2050 GOSUB 2330
2060 FORJ=1TONJ
2070 C(J)=NJ+1
2080 NEXTJ
2090 SM=TT
2100 FORJ=1TONJ
2110 FL=0
2120 REM
2130 FORJJ=1TONJ
2140 IFJ=C(JJ) THENFL=1
2150 NEXTJJ
2160 IFFL=1 THENGOTO2190
2170 IFB(J)<=SM THENSM=B(J):IL=J:L=2
2180 IFA(J)<=SM THENSM=A(J):IL=J:L=0
2190 NEXTJ
2200 IFL=2 THENGOTO2230
2210 C(NF)=IL
2220 NF=NF+1:GOTO2250
2230 C(NL)=IL
2240 NL=NL-1
2250 IFNL>=NF THEN2090
2260 REM
2270 REM
2280 FORJ=1TONJ
2290 SE(KK,J)=C(J)
2300 NEXTJ
2310 RETURN
2320 REM
2330 TT=A(1)
2340 FORJ=1TONJ
2350 P=TT:IFP<A(J) THENP=A(J)
2360 TT=P
2370 Z=TT:IFZ<B(J) THENZ=B(J)
2380 TT=Z
2390 NEXTJ
2400 RETURN
2410 REM
2420 IFRPT=1 THENGOTO2490
2430 CLS
2440 IFNM<>2 THENGOTO2460
2450 PRINT"AN OPTIMAL SEQUENCE IS:":GOTO
2470
2460 PRINT"A POSSIBLE SEQUENCE IS:"
2470 PRINT
2480 PRINT"ORDER          NAME          F/TIME"
2490 FORJ=1TONJ
2500 PRINTJ;";";J$(C(J));";";T2(J,NM)
2510 NEXTJ
2520 GOSUB110
2530 RETURN
2540 REM
2550 FG=1
2560 IFNM=2 THENRETURN
2570 IFKK<2 THENRETURN
2580 FORK=1TOKK-1
2590 IFNG=0 THENGOTO2660
2600 NF=0
2610 FORJ=1TONJ
2620 IFNF=1 THENGOTO2640
2630 IFC(J)<>SE(K,J) THENNF=1
2640 NEXTJ
2650 IFNF=0 THENLETFG=0
2660 NEXTK

```



```

2670 REM
2680 REM
2690 REM
2700 RETURN
2710 REM
2720 PRINT: INPUT "ENTER THE JOB NUMBER  "
; J
2730 IF J < 1 OR J > NJ THEN PRINT "ERROR-RE-ENTER
PLEASE": GOTO 2720
2740 PRINT: PRINT "NOW ENTER THE NEW JOB D
ESCRIPTION"
2750 INPUT W$
2760 IF LEN(W$) > 7 THEN W$ = LEFT$(W$, 7)
2770 J$(J) = W$
2780 FOR I = 1 TO NM
2790 PRINT "ENTER THE NEW TIMES FOR OPERA
TION "; M$(I);
2800 INPUT M(J, I)
2810 NEXT I
2820 RETURN
2830 LET FG = 0
2840 PRINT
2850 PRINT "DO YOU WISH TO SCHEDULE MORE?"
2860 PRINT: PRINT "Y OR N"
2870 INPUT AN$
2880 IF AN$ = "N" THEN RETURN
2890 IF AN$ < > "Y" THEN GOTO 2870
2900 PRINT: PRINT "DO YOU WISH TO MODIFY E
XISTING DATA ?"
2910 PRINT "Y OR N"
2920 INPUT AN$
2930 IF AN$ = "Y" THEN LET FG = 1: RETURN
2940 IF AN$ < > "N" THEN GOTO 2920
2950 PRINT "THEN A NEW PROBLEM IS ASSUMED"
2960 FG = 2
2970 RETURN
2980 REM
2990 FOR I = 1 TO NM + 1: MT(I) = 0: NEXT I
3000 FOR I = 1 TO NM
3010 FOR J = 1 TO NJ
3020 MT(I) = MT(I) + M(J, I)
3030 NEXT J
3040 MT(NM + 1) = MT(NM + 1) + MT(I)
3050 NEXT I
3060 RETURN
3070 REM
3080 IF DY = 1 THEN RETURN
3090 NS = 1
3100 PRINT "JOB"; ;
3110 IF NS = 1 THEN GOTO 3140
3120 PRINT "SCHEDULING (CONT.)"
3130 GOTO 3160
3140 CLS
3150 PRINT " SCHEDULE"
3160 PRINT "-----"
-----
3170 NF = NS + 3
3180 IF NF > NM THEN NF = NM
3190 FOR I = NS TO NF
3200 PRINT, ; " "; M$(I); " ";
3210 NEXT I
3220 PRINT
3230 FOR I = NS TO NF
3240 PRINT, ; " IN OUT ";
3250 NEXT I
3260 PRINT
3270 FOR J = 1 TO NJ
3280 PRINT C(J); " . " ; " ";
3290 FOR I = NS TO NF
3300 PRINT, INT(T1(J, I)); " "; INT(T2(
J, I));

```



