T.T.S. SEGA SC-3000
MAGAZINE

DEC/JAN 85

FREE PROGRAMS INSIDE!

SC·3000H
Personal Computer

ADVANCED GRAPHICS TUTOR

COMPETITION

*SEE INSIDE FOR DETAILS

CONTENTS

T.T.S. PHONE (02) 8311150
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MARAYONG   2148

TTS

T.T.S. Ph:(02) 344-8783

Welcome to Australia's first and only Sega magazine!

Firstly, we would like to apologize to everyone out there for the delay in releasing the magazine. The magazine was printed for NOV/DEC, but then THUNDER, LIGHTNING & CHAOS struck!! Yes, thats right! We had water damaged magazines everywhere. So it was back to square one, we had to get a new cover designed and update a few articles plus a very quick reprint!! But we did make it before christmas!

We know that this magazine will be a great success for you and us, because we give you room to say what you want about the Sega, plus we give you articles and program listings just for your Sega computer. To keep you thinking, we run competitions and quizes.

This month we are running a competition. To enter just write your name & address on a piece of paper (in BLOCK letters please!) and post to TTS with a listing of the equipment you have- eg; IIIA or IIIB basic cartridge, etc. There will be 10 lucky winners! Only one entry per person please! Post your entry to:
LUCKY DRAW, C/- TTS, P.O. BOX 486, COOGEE, NSW. 2034
First prize is a TTS gift voucher for $250, 2nd:$100, 3rd:$50, 4th to 10th:$25 each. The competition will be drawn at the end of feb 85! So rush your entry in now!

3

MARKET PLACE
SEGA SF-7000
Super Control Station

★ The new Sega Super Control Station opens a whole new world of computing fun and power. You plug it into the cartridge slot of your SC-3000 eliminating the need for the cartridge as you now have 64K of RAM memory on board the Control Station. Your BASIC language is automatically loaded into RAM from your master disk, supplied with the Control Station, on power up - to give you 22K free for your programs.

The Super Control Station is so called because it contians your 64K RAM, Centronics parallel printer port, RS-232C serial port for printers - telephone modems or other serial devices, plus the great new micro 3 inch disk drive by National.

The new disks are housed in a hard plastic case with a protective window which automatically snaps shut as the disk is removed from the drive, to protect your valuable programs from dirty fingers. This is a great improvement over the 5 1/4 inch floppy which is very vulnerable. Capacity is 312k formated double density using both sides or 156k per side. This is equal to approximately 200 pages of double spaced type. Write protect locking tabs are built in to the disk case for ease of use in preventing accidental erasure.

The drive motor is a long-life brushless direct drive type, so no maintence is required other than occasional head cleaning. The head uses the steel band driving method with to track accessing times of 3ms - which is twice as fast as most 5 1/4 drives.

Super Control Station
SF-7000

POWER   SEND   RECEIVE
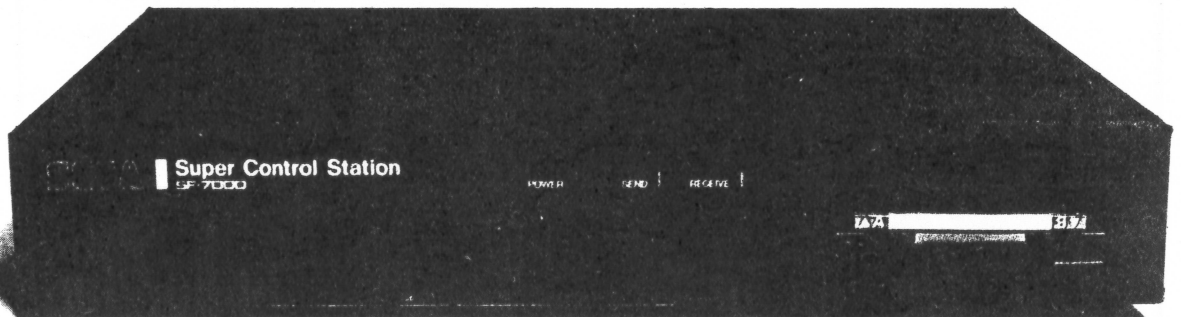
MARKET PLACE
SEGA SF-7000

The new disk basic adds quite a few new commands such as –

FILES   gives a disk directory.

CLOAD   load from cassette.

CSAVE   save to cassette.

MERGE   merge program from disk with one memory.

COMSAVE   save program via serial port.

COMLOAD   load program via serial port.

COMSET   set parameters of serial port.

SET   protect disk files.

KILL erase disk files.

LFILES   print disk directory to printer.

BOOT   load and auto run binary files.

OPEN open disk files for writing, reading or appending.

CLOSE   close disk files.

UTILITY   call disk format or copy routines.

PRINT #   print to disk or RS232C file.

INPUT #   input from disk or RS232C file.

EOF   check for end of disk file.

INPUT$ x1,#,x2   input string of x1 length from file x2.

PUT #   put one record to random access file.

GET #   retrieve one record to random access file.

NAME rename disk file.

At a recomended retail price of $599.00 the Super Control Station should prove very popular with Sega owners, and with the promised new disk based software including word processing, spread sheet, database filing programs, assembler/editor and the LOGO language it will become more so!

Files	Random Access		156K bytes on-line storage.
	Sequential		312K bytes total storage.
Micro disk drive	250K baud transfer rate.		Double density. 40 tracks.
	55mS average access time.		80mm x 100mm x 5mm disk cartridge.
	3mS track to track time.	Memory	64K bytes system RAM.
	Brushless direct-drive motor. (300RPM)	Expansion	16K bytes video RAM.
	Single sided.	Interfaces	Centronics and RS232C standard.
Micro disks	3″ (76.2mm) compact micro-floppy disks.	Dimensions	350mm x 260mm x 57mm. 3.7 kg.

5

A new game has emerged on the market recently in cartridge form, SAFARI RACER, sits you behind the wheel of a high speed rally car capable of 80 KPH in first gear and 300 KPH in top gear. It features excellent 3-D graphics abd is very entertaining for young and old. You must drive as fast as you can to your next checkpoint remembering to fill up with gas and dodge the wild animals that cross the road and also the rally cars you meet! The recommended retail price is $39.95

BUGS! BUGS!

SOLAR CONQUEST

It has come to our notice that there is a bug with the tape solar conquest! To rectify this, Load it and then type this:

```
168 BEEP:SD=SD+.0001:GOSUB16:GOTO345
```

and don't forget to press the (CR) key! We hope you enjoy this excellent game even more now!

GAMING AROUND

This is where we print your high scores on any SEGA SC 3000 or 3000H cartridge or tape.

We will also run a hard luck section for those who had their high score but never thought to get proof until it was way too late, or perhaps through someone elses bungling before getting the required proof.

Through the months we will run competitions for high scores on selected games. There will be great prizes and possibly exhibition play-offs. More about this in future issues. Look out for them!!

To enter in the high scores you must send:

1/: A clear photograph of you score. (Note if you are not using an instant camera it would be wize to take a few photo's of the screen to make sure you get a good print.)

2/: Your full name, address annd telephone number.

3/: A letter covering details of the game, ie: The name of the game; how many screens through the game you got; How many games you played to get good enough to get your high score; The score; And any other notes you wish to add.

4/: A list of SEGA soft and hardware you own.

BORDERLINE
CHAMPION GOLF
CONGO BONGO
DEMON GOBBLER
EXERION
MONACO GP
N-SUB
PACAR
POP FLAMER
SAFARI HUNTER
SEA FLIPPER
SINBAD MYSTERY
STAR JACKER
TRANSYLVANIA CASTLE OF HORROR
VERMIN INVADERS
VORTEX BLASTER

JOHN SANDS PRESS RELEASE

The superlative graphics capabilties of the new John Sands SEGA SC 3000H Personal Computer make it the ideal home entertainment centre of computer fun and games for all the family.

The SEGA computer is marketed in Australia by John Sands Electronics a division of John Sands Limited — a leading Australian company in the communications and leisure fields for more than 145 years, as well as being in the computer services industry since 1969.

The new SEGA SC 3000H, featuring hard sculptured keys in standard typewriter layout, 48K byte total RAM (Random Access Memory), 32K byte Read Only Memory, and a high level of implementation of BASIC language programming, is available from all retailers in Australia at a recommended price of $349.

The SC 3000H unit, produced in association with Sega Enterprises of Japan — one of the world's leading arcade games manufacturers, is supported by an excellent range of quality games software.

Among the many arcade quality games released by SEGA on cartridge for the SC 3000H home computer, are such well known games as "Exerion", "Pacar", Congo Bongo" and the highly acclaimed "Lode Runner". This last title to be released in Australia in November '84.

One of the interesting features of the SEGA games cartridges, according to Marketing Manager Michael McClelland, is that many have a minimum 16K ROM (Read Only Memory), or in some cases use a 32K ROM chip in games like "Star Jacker", "Sindbad Mystery" and "Champion Golf", to mention but a few.

"It is this high ROM content that gives the SEGA games their arcade quality, complexity, speed and excitement", he said, "while many other games on the market have only 2K to 5K of ROM and therefore cannot produce the same arcade quality excitement on a home television screen".

In the Sega range, there are maze games like "Safari Hunting", and the very popular "Sindbad Mystery" where the boy Sindbad follows the Treasure Map clues on the screen for the hidden treasure.

For the more warlike computer player, there are sea battles with "Yamato" and "N-Sub", land battles with "Boarderline", or war games in space with "Exerion" and "Star Jacker".

The armchair athlete is well catered for by John Sands with "Champion Tennis" and "Champion Baseball" where you can either play the computer, or you can play in a second joystick and compete with your family and friends.

8

JOHN SANDS PRESS RELEASE

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Another most enjoyable and extremely popular Sega release is the "Champion Golf" computer game allowing you to enjoy a golf day with your own caddie, hit the ball with the appropriate club, and play the fairways, greens, ponds and bunkers!

For the motorist, Sega has all the thrills of high speed motor racing through the streets of "Monaco GP", or the jungle roads with "Safari Race", (this last to be released October, 1984 in Australia).

"Pop Flamer" - a mouse with a flame thrower! and a computer pinball game called "Sega Flipper" are some of the other arcade games available now for the Sega computers.

Most Sega cartridges are available at a recommended retail price of $39.95.

Other variations (available on cassette at $19.95 RRP) in the fun and games arena for the SC3000H home computer are text adventures like "Environoid" and "Heroic Quest" to stretch the imagination as you tap out the clues on your Sega keyboard to reach strange and wonderful places. Strategy games, whether in the Delta galactic system of "Solar Conquest" or the dragon-filled caves of "Dragonquest", will keep your wits sharp.

Other games to tax your mind include a word-making game "Wordblock" for players of all ages, "Reverso" a game for one or two players on a field of 16 squares, a Sega version of the famous game "Blackjack", and a small business game "Ice Cream Stall" for one to 10 players from 5 to 90!

For something in the do-it-yourself range of home computer entertainment, John Sands Electronics have published the first volume in a series called "Great Programs for your John Sands Sega Personal Computer".

Volume 1, Number 1, in the series - a book of 44pp (recommended retail price $9.95) contains listings of some 20 or more programs which you can write straight into your Sega computer for hours of enjoyment and education.

John Sands
SEGA®

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9

If you have a problem with your Sega, then sent it to me, and I will do my best to answer them here.

TO: THE EDITOR C/-TTS, P.O. BOX 486, COOGEE. 2034.

Dear EDITOR,

My program does not work, I have tried everything but can not fix it. It keeps giving me a Syntax Error in line 50.

Can you please help me?

P K SMITH QUEENSLAND.

EDITORS REPLY:

(50 PI= 3.1416:A= COS(PI):PSET (A

The error in the above line causes a Syntax error because you have attempted to reprogram PI. The Sega computer already knows what PI is. Try PRINT PI (CR) key, and the computer will print the value of PI.

To fix this problem simply remove PI=3.1416 to make the line read:

50 A=COS(PI):PSET(A,B):RETURN

and this will fix it! And don't forget that whenever you need to use PI that the computer already knows it!

10

*** B A S I C   T I P S ***

One of the easiet ways of saving memory and make any
programs run faster is by not leaving gaps.
Example: Before; 10 CLS : A = B + 50 : PRINT A
After mods; 10 CLS:A=B+50:PRINTA

I have noticed that some people who type in programs for
the Sega use the statement LET. This statement is not
necessity.

To clear things on Screen 2, use the BLINE statement.
EXAMPLE:

```
10  SCREEN2,2:CLS
20  FORZ=1TO1000
30  CURSOR20,20:PRINT Z
40  BLINE(15,15)-(50,35),,BF
50  NEXT:END
```


We hope that we have helped someone out there and if any
of you have any problems concerning BASIC programming
don't hesitate to write and ask.
BASIC TIPS C/-TTS
P.O. Box 486,
COOGEE, N.S.W. 2034.

12
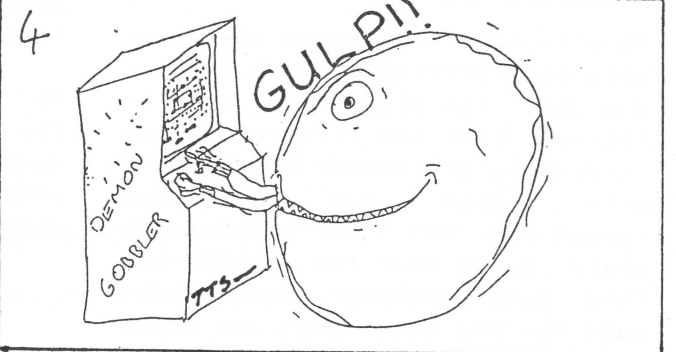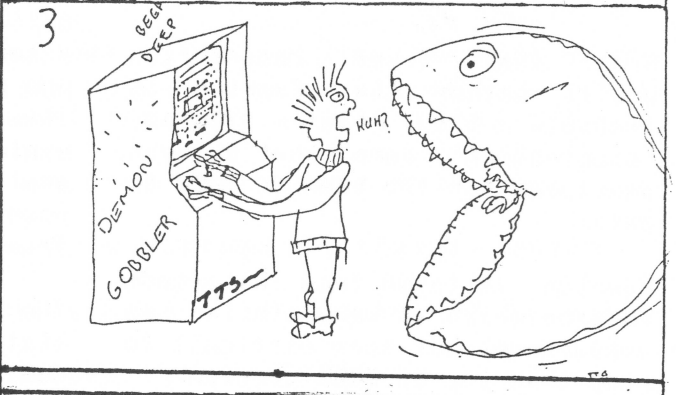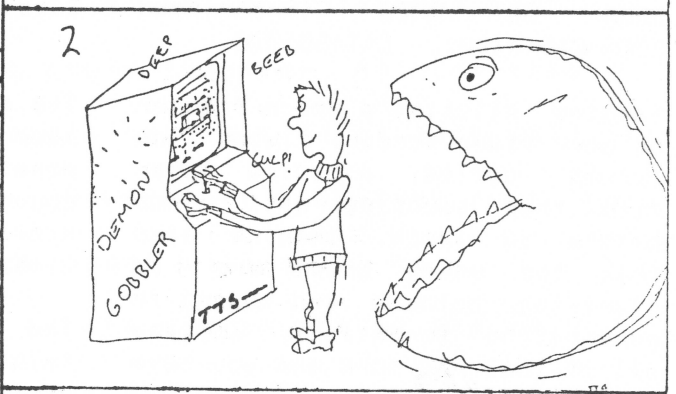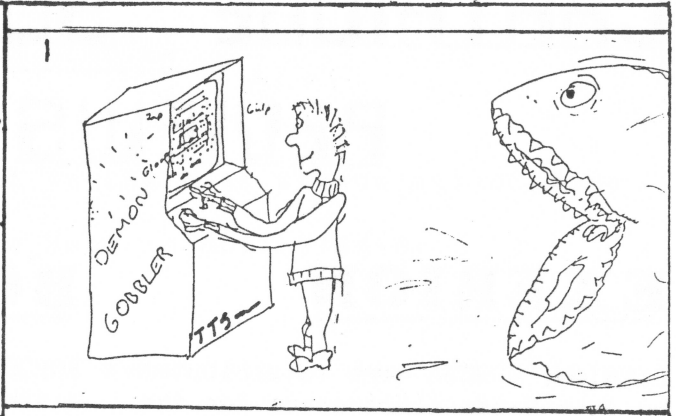
CARTRIDGE SOFTWARE
REVIEWS

EXERION

EXERION, a SEGA game distributed by John Sands Electronics for the SEGA SC 3000 (pronounced EGGS-EAR-RION). CAT:SG1028

Imagine piloting a space fighter on your video screen, flying low across cities, avoiding laser fire, then swooping off to do battle in space. Imagine also that the enemy ships are in startling colours and moving in penetrating formations. Imagine all of that and more and you have Exerion

From that brief description you'll gather that Exerion is probably the best flying, 'shoot-em-up' game that's been developed for the SEGA SC 3000 to date.

Exerion is taken from the arcade version which is very similar in appearance, but more difficult to play than the SC 3000 version.

As with most SEGA games the play gets more difficult the futher on you get. The player will find in Exerion that the first couple of formations are easier to contend with than the following formations, for this reason a tip would be to save the machine-gun fire laser (whose charge runs out) for the tough guys and shoot the easier formations with the single-shot laser, as it lasts indefinatly.

BORDERLINE

BORDERLINE, a SEGA game distributed by John Sands Electronics for the SC 3000. CAT:SG1001

The player, who controls an army Jeep in this game, is to penetrate enemy forces and, of course, to acheive as higher score as possible while doing so, without runnng out of fuel.

The first frame is a road that twists and winds it's way through enemy territory. Enemies 'peel off' the sides of the road and attempt to blow you up. After you pass by these, you move into the second frame where you must explode through a patrol of tanks and armoured cars and destroy a power station to get to the next frame.

The next three frames are stationary, and the object is to destroy the power stations, whose positions get more and more fortified each time.

As with the usual SEGA standard the graphics are excellent, the game is playable, and it increases in difficulty as it proceeds.

TAPE GAME REVIEWS: VORTEX BLASTER

This game without a doubt is the best arcade action game available on tape for the Sega in Australasia.

The object of the game is to penetrate as far into the Vortex field as you can! This includes 5 stages with just about everything you could imagine! All the time you must bomb the fuel depots on the side of each wall to keep your fuel supply up. Beware, if your fuel runs low then your anti-gravity equipment will start to malfunction and you will be dragged to one of the walls and crash! You also have a shield level which, when you get hit will decrease in power. Under this there is your crafts laser heat which will increase as you fire. If the heat level gets to high then your craft will destruct! Under this there is a stage indicator, which as you proceed through the stages will update. Also when the laser heat get near danger level a warning siren starts.

Also if you are running a IIIB cartridge you will hear the words RED ALERT boom out of your televisions speakers! The whole time this has been going on, numerous amounts of ground targets have passed which can

ground targets have passed which can be blown up, along
with the snake machines on the side of the walls.

Now that that is sorted out we only have the objects that
we encounter when going through the stages.

STAGE 1: This stage comprises of what we have aleady
talked of.

STAGE 2: This stage comprises of the same as stage 1,
except you have UFOs attacking you from all directions.

STAGE 3: This is the same as stage 1 except you have
meteors coming towards your craft which you must avoid.

STAGE 4: This is the same as stage 1 except you have
Alien fighter craft attacking you.

STAGE 5: Same as stage 4, but this time the Alien fighter
craft are firing guided missiles at you. Also at the end
of this stage you must destroy the Alien Central Command
Base which hovers just above the surface. If you
succeed, then you will start again at a higher skill
level. However if you miss it then you will crash into
the force field that surrounds it.

SEGA UNLOCKED!!

&H0000 to &H7FFF Rom Routines

This area is exclusively for read out. Poke command is unusable.

Hexidecimal Address	Nature of Routine
10C0-17BF	VDP Character Table (8x8)
17C0-19FF	Basic Key Word Table
1CB1	Determination of the number of free bytes
2310	Places the next character into the DE register
2400	Writes the character in the A register to the video screen
2BD4 (2BD1)	Reads 80 bytes of data from the VRAM at address & H1800 into address & H9364: read 80 bytes from & H8B36 to video ram address & H1800: moves 80 bytes from & H9634 to & H8B36
2C2A (2BCE)	Reads the data from VRAM
2C32 (2BCB)	Writes the address in HL register to the VDP for VRAM reading
2C3D (2BC8)	Writes the data to VRAM
2C44 (2BC5)	Writes the address in HL register to VDP for VRAM writing
2C51 (2BC2)	Reads the VDP Status register
2C54 (2BBF)	Writes to the VDP register. Register in C, data in A
3604	Hexidecimal Conversion
3A03	Delay using the BC register
3A12	Writes a byte to the tape

Hexidecimal Address	Nature of Routine
3B33	Writes 8 bytes from address & H9413 to the VRAM
3D32	Accessing of screen 1,1
3D90	Accessing of screen 2,2
3DEE	Text and graphics screens
3FA0-411F	Keyboard characters arranged in a matrix form
4120-4258	Basic keyboard symbol table
4590	Resets the time $ to "00:00:00"
4756	Changes the cursor to the graphics mode
475E	Changes the cursor to the normal mode
4766	Lower case input
476E	Upper case input
4918	Inkey$
4A6F	Write the text pointed to in the HL register to current screen position
6800	Restart from 00H
6803	Restart from 38H
6806	NMI Entry
6809	Self-diagnostic routines RAM failure (single beep)
680D	Self-diagnostic routines ROM failure (double beep)
6811	Self-diagnostic routines VRAM failures (triple beep)
6AB5	Print FRE routine
6C37	Run routine
73B7	Error determination
73E8-7676	Error messages
779F	Verify routine

17

Hexidecimal Address	Nature of Routine
77F7	Skip program
7822	Found program
785D	Verifying end
788F	Verifying error
78D5	Load routine
78FD-790E	Compare file names
792B	Skip program
7956	Found program
7982	Load program
79AA	Loading end
79E9	Tape read error
7A40	Save routine
7A59-7A85	Save file name
7A94	Save number of bytes
7AB9	Save sync bytes
7AD2	Save program
7AED	Saving end
7B07	Write HL register to the tape
7B13	Pad file name with blanks

Ram Routines

8160/8161	Start of the basic program
8162/8163	End of the basic program
8164/8165	String storage pointer
8166/8167	Top of string storage
8168/8169	Top of memory pointer
82A2	Program found flag, 0= found program
82A3	File name being loaded from the cassette (16 bytes)
83A3	File name being saved on the cassette (16 bytes)

Hexidecimal Address	Nature of Routine
8B36	&H80 bytes. Writes to VRAM &H1800 onwards
9336	Screen control
9339	Colour of the text screen
933A	Colour of the graphics screen
936A	(&H80 bytes VRAM stores &H1800= here) stores PH80 bytes of VRAM here which is then copied to VRAM &H1800
9411	Top of cursor range
9412	Bottom of cursor range
9413	8 bytes for storage of PATTERN command
9420	&H28 bytes for storage of VRAM date
9460-9480	INKEY$ Storage area
9484	Cursor control, 0=normal, 2=graphics
9485	Keyboard control 1=lower case, 0=upper case
9486	Key beep, 0=beep, 1=beep off
9489	Cursor position (X value)
948A	Cursor position (Y value)
948E	Time$ seconds
948F	Time$ minutes
9490	Time$ hours
9744/9745	Address of DATA byte

( ) Refers to the jump table address which calls the routine.