```

3310 NEXT I
3320 PRINT
3330 NEXT J
3340 IF NF = NM THEN GOTO 3360
3350 NS = NF + 1 : GOTO 3100
3360 GOSUB 110
3370 RETURN
3380 REM
3390 OT = NM * T2 (NJ, NM)
3400 IF OT > BT THEN BT = OT
3410 IT (KK) = INT (OT) - INT (MT (NM + 1))
3420 IFFG = O THEN RETURN
3430 CLS
3440 PRINT "    PERFORMANCE CHARACTERISTICS
          FOR";
3450 IF KK < > O THEN GOTO 3480
3460 PRINT "    INITIAL SEQUENCE"
3470 GOTO 3520
3480 IF NM < > 2 THEN GOTO 3510
3490 PRINT "    OPTIMAL SEQUENCE"
3500 GOTO 3520
3510 PRINT "    THIS SEQUENCE"
3520 PRINT "-----"
3530 PRINT "TOTAL FACILITY PROCESSING TIME";
3540 PRINT "="; INT (OT + .5); ", IN UNITS OF "
      ; UNIT$
3550 PRINT
3560 PRINT "TOTAL MACHINE PROCESSING TIME";
3570 PRINT "="; INT (MT (NM + 1) + .5); ", IN UN
      ITS OF " ; UNIT$
3580 PRINT
3590 PRINT "IDLE MACHINE TIME";
3600 PRINT "="; INT (IT (KK) + .5); ", IN UNITS
      OF " ; UNIT$
3610 PRINT
3620 RETURN
3630 REM
3640 FOR I = OT ON NM - 1
3650 T = BT : IF BT < IT (I) THEN T = IT (I)
3660 BT = T
3670 NEXT I
3680 IS = -1
3690 KK = 0
3700 IF IT (KK) = BT THEN IS = KK
3710 IF KK >= (NM - 1) THEN GOTO 3730
3720 KK = KK + 1 : GOTO 3700
3730 KL (0) = IS
3740 L = 1
3750 FOR I = 0 TO IS - 1
3760 IF IT (I) < > BT THEN GOTO 3790
3770 KL (L) = I
3780 L = L + 1
3790 NEXT I
3800 LM = L - 1
3810 RETURN
3820 REM
3830 PRINT : PRINT "ENTER THE MACHINE NUMBE
R YOU WISH TO MOVE."
3840 PRINT "THEN ENTER THE NEW LOCATION I
N YOUR SCHEDULE (X.Y)"
3850 INPUT FS, MS
3860 PA$ = M$ (FS) : M$ (FS) = M$ (MS) : M$ (MS) = PA$
3870 FOR I = 1 TO NJ
3880 PS (I) = M (I, FS)
3890 M (I, FS) = M (I, MS)
3900 M (I, MS) = PS (I)
3910 NEXT I
3920 RETURN

```


—USING RS 232—

This article is for all the Sega owners out there who have a SF-7000 Disc Drive.

One of the features of the SF 7000 is the RS232 interface. In this article I will try to explain the applications this little beastie can be used for.

With a RS232 interface fitted you have the means to communicate with printers, modems, and other computers.

The use of a RS232 interface allows you to connect equipment together using very simple wires up to 50 ft long. It is possible, using a modem, to convert the signals in these wires into a form in which they can be sent almost any distance to another modem, over the standard telephone system.

Please refer to pages 200 and 201 of your SF 7000 Disc Drive Manual for the wiring of two computers together.

USING THE RS232 WITH A PRINTER