CHRISTMAS & NEW YEAR SPECIALS!!

John Sands Sega SR1000 Data Recorder.

The Data Recorder is extremely reliable, of very high quality and has been specifically developed for use with the John Sands Sega computer. It is considered to be twice as fast as most other data recorders and has features which include tape counter, SAVE button, LOAD button, REWIND and FAST FORWARD controls and a two function STOP/EJECT button. The John Sands Sega SR1000 lets you store and recall programs, music and any data which you have saved yourself – on ordinary audio cassette tape. The in-built automatic level control circuit has pre-set tone and volume levels which self-adjusts the recording load level to the exact requirements of the computer.

- Pre-set tone and volume controls.
- Automatic Start/Stop when saving.
- Automatic level control.
- Tape counter for faster program access.

~~$99~~

$95

John Sands Sega Steering Wheel/Accelerator.
- Steering Wheel control.
- Hand accelerator.
- 2 independent control buttons.
- Great dashboard styling.

John Sands Sega Joystick.
- Tough.
- Arcade style.
- Two, independent, fire buttons.
- Immediate, positive response.

$39

$27

John Sands Sega SF7000 Super Control Station/Disk Drive.

- Total technology 3 inch micro disk drive.
- 156K bytes working capacity. 312K bytes storage capacity.
- High speed. (Baud transfer rate 250K).
- RAM Memory expansion 80K bytes total RAM.
- Centronics and RS232C interfaces.
- Extended BASIC language.

The Sega SF7000 Super Control Station/Disk Drive is a complete expansion system, using the latest 3 inch (76.2 mm) compact Micro Disk – which has a very high capacity, and even higher speed than the old 5.25 inch floppy disks.

Each 3 inch disk can hold up to 312K bytes (319,488 characters) of user formatted storage – which is equal to 200 quarto pages of double spaced type – and probably far more than you'll ever use in a purely home computing environment – but very handy to have!

With this super control station/disk drive attached to your John Sands Sega computer, you have a very powerful 80K of RAM. This puts you into a vast area of powerful programs for use in the home and personal business environment. You can also transfer your own cassette programs to the disk to gain all the benefits of disk usage.

Disks are extremely fast and allow you to merge various types of programs with each other, to LOAD, SAVE, READ, WRITE and APPEND all kinds of data and information files, spreadsheets (columns of figures or data under separate headings across the page), and so on – in a split second.

The John Sands Sega Super Control Station/Disk Drive unit has an in-built Centronics standard interface. This allows you to connect high speed dot matrix printers, ink jet and thermal printers – or daisywheel printers for letter quality printing. Your Sega control station/disk drive really is a sophisticated piece of componentry and offers far more than conventional disk drive units. It also has a built-in RS232C standard interface which connects to serial printers and many computer peripherals or accessories – including modems and acoustic couplers for communicating with private and public data bases as we mentioned before. You have total flexibility – total control.

~~$588·00~~

$578·00
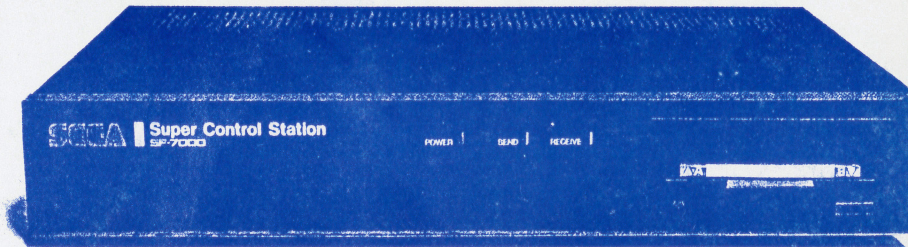
John Sands Sega SP400 Plotter/Printer.

~~$329·00~~

$305·00
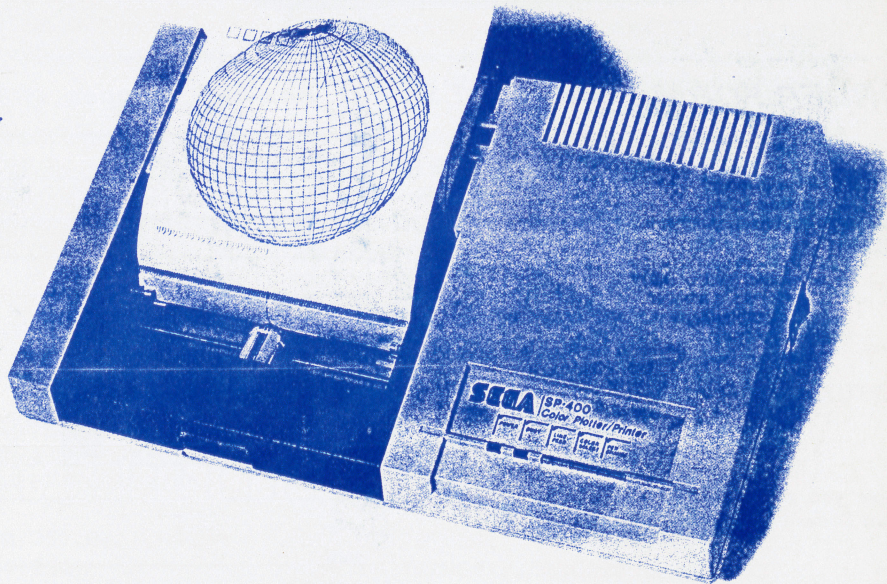
- High resolution plotting.
- Four colors.
- Multi-directional printing.
- Programmable character size

A high quality, 4 color plotter/printer – using black, red, green and blue inks. Prints 38 characters per line on standard roll paper (4.5 inches wide x 180 feet length). The character printing size can be programmed from 1.5 mm x 1 mm to 78 mm x 52 mm.

Simply plugs into the back of your John Sands Sega computer, and on the instruction LPRINT will print anything you command. The quality of printing enables you to produce incredibly detailed graphics of superb resolution, letters and numbers. All in either one, two, three or four colors.

The printer will generate graphs, fully dimensional perspectives, charts and as many visual displays as your imagination can create.

It will function as a word processor, note writer, or program listing device. Which is all part of the total technology system.

SURPRISE!!

Some people will just about type

anything in! So, start typing!

```
10  SCREEN2,2:CLS:MAG3:GOSUB2500:UX=100
:H=15:UY=100:TIME$="00:00:00"
45 REM
50  I$=INKEY$:JX=UX:JY=UY:IFI$=CHR$(28)
THENUX=UX-3:IFUX>142THENUX=142:GOTO400

55  IFI$=CHR$(29)THENUX=UX+3:IFUX<60THE
NUX=60:GOTO400
60  IFI$=CHR$(31)THENUY=UY-3:IFUY>135TH
ENUY=135:GOTO400
65  IFI$=CHR$(30)THENUY=UY+3:IFUY<26THE
NUY=26:GOTO400
70  IFI$=" "THENSOUND4,1,8:COLOR5:LINE(
56,100)-(115,48):LINE(175,100)-(115,48
):BLINE(56,100)-(115,48):BLINE(175,100
)-(115,48):BLINE(190,40)-(250,50),,BF:
CURSOR190,40:PRINTCHR$(16);TIME$:GOSUB
500:SOUND0
25 GOTO400:GOTO45
400  UX=UX+INT(RND(1)*8)-3:UY=UY+INT(RN
D(1)*8)-3:IFUY>1350RUY<200RUX>1450RUX<
52THENUY=JY:UX=JX
420 GOSUB610:GOTO45
500  IFUX<116ANDUX>90ANDUY>20ANDUY<36TH
ENSC=SC+25:UY=115:UX=55:JY=UY:JX=UX:BL
INE(185,170)-(250,180),,BF:CURSOR185,1
70:PRINTCHR$(17);SC
501 H=H+8:SPRITE11,(100,35),0,1:CURSOR
20,H:PRINTCHR$(17);CHR$(250)
502 IFH>175THENCURSOR62,173:PRINTCHR$(
17);"GAME OVER":COLOR14:CURSOR56,183:P
RINTCHR$(16);"PRESS <SPACE> TO END":GO
TO510
504 RETURN
510 SOUND0:I$=INKEY$:IFI$<>" "THEN510
511 GOTO10
610 SPRITE12,(UX,UY),4,4:RETURN
```
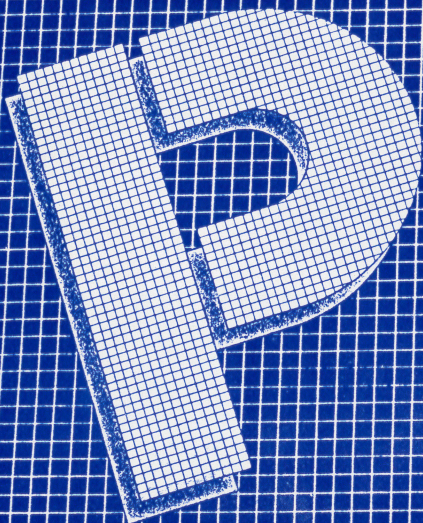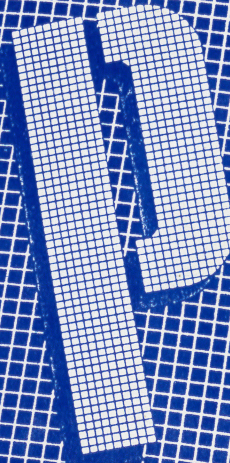
```
2500  GOSUB3000:COLOR0,1,(0,0)-(255,20)
,4:COLOR0,1,(0,0)-(50,191),4:COLOR0,1,
(50,191)-(255,170),4:COLOR0,1,(178,20)
-(255,170),4:COLOR0,14,(60,20)-(175,17
0),4:COLOR0,12,(185,15)-(238,28),4
2501  SPRITE11,(100,35),0,1:COLOR11:CUR
SOR190,20:PRINTCHR$(17);"TIME":COLOR14
:CURSOR191,20:PRINT"TIME":CURSOR190,40
:PRINTCHR$(16);TIME$
2502  CURSOR51,4:PRINTCHR$(17);"STELLAR
 WAR":CURSOR52,4:PRINT"STELLAR WAR":CU
RSOR7,6:PRINTCHR$(16);"SHOTS":CURSOR8,
6:PRINT"SHOTS"
2504  CURSOR185,160:PRINTCHR$(17);"SCOR
E":CURSOR185,170:PRINT"0000"
2999  RETURN
3000  PATTERNS#0,"11214181000001F3"
3002  PATTERNS#1,"0100008141211100"
3004  PATTERNS#2,"100804020000009E"
3006  PATTERNS#3,"0000000204081000"
3010  PATTERNS#4,"060E0E0C0C1C1713"
3012  PATTERNS#5,"13171C1C0C0E0E06"
3014  PATTERNS#6,"181C1C0C0CCEFA32"
3016  PATTERNS#7,"32FACE0E0C1C1C18"
3020  PATTERNS#8,"000000000003060C"
3022  PATTERNS#9,"18306143464C5870"
3024  PATTERNS#10,"000C1C38F0A02020"
3026  PATTERNS#11,"60C0800000000000"
3030  PATTERNS#12,"0000000000000103"
3032  PATTERNS#13,"070F1E3638302000"
3034  PATTERNS#14,"000000000040C000"
3036  PATTERNS#15,"8000000000000000"
3999  RETURN
```

MACHINE CODE part I (ADVANCED GRAPHICS)

In this first part we are going to learn a bit about
creating graphics in machine code.
What is machine code?
Machine code is the internal language used by any
computer. The Sega uses a Z-80 machine code. When you
type in a BASIC program the computer must decode this
into the machine code equivalent, therefore BASIC is
slow. However, when we write a program in machine code,
we are giving the computer direct commands. Machine code
runs about 350 times faster than BASIC!
In machine code we will be using the BASE-2 (BINARY CODE)
and BASE-16 (HEXIDECIMAL) number systems.

BASE 2	BASE 10	BASE 16
BINARY	DECIMAL	HEXIDECIMAL
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F

BINARY (BASE 2)

BIT #	7	6	5	4	3	2	1	0
VALUE	* 128*	64 *	32 *	16 *	08 *	04 *	02 *	01 *
	* 0 *	0 *	0 *	0 *	0 *	0 *	0 *	0 *

Where 0=off & 1=on

Therefore the value of 10100000 will have a decimal value
of 160, because bit 7 & 5 are on (1), so the decimal
result is 128+32 (160). Where a "1" occurs, the decimal
value is added, while all "0" are not added. There are 8
bits in each byte, each bit can be a 0 (off) or 1 (on), a
byte can represent a value from 0 to 255.

HEXIDECIMAL (BASE 16)

Binary numbers of 8 bits (1 byte) get very messy to use
in decimal, so a method was developed, in which binary
numbers are represented in Hexidecimall, also known as
HEX for short.

Addressing Video Ram (VRAM)

The video ram on the Sega can not be addressed direct.
To address the VRAM, we must use ports. The VDP (Video
Display Processor) is mapped at two ports, these are
&HBE (DATA) and &HBF (COMMAND). The VDP incorporates
eight (8 bit) write only registers and one (8 bit) read
only register and a 14 bit autoincrementing address
register.

These registers are as follows:
REGISTER 0: Mode select (M3) controls the format of the
display screen. This is combined with M2 & M1 of
register 1 to select the screen layout (see table X1)
* 7 * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
* 0 * 0 * 0 * 0 * 0 * 0 * M3* 0 *

REGISTER 1: Controls the VRAM type, the blanking out of
the active display area, Interrupt enable/disable
, M1 & M2 and the Size & Mag factor for any sprites.
The Sega is set to the following on power up:
VRAM bit = 1 for the 4116 type, Blank bit =1, Interrupt
enable (50Hz)=1, Screen mode = text, Size =0 and Mag =0
SIZE: This bit selects if the sprite is to be 8 x 8 or
16 x 16
MAG: If bit is set to 1 then all sprites are displayed
double sized. If this bit is 0 then normal size.
(See table X2).
* 7 * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
*16K*BLK* IE* M1* M2* 0 *SIZ*MAG*

REGISTERS # 2,3,4,5 & 6 are set up by the sega on power
up. We will explain these registers in future parts.

REGISTER 7: Contains the Colors for the write/backgroung
colors on the text screen, etc.
* 7 * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
*   WRITE COLOR   *BACKGROUND COL.*

STATUS REGISTER: This contains the Interrupt flag, the
fifth sprite flag and number and the sprite collision
flag.
* 7 * 6 * 5 * 4 * 3 * 2 * 1 * 0 *
* F * 5S* C *FIFTH SPRITE NUMBER*

In part two we will list a machine code subroutine to
update a VDP register.

VRAM memory map

Pattern Generator Table: &H1800
These addresses store the eight bytes that are used to
compose a character. On power up the Sega loads the
patterns for the text characters from ROM address
&H10C0 into this table.

Sprite Generator Table: &H1800
These addresses store the eight bytes for each sprite,
as defined by the Basic command PATTERN. This area
also contains the data for the text mode characters.
The Sega swaps them over as required by the ROM routine
at address &H2BD4.

GRAPHIC NAME TABLE: &H3800
These are 8 bit pointers which point to the specific
pattern required.

SPRITE ATTRIBUTE TABLE: &H3B00
Starting at &H3B00 are four bytes for each sprite.
Each group of four bytes controls the X and Y position,
sprite number and color. Sprite 0 has the first four
bytes, sprite 1 has the second group of four bytes,
etc.

BYTES #
1 Y POSITION
2 X POSITION
3 SPRITE NUMBER
4 EC 0 0 0 COLOR

EC=0 Normal, If EC=1 then the sprite will be shifted
32 pixels to the left.
COLOR: 4 Bits, selects the color for the sprite. (See
table X3).

TABLE X3:
0000 (0)=Transparent	1000 (8)=RED
0001 (1)=BLACK	1001 (9)=LIGHT RED
0010 (2)=GREEN	1010 (A)=DEEP YELLOW
0011 (3)=LIGHT GREEN	1011 (B)=LIGHT YELLOW
0100 (4)=DARK BLUE	1100 (C)=DARK GREEN
0101 (5)=LIGHT BLUE	1101 (D)=MAGENTA
0110 (6)=DARK RED	1110 (E)=GREY
0111 (7)=CYAN	1111 (F)=WHITE

```
┌─────────────────────────────────────┐
│ SCREEN 2 (GRAPHICS MODE)             │  &H0000
│ PATTERN TABLE                        │           VRAM MEMORY MAP
│ 6144 BYTES                           │
│                                      │
│                                      │
│                                      │
│                                      │  &H17FF
├──────────────────────────────────────┤ &H1800
│ TEXT MODE (PATTERN GEN TAB           │
│ SCREEN 2 (SPRITE GEN TAB)            │
│ 2048 BYTES                           │  &H1FFF
├──────────────────────────────────────┤ &H2000
│ SCREEN 2 (GRAPHICS MODE)             │
│ COLOR TABLE                          │
│ 6144 BYTES                           │
│                                      │
│                                      │
│                                      │  &H37FF
├──────────────────────────────────────┤ &H3800
│ SCREEN 2                             │
│ GRAPHIC NAME TABLE                   │
│ 768 BYTES                            │  &H3AFF
├──────────────────────────────────────┤ &H3B00
│ SPRITE ATTRIBUTE TABLE               │
│ 128 BYTES                            │
├──────────────────────────────────────┤
│ EMPTY                                │  &H3BFF
├──────────────────────────────────────┤ &H3C00
│ SCREEN 1 (TEXT MODE)                 │
│ 40 x 24lines                         │
│ 960 BYTES                            │
├──────────────────────────────────────┤
│ EMPTY                                │  &H3FFF
└──────────────────────────────────────┘
```

23

```
TABLE X1:
M1 M2 M3   SCREEN TYPE
0  0  0    Graphics mode I (32 x 24)
0  0  1    Graphics mode II(256 x 192)
0  1  0    Multicolor mode (64 x 48)
1  0  0    Text mode       (40 x 24)


TABLE X2:
SIZE MAG   BIT SIZE   SEGA MANUAL
0    0     8 x 8      MAG 0 single sprite
1    0     16 x 16    MAG 1 four by four sprite
0    1     8 x 8      MAG 2 double mag 0
1    1     16 x 16    MAG 3 double mag 1
```

Due to space allotment in this issuepart II we will
demonstrate high speed graphics! Please note that you
will require a monitor to type in any machine code
routines that we list. If you do not have a monitor
then you may obtain one at the special price of $15.00,
this includes pack & post, etc. Send to:
T.T.S.
P.O. Box 486,
COOGEE, NSW. 2034.

Please note: All cheques, etc to be made out to TTS or
TRIDENT TECHNOLOGICAL SYSTEMS. You may send Cheque,
Money Orders, Bankcard or Mastercard. For Bank or
Master Cards write down the number, exp. date and
signature on a piece of paper.
DO NOT SEND CASH!!

PROGRAMS

Dice Roll.

Tic Tac Toe.

U.F.O. Attack!!

Genius!

Jackpot!

Sound Effects!

```
UND2,3112,
XTJ:REM*************
 60 FORI=110TO1000STEP5,
UND4,0,15:NEXT:SOUND0:
 70 FORI=800TO          STEP-10:S.
XTI:SOUND4,           0:SOUND0=0TO35
 0:REM*************
 80 FORJ=1TO9:SOUND1,120
SOUND0:NEXTI:NEXTJ:SO
 90 FORJ=1TO4:FOP
 1,I,15:NEXTI
 100 C
```

```
 FORI=2000TO3000STEP150:SOUN.
RND(1)*I)+1010,15:NEXTI:REM     CO
 160 FORI=450TO900STEP              SIR·
XTI:FORI=900TO450STEP-         :SOUND1,I,15
EXTI:SOUND0:REM
 260 FORI=15TO0STEP-.3:SOUND4,2,I:FOR
1TO10STEP5:NEXT:SOUND0  :REM
 '70 FORI=990TO210STEP-25:SOUND0:NE
UND4,I,10:SOUND2,I+100,15:SOUND0:NEX
:FORI=210TO990STEP25:SOUND1,I,10:SOU
4,1,10:SOUND2,I-100,15:SOUND0:REM
 FORI=550TO530STEP-81:SOU
```

```
 20 FORS=1600TO800S
XTS:SOUND0:FORS=15TO
ND(1)*I=200p
:NEXT.I)
```

```
SPRITE7,(215,
SPRITE3,(120,140)
(2),0,1:SPRITE11,
(0),0,1:REM
 CULOR10,1
45:PRINT"1"
790 PRINTCHR$(
800 CURSOR185,4
CURSOR55,95
OR115,95
95
```

```
 0 CLS:PRINT"JACKPOT!!
$$$$$
 MAG1:SCREEN2:COLOR1,15,,15:CLS
 -50:FORZ=1TO4:X(Z)=(2*20)+30:C(Z
3:NEXT
ATTERNS#0,"00001C3E7F2F7F7F
TERNS#1,"3F1F0F0703010000
ERNS#2,"000382CFEFEFEFE
RNS#3,"0000382C70030100000
RNS#4,"FCF8F0E0C0800000
NS#5,"0307070319303F3F
S#6,"3D1901010101010
#2:"C0E0E0C0988CFCFC
#9:"8C988080800C0C0E0
9:"010101010101010
3:"0307070700F0F0F
```

```
 1880
 1:LIN
 1890 F
 100:F
 1900 FOR
 115:(I,10
 1910 CURSO
 R11:PR
 $5
```

```
10 FORI=250TO110STEP-10:SOUND1,I,10:SO
UND4,1,12:SOUND2,I+50,8:SOUND0:NEXTI:S
OUND0:REM*************     DYING
20 FORS=1600TO800STEP-8:SOUND1,S,15:NE
XTS:SOUND0:FORS=15TO
```

```
130 SOUND3,180,0:SOU
000:NEXT0:SOUND0:REM

140 FORS=1TO5:FORF=1
260 1   E:NEXTF:S
```

Genius!?

HERE IS A REAL GREAT PROGRAM!!!

SAVE YOURSELF $$$ AND TYPE THIS INTO YOUR SEGA

COMPUTER!! HEAPS OF FUN FOR THE WHOLE FAMILY!!

WITH VARIOUS SKILL LEVELS, CAN YOU BECOME A GENIUS??