It is possible to alter the speed at which characters are transmitted from the RS232 to the printer. The speed is measured by a figure known as the "BAUD RATE". The baud rate is measured in "bits per second". 8 bits make a byte so take the Sega data recorder for example, this transfers data at 1200 baud $1200/8 = 150$ characters per second

You need to make sure that the RS232 is transmitting at the same speed as the printer is receiving. Do not confuse this interface speed at which the printer actually prints characters on paper. If the printer cannot keep up with the rate at which characters are arriving from the RS232 then it will send special signals back to the RS232 instructing it to stop sending, until the printer catches up. This process is known as "flow control".

If you are using a RS232 printer (as you probably are if you are reading this!) you will find switches (possibly inside the casing) to set the baud rate, please refer to the printer manual to set these D.I.P switches.

The best speed to choose is probably 1200 baud (150 characters per second). So, set the DIP switch on the printer to 1200 baud, then refer to page 200 of your SF 7000 manual to set the "jumper" to pin 4. (1200 baud)

Using the "ESC-TAB.BAS" program supplied with your SYSTEM DISC as well as reading pages 215-218 of the SF-7000 manual you can now set margins, line space setting etc.

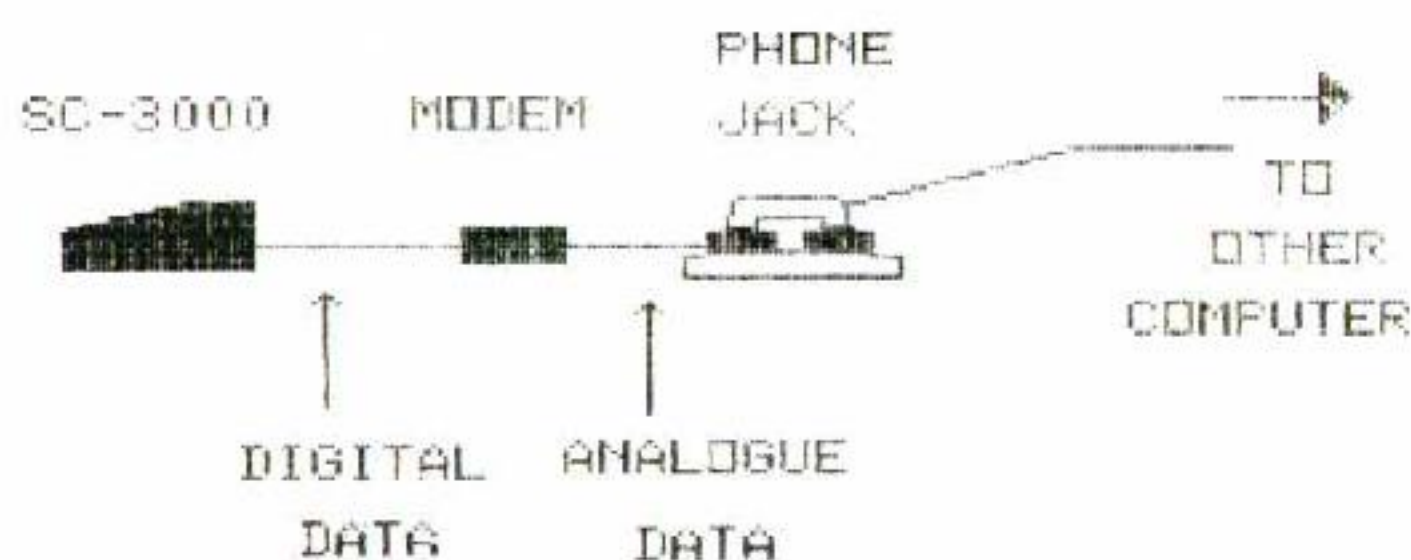
Simply re-boot the computer with system disc supplied to return to normal printer port.

CONNECTING TO ANOTHER COMPUTER VIA A MODEM

A modem is simply a way of extending the distance between two computers (as opposed to cable) — normally via the standard telephone network.

(Modem is short for Modulator/demodulator)

A modem will take your computer's digital signals and change them into analogue signals to go over the telephone lines. When data is sent back, a modem will convert them back from analogue signals to digital signals so that your computer can understand them.

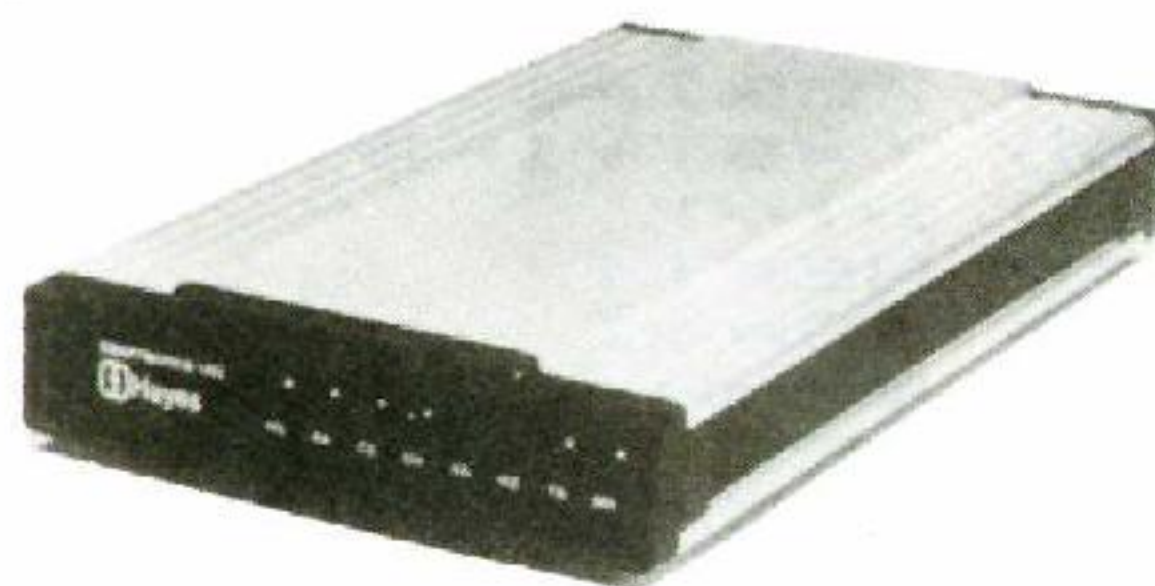


There are two types of modems available, one being a "DIRECT LINE" and the other being an "ACOUSTIC TYPE".

Direct line modems are the more reliable of the two, but they are pretty rare at the moment due to restrictions set by the post office.

The Post Office has to analyse each make and model of modems which are brought onto the market by examining how it was built etc, this can take up to six months to assess. Once the modem has been Post Office approved then it can be put out into the shops.