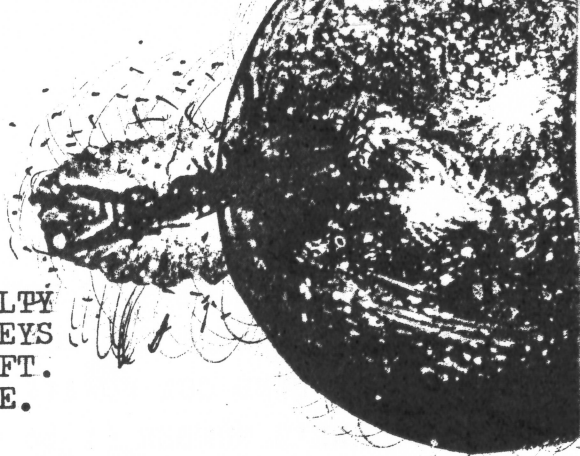or WILL YOU DROP OUT AT BEING A DUNCE?? THE LEVEL

OF PLAY DETERMINES THE REACTION TIME. THE FOUR ARROW

KEYS ARE USED TO FOLLOW THE COMPUTERS PATTERN.

```
10 PATTERNS#0,"FFFFC0C0C0C0C0C0"
20 PATTERNS#1,"C0C0C0C0C0C0FFFF"
30 PATTERNS#2,"FFFF030303030303"
40 PATTERNS#3,"030303030303FFFF"
50 PATTERNS#4,"FFFFFFFFFFFFFFFF"
60 PATTERNS#5,"FFFFFFFFFFFFFFFF"
70 PATTERNS#6,"FFFFFFFFFFFFFFFF"
80 PATTERNS#7,"FFFFFFFFFFFFFFFF"
90 CLS:PRINT"RANDOMIZE!":D$="":FORZ=1T
0100:GOSUB340:D$=D$+CHR$(C):NEXT
100 MAG3:CLS:PRINT"GENIUS":PRINT:PRINT
"WHAT LEVEL OF DIFFICULTY WOULD":PRINT
"YOU LIKE TO TRY HARD 1-9 EASY? ";
110 I$=INKEY$:IFI$<"1"ORI$>"9"THEN110
120 PRINTI$:FORI=200TO1500STEP50:SOUND
1,I,12:NEXT:SOUND0:DI=VAL(I$)
130 CLS:SCREEN2,2:COLOR15,1,,1:CLS:PRI
NTCHR$(17);"  G E N I U S";CHR$(16);"
  LEVEL ";DI
140 FORK=1TO100:BLINE(85,100)-(150,120
),,BF:CURSOR93,112:COLOR13:PRINTCHR$(1
7);"PLAY";CHR$(17):FORS=1TOK:SPRITE0,(
100,50),0,5:SPRITE1,(100,150),0,10:SPR
ITE2,(50,100),0,2:SPRITE3,(150,100),0,
8
150 F=ASC(MID$(D$,S,1)):ONFGOTO160,170
,180,190
160 SPRITE0,(100,50),4,5:SOUND3,150,15
:GOTO200
170 SPRITE1,(100,150),4,10:SOUND3,300,
15:GOTO200
180 SPRITE2,(50,100),4,2:SOUND3,500,15
:GOTO200
190 SPRITE3,(150,100),4,8:SOUND3,800,1
5
```

```
200 FORDL=1TODI*8:NEXTDL:SOUND0
210 NEXTS:GOSUB230:NEXTK
220 GOTO220
230 BLINE(85,100)-(150,120),,BF:CURSOR
85,105:COLOR13:PRINTCHR$(17);"INPUT";C
HR$(16):FORCT=1TOS-1:T=0:SPRITE0,(100,
50),0,5:SPRITE1,(100,150),0,10:SPRITE2
,(50,100),0,2:SPRITE3,(150,100),0,8
240 T=T+1:I$=INKEY$:IFI$=""ANDT<DI*8TH
EN240
250 IFT>DI*8-1THEN360
260 I=ASC(I$):IFI<280RI>31THEN240
270 ONI-27GOTO310,300,280,290
280 I=1:SPRITE0,(100,50),4,5:SOUND3,15
0,15:GOTO320
290 I=2:SPRITE1,(100,150),4,10:SOUND3,
300,15:GOTO320
300 I=3:SPRITE2,(50,100),4,2:SOUND3,50
0,15:GOTO320
310 I=4:SPRITE3,(150,100),4,8:SOUND3,8
00,15
320 FORDL=1TODI*5:NEXT:SOUND0:CH=ASC(M
ID$(D$,CT,1)):IFCH=ITHENNEXTCT:RETURN
330 GOTO360
340 C=INT(RND(1)*5)+1:IFC>4THEN340
350 RETURN
360 SCREEN1,1:CLS:PRINT"YOU LOSE!!":PR
INT"YOU SKILL LEVEL IS";S:PRINT:PRINT"
THIS MAKES YOU A ";:SOUND0:IFS<4THENPR
INT"DUNCE!":END
370 IFS<8THENPRINT"DUMMY!":END
380 IFS<12THENPRINT"FOOL!":END
390 IFS<20THENPRINT"SMARTIE!":END
400 IFS<30THENPRINT"BRAIN!":END
410 PRINT"GENIUS!!!!!":END
```

U.F.O. Attack !!

THIS IS A UFO ATTACK GAME
WRITTEN IN BASIC WITH SCORE,
HI-SCORE,TIME & AUTO DIFFICULTY
LEVELS OF PLAY. USE ARROW KEYS
TO MOVE YOUR SHIP RIGHT & LEFT.
PRESS THE (SPACE-BAR) TO FIRE.

```
10 SCREEN2,2:CLS:COLOR1,15,(0,0)-(255,
191),1
20 PATTERNS#(0),"3C7EDBFFE7DB7E24"
30 PATTERNS#(1),"183C7EFFFFFFFFFF"
40 PATTERNS#(2),"FFFFFFFFFFFFFFFF"
50 LINE(55,0)-(55,191),1:LINE(115,0)-(
115,191),1:LINE(170,0)-(170,191),1:FOR
SS=0TO185STEP5:LINE(0,SS)-(55,SS+5),1:
LINE(115,SS+5)-(170,SS):NEXT:LINE(170,
155)-(255,155),1
60 LINE(170,120)-(255,120),1:LINE(170,
80)-(255,80),1:LINE(170,18)-(255,18),1
:LINE(170,50)-(255,50),1
70 PRINTCHR$(16):CURSOR180,165:PRINT"H
IGH SCORE":CURSOR180,125:PRINT"TIME":C
URSOR180,90:PRINT"YOUR SCORE":CURSOR18
0,54:PRINT"DIFFICULTY":PRINTCHR$(17):C
URSOR185,20:COLOR2,15:PRINT"U F O":CUR
SOR180,40:PRINT"ATTACK":COLOR10,15:CUR
SOR185,10:PRINT"TTS"
80 TM=90:IFSC>SHTHENSH=SC
85 BLINE(175,180)-(250,190)),,BF:PRINTC
HR$(16):CURSOR175,180:PRINT"(E)NDor(P)
LAY":IFINKEY$=""THEN85
86 IFINKEY$="E"THENEND
87 PRINTCHR$(17)
90 BLINE(175,180)-(250,190),,BF:CURSOR
175,180:PRINTSH:SC=50:GOSUB360
100 MAG0:A=80:SPRITE9,(A,185),1,2:X1=1
00:X1=115:X2=90:X3=110:X4=64:Y=Y1=Y2=Y
3=0
110 GOSUB120:GOSUB260:GOTO370
120 X1=X1+(RND(1)*6)-3:X2=X2+(RND(1)*6
)-3:X3=X3-(RND(1)*6)+3:X4=X4+(RND(1)*6
)-3:Y=Y+(RND(1)*9)+2+YY:Y1=Y1+(RND(1)*
8)+1+YY:Y2=Y2+(RND(1)*7)+YY:Y3=Y3+(RND
(1)*6)+YY:SOUND4,3,15
130 IFX1>100THENX1=100
140 IFX2>100THENX2=100
150 IFX3>100THENX3=100
160 IFX4>100THENX4=100
170 IFX1<60THENX1=60.
180 IFX2<60THENX2=60
190 IFX3<60THENX3=60
200 IFX4<60THENX4=60
210 IFY>180THENY=0:SC=SC-INT(SC/3)
220 IFY1>180THENY1=0:SC=SC-INT(SC/2)
230 IFY2>180THENY2=0:SC=SC-INT(SC/3)
240 IFY3>180THENY3=0:SC=SC-INT(SC/2)
250 SPRITE5,(X4,Y3),0,8:SPRITE2,(X1,Y)
,0,1:SPRITE4,(X2,Y2),0,7:SPRITE3,(X3,Y
1),0,13:RETURN
260 M$=INKEY$:IFM$=""THENRETURN
270 K=ASC(M$):IFK=29ANDA>61THENA=A-6:S
PRITE9,(A,185),1,2:RETURN
280 IFK=28ANDA<100THENA=A+6:SPRITE9,(A
,185),1,2:RETURN
290     IFK<>32THENRETURN
300 HH=0:IFA>X1-4ANDA<X1+4THENYY=Y:GOS
UB390:X1=XX:Y=0:HH=1
310 IFA>X2-4ANDA<X2+4THENYY=Y2:GOSUB39
0:X2=XX:Y2=0:HH=1
320 IFA>X3-4ANDA<X3+4THENYY=Y1:GOSUB39
0:X3=XX:Y1=0:HH=1
330 IFA>X4-4ANDA<X4+4THENYY=Y3:GOSUB39
0:X4=XX:Y3=0:HH=1
340 IFHH=1THENGOTO360
350 LINE(A+4,185)-(A+4,0),10:BLINE(A+4
,185)-(A+4,0):IFSC>10THENSC=SC-10
360 YY=SC/200:BLINE(175,105)-(250,113)
,,BF:CURSOR175,105:PRINTSC:BLINE(180,6
5)-(250,73),,BF:CURSOR180,65:PRINTINT(
YY):RETURN
370 BLINE(190,140)-(240,148),,BF:CURSO
R190,140:TM=TM-1:PRINTTM:IFTM>0THEN110

380 BEEP2:FORQ=0TO700:NEXT:GOTO80
390 LINE(A+4,185)-(A+4,YY+4),10:SOUND3
,400,15:BLINE(A+4,185)-(A+4,YY+4):SOUN
D3,800,15:SC=SC+100+INT(RND(1)*100):SO
UND3,400,0:XX=INT((RND(1)*40)+60):RETU
RN
400 IFA>X1-4ANDA<X1+4THENLINE(A+4,185)
-(A+4,Y+4),10:BEEP:BLINE(A+4,185)-(A+4
,Y+4):X1=(RND(1)*40)+60:Y=0:SC=SC+100:
RETURN
```

27

Tic Tac Toe.

HERE IS A GAME WE HOPE YOU WILL ENJOY AS WE MADE SURE
THAT YOU CAN BEAT THE COMPUTER, BUT HAVE LEFT IT UP
TO YOU TO FIND OUT HOW!!! WHEN IT IS YOUR TURN PRESS
THE SQUARE'S NUMBER (1 to 9) THAT YOU WISH TO PLACE
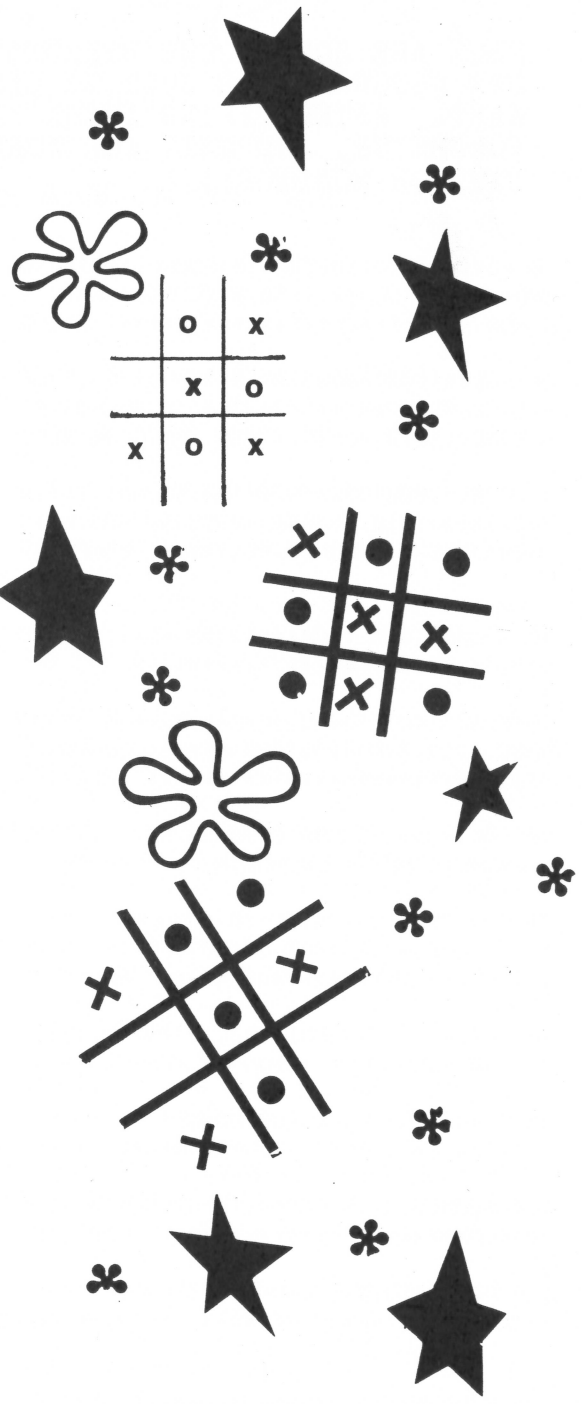YOUR PIECE AT.

```
660 SCREEN2,2:CLS:ERASE:CC=13:COLOR1,C
C,(0,0)-(255,191),10:L=1
670 PATTERNS#(0),"1F3F7FFFC0CC8C81"
680 PATTERNS#(1),"8183804726110C03"
690 PATTERNS#(2),"F8FCFEFF03333181"
700 PATTERNS#(3),"81C101E2648830C0"
710 PATTERNS#(4),"E080E02EE80E080E"
720 PATTERNS#(5),"80C0E0F0F8FCFEFF"
730 PATTERNS#(6),"FF7F3F1F0F07E381"
740 PATTERNS#(7),"80AEEA0E0A0A0000"
750 DATA90,20,90,170,160,20,160,170,20
,70,230,70,20,120,230,120
760 DATA1,2,3,4,5,6,7,8,9,1,4,7,2,5,8,
3,6,9,1,5,9,3,5,7
770 RESTORE750:FORZ=0TO3:READA,B,X,Y:L
INE(A,B)-(X,Y),1:NEXT
780 COLOR10,15:PRINTCHR$(17):CURSOR55,
45:PRINT"1"
790 PRINTCHR$(17):CURSOR115,45:PRINT"2
"
800 CURSOR185,45:PRINT"3"
810 CURSOR55,95:PRINT"4"
820 CURSOR115,95:PRINT"5"
830 CURSOR185,95:PRINT"6"
840 CURSOR55,135:PRINT"7"
850 CURSOR115,135:PRINT"8"
860 CURSOR185,135:PRINT"9"
870 MAG3:SCREEN2,2:GOTO970
880 SPRITE1,(40,28),W,E:RETURN
890 SPRITE2,(110,28),W,E:RETURN
900 SPRITE3,(180,28),W,E:RETURN
910 SPRITE4,(40,78),W,E:RETURN
920 SPRITE5,(110,78),W,E:RETURN
930 SPRITE6,(180,78),W,E:RETURN
940 SPRITE7,(40,128),W,E:RETURN
950 SPRITE8,(110,128),W,E:RETURN
960 SPRITE9,(180,128),W,E:RETURN
970 IFP=0ANDL=1THEN990
980 W=4:E=4:GOSUB1050:ONMGOSUB880,890,
900,910,920,930,940,950,960:L=L+1:GOSU
B 1090
990 BLINE(10,10)-(94,16),,BF:CURSOR10,
10:BEEP:COLOR1,CC:PRINT"HUMAN'S TURN T
O MOVE"
```

```
1000 M$=INKEY$:IFM$=""THEN1000
1010 W=1:E=1:FORM=1TO9:IFASC(M$)=M+48T
HENGOTO 1070
1020 NEXT:GOTO1000
1030 ONMGOSUB880,890,900,910,920,930,9
40,950,960:L=L+1:GOSUB1090
1040 A$=H$:BLINE(10,10)-(94,16),,BF:CU
RSOR10,10:BEEP:COLOR4,CC:PRINT" SEGA'S
 TURN TO MOVE":GOTO970
1050 GOSUB1270:IFM(M)<>0THEN1050
1060 M(M)=W:RETURN
1070 IFM(M)<>0THEN1000
1080 M(M)=W:GOTO1030
1090 IFM(1)=WANDM(2)=WANDM(3)=WTHEN119
0
1100 IFM(4)=WANDM(5)=WANDM(6)=WTHEN119
0
1110 IFM(7)=WANDM(8)=WANDM(9)=WTHEN119
0
1120 IFM(1)=WANDM(4)=WANDM(7)=WTHEN119
0
1130 IFM(3)=WANDM(6)=WANDM(9)=WTHEN119
0
1140 IFM(2)=WANDM(5)=WANDM(8)=WTHEN119
0
1150 IFM(3)=WANDM(5)=WANDM(7)=WTHEN119
0
1160 IFM(1)=WANDM(5)=WANDM(9)=WTHEN119
0
1170 IFL=10THEN1220
1180 RETURN
1190 IFW=1THENCURSOR10,180:GOTO1240
1200 IFW=1THENCURSOR10,180:GOTO1240
1210 IFW=4THENCURSOR10,180:GOTO1230
1220 BLINE(10,10)-(250,16),,BF:CURSOR1
0,10:PRINT"A  DRAW!!":BEEP:P=0:GOTO125
0
1230 BLINE(10,10)-(250,16),,BF:CURSOR1
0,10:PRINT"SEGA  WINS!!":BEEP2:BEEP2:P
=1:GOTO1250
1240 BLINE(10,10)-(250,16),,BF:CURSOR1
0,10:PRINT"HUMAN WINS!!":BEEP2:BEEP:P=
0
```

28

Tic Tac Toe.cont

```
1250 PRINTCHR$(16):CURSOR30,170:PRINT"
Play me again human ......":CURSOR50,1
80:PRINT"you'll have trouble winning"
1260 CURSOR170,5:PRINT"(P)LAYor(E)ND":
IFINKEY$=""THEN1260
1265 IFINKEY$<>"E"THEN660
1266 END
1270 IFL=1ANDP=1THENM=1:RETURN
1280 IFP=0THEN1410
1290 IFL=3ANDM(7)=0THENM=7:RETURN
1300 IFL=3ANDM(9)=0THENM=9:RETURN
1310 RESTORE760:FORZ=1TO8:READF,G,H:IF
M(F)+M(G)+M(H)<>8THENNEXT:GOTO1350
1320 IFM(F)=0THENM=F:RETURN
1330 IFM(G)=0THENM=G:RETURN
1340 IFM(H)=0THENM=H:RETURN
1350 RESTORE760:FORZ=1TO8:READF,G,H:IF
M(F)+M(G)+M(H)<>2THENNEXT:GOTO1390
1360 IFM(F)=0THENM=F:RETURN
1370 IFM(G)=0THENM=G:RETURN
1380 IFM(H)=0THENM=H:RETURN
1390 IFM>8THENM=1
1400 M=M+1:RETURN
1410 IFL=2ANDM(5)=0THENM=5:RETURN
1430 IFL=2ANDM(1)=0THENM=1:RETURN
1440 IFL=4ANDM(2)=1ANDM(4)=1THENM=1:RE
TURN
1450 IFL=4ANDM(2)=1ANDM(6)=1THENM=3:RE
TURN
1460 IFL=4ANDM(8)=1ANDM(4)=1THENM=7:RE
TURN
1465 IFL=4ANDM(8)=1ANDM(1)=1THENM=6:RE
TURN
1470 IFL=4ANDM(8)=1ANDM(6)=1THENM=9:RE
TURN
1480 IFL=4ANDM(2)=1ANDM(7)=1THENM=1:RE
TURN
1490 IFL=4ANDM(5)=1ANDM(9)=1THENM=7:RE
TURN
1500 IFL=4ANDM(3)=1ANDM(4)=1THENM=1:RE
TURN
1510 GOTO1310
```

Sound Effects!

HERE ARE SOME SOUND EFFECTS FOR YOU TO USE IN ANY OF YOUR OWN PROGRAMS. OR JUST TO LISTEN TO, MODIFY OR DO WHAT YOU WANT. AFTER TYPING THESE IN JUST TYPE RUN AND TURN THE VOLUME UP, AND WAIT FOR WORLD WAR III TO ERUPT FROM YOUR T.V. OR MONITOR!!

```
10 FORI=250TO110STEP-10:SOUND1,I,10:SO
UND4,1,12:SOUND2,I+50,8:SOUND0:NEXTI:S
OUND0:REM******************** DYING

20 FORS=1600TO800STEP-8:SOUND1,S,15:NE
XTS:SOUND0:FORS=15TO0STEP-.8:SOUND4,2,
S:FORD=1TO10:NEXTD,S:REM  FALLING BOMB

30 FORI=2000TO3000STEP150:SOUND1,INT(R
ND(1)*I)+1010,15:FORJ=0TO3:SOUND5,0,15
:NEXTJ:NEXTI:SOUND0:REM***** COMPUTER


40 SOUND4,0,15:FORI=1TO450:NEXTI:SOUND
0:REM******************** SPACE SHI
P
50 FORJ=1TO3:SOUND1,RND(1)*J+999,15:SO
UND2,3112,8:FORI=1TO20:NEXTI:SOUND0:NE
XTJ:REM******************** BEEPING

60 FORI=110TO1000STEP50:SOUND1,I,15:SO
UND4,0,15:NEXTI:SOUND0:REM  MACHINEGUN

70 FORI=800TO110STEP-10:SOUND1,I,15:NE
XTI:SOUND4,2,15:FORJ=0TO35:NEXTJ:SOUND
0:REM****************** DROPPING

80 FORJ=1TO9:SOUND1,120,12:FORI=1TO15:
SOUND0:NEXTI:NEXTJ:SOUND0:REM  RUNNING

90 FORJ=1TO4:FORI=450TO900STEP10:SOUND
1,I,15:NEXTI:NEXTJ:SOUND0:REM**  SIREN

100 SOUND5,3,15:FORA=1TO500:NEXTA:SOUN
D0:REM******************** FOOTSTEP
S
110 FORD=1TO20:SOUND4,2,15:FORS=1TO9:N
EXTS:SOUND0:NEXTD:REM****  MACHINE GUN2


120 FORS=3TO10:SOUND1,440*2^(S/12),15:
NEXTS:FORD=1TO200:NEXTD:SOUND0:REM
                              SCALE
```

```
130 SOUND3,180,0:SOUND5,3,15:FORD=1TO1
000:NEXTD:SOUND0:REM         HELICOPTER

140 FORS=1TO5:FORF=15TO1STEP-1:SOUND1,
260-10*F,F:NEXTF,S:SOUND0:REM BOUNCING

150 FORI=2000TO3000STEP150:SOUND1,INT(
RND(1)*I)+1010,15:NEXTI:REM   COMPUTER2

160 FORI=450TO900STEP10:SOUND1,I,15:NE
XTI:FORI=900TO450STEP-10:SOUND1,I,15:N
EXTI:SOUND0:REM                 SIREN2

260 FORI=15TO0STEP-.3:SOUND4,2,I:FORO=
1TO10STEP5:NEXT:SOUND0 :REM  SPLAT  *

270 FORI=990TO210STEP-25:SOUND1,I,10:S
OUND4,1,10:SOUND2,I+100,15:SOUND0:NEXT
I:FORI=210TO990STEP25:SOUND1,I,10:SOUN
D4,1,10:SOUND2,I-100,15:SOUND0:REM CRASH

280 FORI=550TO530STEP-81:SOUND4,2,10:S
OUND2,I,15:SOUND0:NEXTI:SOUND0:REM   *
                              SPLATZ.

550 FORKK=1TO2:FORI=191TO990STEP15:SOU
ND1,I,15:NEXTI:FORO=990TO191STEP-15:SO
UND1,O,15:NEXTO:NEXT:SOUND0:REM  SIREN3

560 FORKK=1TO2:FORI=600TO1699STEP40:SO
UND2,I,10:NEXTI:FORO=1699TO600STEP-40:
SOUND2,O,10:NEXTO:NEXT:SOUND0:REMSIREN4

600 FORS=1TO2:FORF=15TO1STEP-1:SOUND1,
760-3*F,F:NEXTF,S:SOUND0:REM  BOUNCING2

610 FORS=1TO2:FORF=15TO1STEP-1:SOUND1,
760-10*F,F:NEXTF,S:SOUND0:REM BOUNCING3

611 GOTO600
```
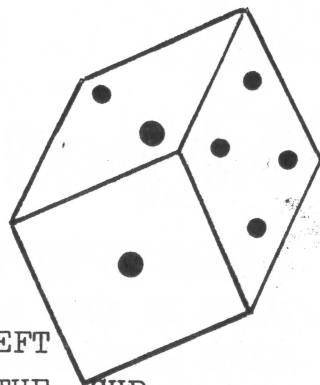
30

Dice Roll.