Direct line modems also require a Post Office telephone technician to install a telephone output jack onto your telephone.



A direct line modem with all the mod cons. (note the facial L.E.D.s to tell the operator what is happening).

Acoustic modems simply connect to your telephone hand piece via rubber cups. Unfortunately this type has certain drawbacks. It is prone to pick up room noise which can garble the received message, and the microphone in the handset itself is a source of noise at times (usually the most crucial time!!)



An example of an acoustic modem. Note the rubber cups where the telephone handpiece fits.

MODEM CONSIDERATIONS AND FEATURES

Full-Duplex modems	Will allow you to receive and send data at the same time it also 'echoes back' what you type at your keyboard, this means you can see on your screen exactly what the receiving computer sees (an error checking device.)
Half-Duplex modems	Allow only one signal at a time to come either from or to your computers.
Originate/Answer	This feature will let the operator send and receive calls.
Originate only	These feature will let the operator send and receive calls.
Auto dial	The ability to let the computer dial a computer number automatically from the keyboard.
Auto answer	The ability to let the computer answer calls and receive information while the operator is away.
Auto disconnect	Allows the computer to automatically 'hang up' the telephone line after a transmission has been terminated so as the line is free for more calls.
Intelligent modems	These can do a number of additional chores. For example, say you want to connect to an information service and either the telecommunications link or the ports o the service are all busy. The 'smart' modem will continue to dial until a connection has been made.

There are various modems on the market at the moment which will interface with the Sega Disc Drive unit because it has a RS-232. You can hire one from the Post Office, or you can buy one.

One modem in particular that is expecially suited to the Sega with disc drive is the VMD312 which is available from ASMAIL & ASNET for \$399.00. This modem comes complete with RS232 interface, Asynchronous operation, built in telephone jack, multiple speed selection, full duplex, Post Office approval for direct line, and

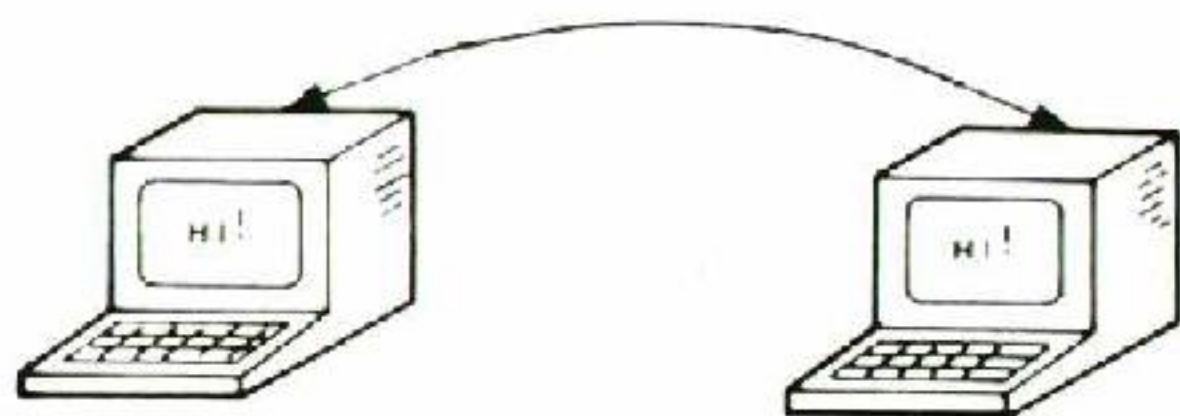
several visual display status indicators. If you have any Queries regarding this modem write to:

ASMAIL AND ASNETT
P.O. BOX 39159
AUCKLAND

Once you have a modem attached to your computer you can access databases, stock exchange rates, send a program to a friend in another country, etc etc, in fact the uses for a modem are just about limitless.

CONNECTING TWO COMPUTERS FOR FILES TRANSFER AND COMMUNICATION

It is often convenient to transfer files (data) between different computers via a RS232, particularly when there is no common disc or tape format between the two machines.



The SEGA RS232 interface will accept commands such as "COMLOAD"; "COMSAVE"; "COMSET"; "INPUT# 0," "PRINT# 0"

Comload will accept any program sent via an RS232 and "poke" the data into the memory, but unless the "basic" keywords are the same, then the program will not run.

Comsave allows you to send a program out the RS-232 to another computer or device. (this command is pretty standard)

Comset sets up what is known as the "Transmission Protocol". The Protocol determines how much data is sent at any given time and what sort of error checking is made. Refer to page 88 of the SF-7000 handbook. After reading this section of the book you may be wondering what 'Parity' and 'Data length' are. Parity is a method of error checking. What happens is that after the transmission of one set of data the number of "1" 's in that data are added up (Note. The data is in binary) and if the number is even eg 0, 2, 4, 6 and 8 and even parity is being used then no error has occured. Otherwise if the number of "1" is odd and even parity is being used then an error has occured in the transmission of the data and will force an error accordingly.

Data length is the number of bits (binary digits) sent at one time.

Lets assume we have a program on a Spectra-video computer and we wish to transfer it into our SEGA. Type in "COMLOAD" on the Sega (to receive information), then type in the appropriate command for sending information on the Spectra-video (in the case of the Sega it would be COMSAVE). The Sega "receive" light should come on, and after a short period of time we should have the program in memory. (providing the baud rate and protocol was the same for both machines.)

We can also get the computer to show us what is being sent as it is being sent, by typing in the following program.