THROW AWAY YOUR OLD DICE AND USE THE
SEGA DICE TO PLAY YOUR FAVOURITE GAME.
YOU WILL NEVER HAVE TO FIND WHERE YOU LEFT
YOUR DICE OR KEEP PUTTING THEM BACK IN THE CUP.
NO CHEATING HERE!!!

```
410 SCREEN2,2:CLS:COLOR2,10,(0,0)-(255
,191),10:PRINTCHR$(17):CURSOR80,5:PRIN
T"DICE ROLL"
420 DATA20,60,95,60,20,60,20,140,20,60
,40,70,40,70,40,170,40,70,120,70,120,7
0,95,60,120,70,120,170,40,170,20,140,4
0,170,120,170
430 RESTORE420:FORZ=0TO8:READA,B,X,Y:L
INE(A,B)-(X,Y),1:NEXT
440 RESTORE420:FORZ=0TO8:READA,B,X,Y:L
INE(A+120,B)-(X+120,Y),1:NEXT
450 PRINTCHR$(16):CURSOR35,40:PPINT"Pr
ess (SPACE) to roll or (E) to end":CUR
SOR40,62:PRINT"TTS SEGA":CURSOR160,62:
PRINT"DICE ROLL":PRINTCHR$(17)
460 PATTERNS#(0),"030F1F3F7F7FFFFF"
470 PATTERNS#(1),"FFFF7F7F3F1F0F03"
480 PATTERNS#(2),"C0F0F8FCFEFEFFFF"
490 PATTERNS#(3),"FFFFFEFEFCF8F0C0"
500 SPRITE0,(0,0),0,10
510 MAG1:V=INT(RND(1)*6+1):SOUND1,250*
V,14:ONVGOSUB540,550,560,570,580,590:N
=INT(RND(1)*6+1):SOUND1,260*N,14:ONNGO
SUB600,610,620,630,640,650:IFRND(1)<.5
1THEN510
520 BLINE(35,180)-(195,187),,BF:M=V+N:
SOUND1,110*M,10:CURSOR35,180:PRINTV:CU
RSOR65,180:PRINT"+":CURSOR95,180:PRINT
N:CURSOR125,180:PRINT"=":CURSOR150,180
:PRINTM:SOUND0:IFINKEY$=""THEN520
525 IFINKEY$<>"E"THEN510
530 IFINKEY$="E"THENEND
540 SPRITE1,(74,110),0,1:SPRITE2,(0,0)
,0,1:SPRITE3,(0,0),0,1:SPRITE4,(0,0),0
,1:SPRITE5,(0,0),0,1:SPRITE6,(0,0),0,1
:RETURN
550 SPRITE1,(50,80),0,1:SPRITE2,(95,14
0),0,1:SPRITE3,(0,0),0,1:SPRITE4,(0,0)
,0,1:SPRITE5,(0,0),0,1:SPRITE6,(0,0),0
,1:RETURN
560 SPRITE1,(95,80),0,1:SPRITE2,(74,11
0),0,1:SPRITE3,(50,140),0,1:SPRITE4,(0
,0),0,1:SPRITE5,(0,0),0,1:SPRITE6,(0,0
),0,1:RETURN
570 SPRITE1,(95,80),0,1:SPRITE2,(50,80
),0,1:SPRITE3,(50,140),0,1:SPRITE4,(95
,140),0,1:SPRITE5,(0,0),0,1:SPRITE6,(0
,0),0,1:RETURN
580 SPRITE1,(95,80),0,1:SPRITE2,(50,80
),0,1:SPRITE3,(50,140),0,1:SPRITE4,(95
,140),0,1:SPRITE5,(74,110),0,1:SPRITE6
,(0,0),0,1:RETURN
590 SPRITE1,(95,80),0,1:SPRITE2,(50,80
),0,1:SPRITE3,(50,140),0,1:SPRITE4,(95
,140),0,1:SPRITE5,(50,110),0,1:SPRITE6
,(95,110),0,1:RETURN
600 SPRITE7,(194,110),0,1:SPRITE8,(0,0
),0,1:SPRITE9,(0,0),0,1:SPRITE10,(0,0)
,0,1:SPRITE11,(0,0),0,1:SPRITE12,(0,0)
,0,1:RETURN
610 SPRITE7,(170,80),0,1:SPRITE8,(215,
140),0,1:SPRITE9,(0,0),0,1:SPRITE10,(0
,0),0,1:SPRITE11,(0,0),0,1:SPRITE12,(0
,0),0,1:RETURN
620 SPRITE7,(215,80),0,1:SPRITE8,(194,
110),0,1:SPRITE9,(170,140),0,1:SPRITE1
0,(0,0),0,1:SPRITE11,(0,0),0,1:SPRITE1
2,(0,0),0,1:RETURN
630 SPRITE7,(215,80),0,1:SPRITE8,(170,
80),0,1:SPRITE9,(170,140),0,1:SPRITE10
,(215,140),0,1:SPRITE11,(0,0),0,1:SPRI
TE12,(0,0),0,1:RETURN
640 SPRITE7,(215,80),0,1:SPRITE8,(170,
80),0,1:SPRITE9,(170,140),0,1:SPRITE10
,(215,140),0,1:SPRITE11,(194,110),0,1:
SPRITE12,(0,0),0,1:RETURN
650 SPRITE7,(215,80),0,1:SPRITE8,(170,
80),0,1:SPRITE9,(170,140),0,1:SPRITE10
,(215,140),0,1:SPRITE11,(170,110),0,1:
SPRITE12,(215,110),0,1:RETURN
```

31

Jackpot! $¢

WELCOME TO THE BIG TIME LAS VEGAS POKIES AS THEY COME
ALIVE ON YOUR COMPUTER SCREEN WITH GREAT GRAPHICS AND
SOUND EFFECTS! WILL YOU BREAK THE BANK OR WILL THE
BANK BREAK YOU?   GOOD LUCK, YOU WILL NEED IT!

```
1520 CLS:PRINT"JACKPOT!!   $$$$$$$$$$$$
$$$$$$$"
1530 MAG1:SCREEN2:COLOR1,15,,15:CLS
1550 F=50:FORZ=1TO4:X(Z)=(Z*20)+30:C(Z
)=Z*4-3:NEXT
1560 PATTERNS#0,"00001C3E7F7F7F7F7F"
1570 PATTERNS#1,"3F1F0F0703010000"
1580 PATTERNS#2,"0000387CFEFEFEFE"
1590 PATTERNS#3,"FCF8F0E0C0800000"
1600 PATTERNS#4,"03070703193D3F3F"
1610 PATTERNS#5,"3D19010101030307"
1620 PATTERNS#6,"C0E0E0C098BCFCFC"
1630 PATTERNS#7,"BC98808080C0C0E0"
1640 PATTERNS#8,"0101010101010101"
1650 PATTERNS#9,"030707070F0F1F1F"
1660 PATTERNS#10,"8080808080808080"
1670 PATTERNS#11,"C0E0E0E0F0F0F8F8"
1680 PATTERNS#12,"010103070F1F3F7F"
1690 PATTERNS#13,"7F7F7D3901030307"
1700 PATTERNS#14,"8080C0E0F0F8FCFE"
1710 PATTERNS#15,"FEFEBE9C80C0C0E0"
1720 PATTERNS#16,"000103070F1F3F7F"
1730 PATTERNS#17,"7F3F1F0F07030100"
1740 PATTERNS#18,"0080C0E0F0F8FCFE"
1750 PATTERNS#19,"FEFCF8F0E0C08000"
1760 PATTERNS#20,"00000000003F7FFF"
1770 PATTERNS#21,"8182828281FF0000"
1780 PATTERNS#22,"0000000000FFFFFD"
1790 PATTERNS#23,"8505C545C6FC0000"
1800 PATTERNS#24,"0000000000000000"
1810 PATTERNS#25,"0000000000000000"
1820 PATTERNS#26,"0000000000000000"
1830 PATTERNS#27,"FFFFFFFFFFFFFFFF"
1840 COLOR11:FORX=40TO45:LINE(X,30)-(X
,180):LINE(X+90,30)-(X+90,180):NEXT:FO
RY=45TO48:LINE(46,Y)-(130,Y):LINE(46,Y
+24)-(130,Y+24):NEXT
1850 FORX=70TO75:LINE(X,49)-(X,69):LIN
E(X+30,49)-(X+30,69):NEXT
1860 FORY=71TO175STEP9:LINE(46,Y)-(130
,Y):NEXT
1870 FORY=175TO180:LINE(46,Y)-(130,Y):
NEXT
1880 FORY=155TO160:LINE(24,Y)-(39,Y+20
):LINE(24,Y-145)-(39,Y-125):NEXT
1890 FORX=24TO26:LINE(X,10+(X-23))-(X,
160+(X-23)):NEXT:FORY=30TO35:LINE(46,Y
)-(130,Y):NEXT
1900 FORY=10TO15:LINE(115,Y)-(135,Y+20
):NEXT:FORY=10TO30:LINE(26+(Y-13),Y)-(
115+(Y-10),Y):NEXT
1910 CURSOR150,20:COLOR13:PRINT"
- $500":CURSOR150,30:PRINT"   ";:COLO
R11:PRINT"   - $250":CURSOR150,40:PRI
NT"      - $200":CURSOR150,50:PRINT"
   ";:COLOR13:PRINT"    - $150"
1920 CURSOR150,60:COLOR4:PRINT"
- $100":CURSOR150,62:PRINT"     ";:CUR
SOR150,70:COLOR3:PRINT"      - $ 75":
COLOR4:CURSOR150,80:PRINT"       - $ 5
0":CURSOR150,90:PRINT"    *  - $ 25":C
URSOR150,100:COLOR3:PRINT"    *  - $ 1
0"
1930 CURSOR150,110:COLOR8:PRINT"  * *
  - $  5":CURSOR150,130:COLOR1:PRINT"*
- ANY OTHER":SCREEN2,2
1940 GOTO1970
1950 CURSOR48,81:COLOR15:PRINT"X PRESS
 KEY"
1960 X=50:FORI=1TO3:GOSUB2000:NEXT:GOS
UB2030
1970 GOSUB2200:GOSUB2210:CURSOR48,81:C
OLOR6:PRINT"X PRESS KEY":CURSOR40,182:
PRINT"press E to end"
1980 GOSUB2010:IFINKEY$=""THEN1980
1985 IFINKEY$="E"THEN END
1990 GOTO1950
2000 FORZ=0TOINT(RND(1)*5):C=1:FORZ1=0
TO22STEP4:SPRITEI,(X,50),Z1,C:C=C+2:SO
UND1,INT(RND(1)*300)+230,INT(RND(1)*8)
+6:NEXT:NEXT:S(I)=INT(RND(1)*5.9)+1:SP
RITEI,(X,50),(S(I)*4)-4,(S(I)*2)+1:X=X
+30:SOUND0:RETURN
2010 FORZ=1TO4:SPRITEZ+5,(X(Z),27),24,
C(Z):SOUND1,400,Z*4-2:NEXT:SOUND0:FORZ
=1TO4:X(Z)=X(Z)-8:IFX(Z)<38THENX(Z)=11
0
```