```

10 FOR AD = &HF000 TO &HFFFF
20 A$ = INKEY$ : IF A$ = "" THEN 40
30 IF A$ = " " THEN END
40 DA = INP(&HE9)
50 PRINT CHR$(DA) : POKE AD, DA
60 NEXT AD

```

A small description of the following program is as follows:

Line 10 sets AD from &hF000 to &hFFFF (the area of memory where the data will be stored)

Line 20 to 30 checks to see if a key was pressed. If not then carry on with the program. If the space bar is pressed the end the program.

Line 40 reads the contents of the RS-232 buffer (ASCII code) and call it DA (short for DATA)

Line 50 prints DA then pokes DA in the address AD in the R.A.M. (AD=address).

Line 60 moves onto the next address location and starts again.

PRINT#0, n (where n can a variable or a string)

This command sends data out through the RS232 either in the form of a sting (n\$) or a numeric variable (n). If the data is a string then the computer changes it to ASCII. (the computer does not change 'n' because

numerics are already in ASCII code.), (see program below to demonstrate this.)

A small program to show how you can utilise this command. (as it is much too hard to explain!!)

```

10 cls
20 a$=inkey$: if a$="" then 20
30 a=asc(a$)
40 print a$;"=";a,
50 print#0,a
60 if inkey$<>"" then 60
70 goto 20

```

Line 10 clears the text screen.

Line 20 checks to see if a key was pressed. If so then assigns a\$ to that key.

Line 30 assigns the variable "a" to the numeric ASCII code of a\$.

Line 40 PRINT a \$ (the key which was pressed) then next to a\$ it will print the equals sign, then the computer will print the variable "a" (which has been assigned a value in line 30. The comma splits the screens (just to tidy things up a bit!)

Line 50 PRINTS# 0, a (remember a = ASCII).

So if we press the key marked "B" then the variable "a" will be 66. Then the computer will PRINT B=66 on the screen followed by a PRINT# 0,a.

RS-232C COMMUNICATIONS PROGRAM

This program will allow Sega's and Disc Drive to "talk" to each other.

```

10 GOSUB 240
20 GOSUB 300
30 CONSOLE 0,24,1,1,1
40 X=19:Y=16:X1=147:Y1=16
50 A$=INKEY$: IF A$="" THEN 160
60 SOUND1,1000,15
70 CURSOR X,Y: PRINT A$:SOUND0
80 X=X+4: IF X>=108 THEN X=19:Y=Y+6
90 IF Y>=170 THEN BLINE(9,11)-(118,179),
,BF: X=19:Y=16
100 C=ASC(A$)
110 IF C=13 THEN X=19:Y=Y+6
120 OUT &HEB,C
130 IF INP(&HE9)=151 THEN GOTO 160
140 A$=INKEY$: IF A$<>"" THEN 140
150 GOTO 50
160 REM==PLACE COMMENT ON SCREEN==
170 IF INP(&HE9)=149 THEN GOTO50
180 LET A=INP(&HEB)
190 IF A=13 THEN X1=135:Y1=Y1+6
200 CURSOR X1,Y1:PRINT CHR$(A)
210 X1=X1+4: IF X1>=236 THEN X1=147:Y1=Y1+
6
220 IF Y1>=170 THENBLINE (137,11)-(246,1
79),,BF: X1=147:Y1=16
230 GOTO 50
240 SCREEN 2,2:CLS
250 LINE (126,0)-(128,191),1,BF
260 LINE (8,10)-(119,180),15,B
270 LINE (136,10)-(247,180),15,B
280 COLOR 1,1
290 RETURN
300 DATA40A0E0A0A0,C0A0C0A0C0,60B0B0B060

```



```

,COA0A0A0CO,E080C080E0,E080C08080,6080A0
A060
310 DATAA0A0E0A0A0,E0404040E0,E040404080
,A0A0C0A0A0,80808080E0,A0E0A0A0A0,C0A0A0
A0A0
320 DATAE0A0A0A0E0,E0A0E08080,E0A0A0C020
,E0A0C0A0A0,60804020C0,E040404040,A0A0A0
A0E0
330 DATAA0A0A0A040,A0A0A0E0A0,A0A040A0A0
,A0A0404040,E0204080E0
340 DATA40A0A0A040,40C04040E0,C0204080E0
,C0204020C0,A0A0E02020,E080C020C0,E080E0
A0E0,E020404040,E0A0E0A0E0,E0A0E020C0
350 FORA=ASC("a")TOASC("z")
360 READ A$
370 PATTERN C#A,A$
380 NEXT A
390 FOR A=ASC("0") TO ASC("9")
400 READ A$
410 PATTERN C#A,A$
420 NEXT A
430 SCREEN 2,2
440 COLOR 1,14,(0,0)-(255,191),7
450 RETURN

```

DISSECTION

Line 10	Jump to the subroutine that starts at line 240. This sets up the original screen.	Line 120	Output the data to the RS232 port.
Line 20	Jump to the subroutine that starts at line 300. This routine sets up the little letters that are used in the display. The reason for the small lettering is to allow more text to be displayed at once.	Line 130	If some data is being received then go to line 160.
Line 30	Set the Sega to lower case.	Line 140	Wait until you have taken your finger off the key being pressed. You may wish to remove this line.
Line 40	Set original coordinates for where text is to be placed on the screen. X and Y hold the position of the out going texts screen posotion, whilst X1 and Y1 hold the position of the in coming texts position.	Line 150	Go back to line 50.
Line 50	Wait for a key to be pressed.	Line 160	From here to line 230 is the part to handle the incoming data.
Line 60	Make a beep to tell the user that a letter has been accepted.	Line 170	If no data is being received then go back to line 50.
Line 70	Place that letter at the X and Y coordinates. Switch off the sound.	Line 180	Let A take on the value of the incoming data. Note it is a number at the moment.
Line 80	make X point to the next point on the screen, ie: where the next letter is to go. If X is greater than 108 then move down a line, ie: the next letter will be off your section of the screen.	Line 190	If a CR has been received then move down a line.
Line 90	If you have reached the bottom of the screen then wipe clean your part of the screen, and start from the top again.	Line 200	Move to the location where the next letter is to be placed. Then print the information on the screen as a letter.
Line 100	Covert the letter you just entered to a number (ASCII number).	Line 210	Check for a letter 'falling' off the edge of the screen. If one is about to do so then move to the left hand side of the next line down.
Line 110	If you have pressed CR then move down a line.	Line 220	If the screen is about to be filled up then clear the screen and go to the top of the screen.
		Line 230	Go back to line 50.
		Line 240	— Line 290 Set up screen.
		Line 300	— Line 450 Define new small letters.

Note Do not press the shift key when entering data, as this leads to upper case letters being produced . . . and we don't want that!!!



DAZZLE DAZZLE DAZZLE

This program, although simple, is quite effective and can produce quite stunning results. Just run it and see the result.

If you like, try altering it to change colours at random times . . . or even create a few simple sound effects.

Here is how it works:-

Line 10-30 set up shapes for use in program.

Line 40 clear screen.

Line 50 fill screen with pattern number 250.

```

10 PATTERN#250, "FFFFFFF"
20 PATTERN#251, "EOEOEOEOEOEOEOEO"
30 PATTERN#252, "1C1C1C1C1C1C1C1C"
40 CLS
50 FORA=0TO21:CURSOR0,A:FORB=0TO36:PRINT
CHR$(250);:NEXTB,A
60 X=INT(RND(8)*25)+5:Y=INT(RND(8)*15)+5
: X1=1:Y1=1
70 R=RND(8):IFR<.6THENG=251:IFR<.3THENG=
252
80 CURSORX,Y:PRINTCHR$(G)
90 IFX=0ORX=35THENX1=-X1
100 IFY=1ORY=20THENY1=-Y1
110 X=X+X1:Y=Y+Y1:GOTO70

```

Line 60 set up original coordinates and original directions of shape. The original positions are random (X and Y) whilst the original directions are not (X1 and Y1).

Line 70 select a random shape to place on the screen.

Line 80-100 check if shape is about to hit edge of screen. If so make the shape bounce.

Line 110 actually move the shape on the screen. Loop back to the line 70.

Sound Effects

Just run the following program to get 9 wierd sound effects.

```

10 SOUND4,1,0:FORI=15TO0STEP-2:SOUND1,31
0*I+1,I:SOUND4,,I:SOUND1,1000-I*3,I:NEXT
:SOUNDO
20 SOUNDS,3,15:FORI=110TO110STEP-70:SOU
ND3,I,10:NEXT:SOUNDO
30 SOUND4,0,0:FORI=15TO0STEP-1:SOUND1,90
0,I:SOUND4,,I:NEXT
40 SOUND4,0,15:FORI=1TO15STEP.4:SOUND4,,
I:NEXT:FORI=15TO0STEP-1:SOUND4,,I:NEXT
50 SOUND1,,15:SOUND2,,15:SOUND3,,15:FORI
=2000TO1175STEP-75:SOUND1,I:SOUND2,2220-
I:SOUND3,(IXOR1100)+100:NEXT:FORI=15TO0S
TEP-1:SOUND1,,I:SOUND2,,I:SOUND3,,I:NEXT
60 SOUND3,,0:FORA=10000TO500STEP-330:SOU
ND3,A:SOUND4,3,15:SOUNDS,3,15:NEXT:FORI=
14TO0STEP-1:SOUNDS,3,I:NEXT
70 FORI=510TO4000STEP200:SOUND4,3,15:SOU
ND3,I,9:NEXT:FORI=15TO0STEP-.5:SOUND4,,I
:NEXT:SOUNDO
80 SOUND4,3,15:FORI=1TO20:SOUND3,RND(8)*
3000+500:NEXT:FORI=15TO0STEP-.3:SOUND4,,
I:NEXT
90 SOUNDS,3,15:FORI=1TO20:SOUND3,RND(8)*
3000+500:NEXT:FORI=15TO0STEP-.3:SOUNDS,,
I:NEXT

```


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