32

```
2020 NEXT:RETURN
2030 A=S(1):B=S(2):C=S(3)
2040 IFA=6ANDB=6ANDC=6THENM=500:GOTO21
70
2050 IFA=6ANDB=6ANDC=5THENM=250:GOTO21
50
2060 IFA=5ANDB=5ANDC=5THENM=200:GOTO21
50
2070 IFA=5ANDB=5ANDC=6THENM=150:GOTO21
50
2080 IFA=3ANDB=3ANDC=3THENM=100:GOTO21
50
2090 IFA=1ANDB=1ANDC=1THENM=75:GOTO216
0
2100 IFA=2ANDB=2ANDC=2THENM=50:GOTO216
0
2110 IFA=2ANDB=2THENM=25:GOTO2160
2120 IFA=1ANDB=1THENM=10:GOTO2160
2130 IFA=4THENM=5:GOTO2160
2140 BEEP:F=F-5:RETURN
2150 FORZ=15TO0STEP-.1:SOUND1,500,Z:NE
XT:SOUND0:F=F+M:GOTO2180
2160 FORZ=15TO1STEP-1:SOUND1,200,Z:NEX
T:SOUND0:F=F+M:GOTO2180
2170 F=F+M:FORZ=120TO1220STEP100:SOUND
1,Z,15:SOUND2,Z+500,15:NEXT:SOUND3,300
,15:FORZ=15TO1STEP-1:SOUND3,300,Z:NEXT
:SOUND0:GOTO2180
2180 COLOR1:CURSOR10,0:GOSUB2190:PRINT
"YOU HAVE WON ";INT(M);"   DOLLARS!":BE
EP:FORZ=0TO800:NEXT:GOSUB2190:RETURN
2190 FORZ=0TO8:BLINE(0,Z)-(255,Z):NEXT
:RETURN
2200 FORZ=170TO190:BLINE(150,Z)-(255,Z
):NEXT:COLOR1:CURSOR155,170:PRINT"YOU
HAVE $";F;:RETURN
2210 IFF>0THENRETURN
2220 SCREEN1,1:CLS:COLOR1,3:PRINT"YOU
ARE BROKE!!!!":PRINT:PRINT"YOU HAVE BEE
N KICKED OUT OF THE CLUB!"
```
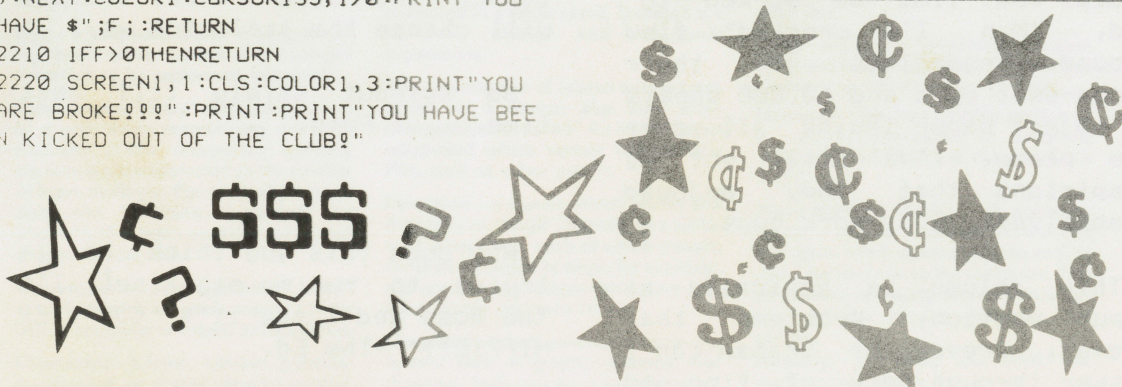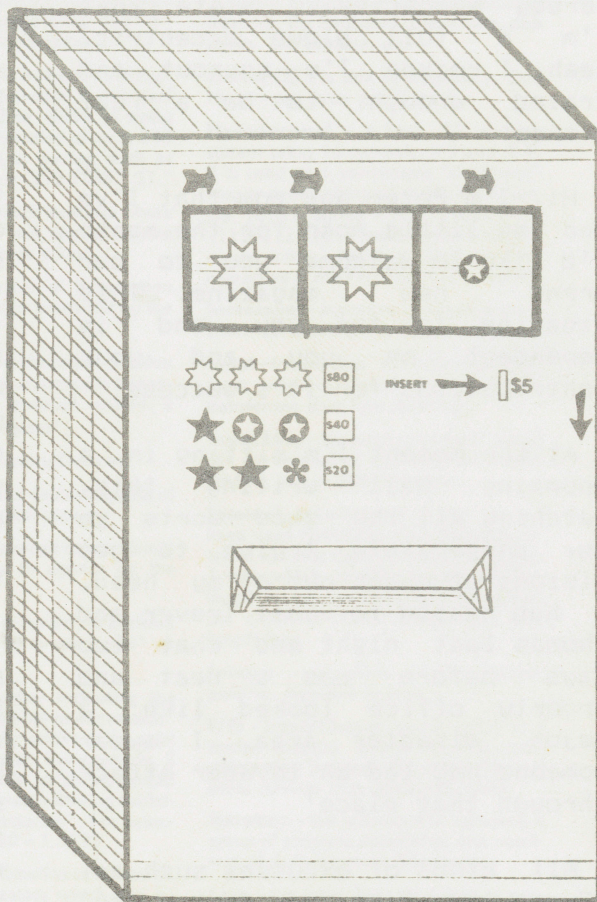
COMPUTER HIPPIE!!? What a name to give a persons' column. I hereby emphatically state that I'm a full blown eccentric. Yeah, I reckon I'm spunout and crazed enough to be a real Drongo!

Hi, I'm Peter and now that I've had my little moan for the month I'd like to welcome you to our brand new magazine. This magazine is for you and is dependent on you and your contributions for it's success!

At the moment I'm sitting in a Shopping Mall writing this, watching all the good sorts go by, desperately trying to get visions of chaos out of my head. I had reason to visit Trever and Thomas last night and what two days before was a neat and orderly office looked like a major disaster area. I swear someone had led an invader attack through that place!

All kinds of excuses such as, "Guess what time we worked to" and, "Man I'm wrecked" flew around. Regardless of their blood-shot eyes and 60,000 sheets of reject paper laying all over the place, I've still got my suspicions that they enjoyed themselves. Good work guys.

This column is basically an input section, problems that Thomas, Trever or Graham can't answer through lack of time to get to everyone, will be dealt with here.

Because I'm a late starter on this computer I'll be following Thomas's machine language series and having my problems along with you. So any problems you have let me know and I'll hassle Thomas till we get an answer. Any solutions you've worked out to get around a hassle of your own please send in and we'll share it with other users.

You did the right thing in choosing your SEGA, so do the right thing and support your only magazine. Also, software support depends on users more than on software companies and the more activity we generate the more interested in supplying our needs these companies will become.

Send in those solutions and problems and next month this section will start to take proper shape. (PS. I hate "COMPUTER HIPPIE", I vote we call this section "ECCENTRIC'S CORNER" so pleeeease address your correspondence to "ECCENTRIC'S CORNER" and maybe Trever, the Ed, will change the title for us.)

So spinout safely till next time, Pete.

Who does this guy think he is trying to run my magazine! I'm the boss and I say it's "COMPUTER HIPPIE!!" -The Ed.

GLOSSARY

Accessory Devices - additional equipment which attaches to the computer and extends its functions and capabilities. Included are preprogrammed cartridges* and units which send, receive or store computer data, such as printers and disks. These are often called peripherals.

Array - A collection of numeric or string variables, arranged in a list or matrix for processing by the computer. Each element in an array is referenced by a subscript* describing its position in the list.

ASCII - The American Standard Code for Information Interchange, the code structure used internally in most personal computers to represent letters, numbers, and special characters.

BASIC - an easy-to-use popular programming language used in most personal computers. The word BASIC is an acronym for "Beginners All purpose Symbolic Instruction Code."

Baud - commonly used to refer to bits per second.

Binary - a number system based on two digits, 0 and 1. The internal language and operations of the computer are based on the binary system.

Branch - a departure from the sequential performance of program statements. An unconditional branch causes the computer to jump to a specified program line every time the branching statement is encountered. A conditional branch transfers program control based on the result of some arithmetic or logical operation.

Breakpoint - a point in the program specified by the STOP command where program execution can be suspended. During a breakpoint, you can perform operations to help you to locate program errors. Program execution can be resumed with a CONT command, unless editing took place while the program was stopped.

Bug - a hardware defect or programming error which causes the intended operation to be performed incorrectly.

Byte - a string binary* digits (bits) treated as a unit, often representing one data character*. The computer's memory capacity is often expressed as the number of bytes available. For example, a computer with 16K bytes of memory has about 16,000 bytes available for storing programs and data.

Cartridges - preprogrammed ROM* modules which are easily inserted in the SEGA computer to extend its capabilities.

Character - a letter, number, punctuation symbol, or special graphics symbol.

Command - an instruction which the computer performs immediately. Commands are entered with no preceding line number.

Concatenation - linking two or more strings* to make a longer string. The " + " is the concatenation operator.

Constant - a specific numeric or string* value. A numeric constant is any real number such as 1.2 or -9054. A string constant is any combination of up to 248 characters enclosed in quotes, such as "HELLO THERE" or "275 FIRST ST."

Cursor - a symbol which indicates where the next character* will appear on the screen when you press a key.

Data - basic elements of information which are processed or produced by the computer.

Default - a standard character or value which the computer assumes if certain specifications are omitted within a statement* or a program*.

Device - (see Accessory Devices)

Disk - a mass storage device capable of random and sequential access.

Display - (noun) the video screen; (verb) to cause characters to appear on the screen.

Execute - to run a program; to perform the task specified by a statement* or command*

Exponent - a number indicating the power to which a number or expression* is to be raised; usually written at the right and above the number. For example, $2 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$. In SEGA BASIC the exponent is entered following the letter "E" in scientific notation*. For example, $2\,8; 1.3 \times 10 = 1.3E25$.

Expression - a combination of constants, variables, and operators which can be evaluated to a single result. Included are numeric, string, and relational expressions.

File - a collection of related data records stored on a device; also used interchangeably with device* for input/output equipment which cannot use multiple files, such as a line printer.

Function - a feature which allows you to specify as "single" operations a variety of procedures, each of which actually contains a number of steps; for example, a procedure to produce the square root via a simple reference name.

Graphics - visual constructions on the screen, such as graphs, patterns, and drawings, both stationary and animated.

SEGA BASIC has build-in subprograms which provide easy to-use colour graphic capabilities.

Hardware - the various devices which comprise a computer system, including memory, the keyboard, the screen, disk drives, line printers, etc.

Hertz(HZ) - a unit of frequency. One Hertz = one cycle per second.

Hexadecimal - a base .16 number system using 16 symbols, 0.9 and A-F. It is used as a convenient "shorthand" way to express binary* code. For example, 1010 in binary = A in hexadecimal, 1111111 = FF. Hexadecimal is used in constructing patterns for graphics characters in the PATTERN subprogram.

Increment - a positive or negative value which consistently modifies a variable*.

Input - (noun) data* to be placed in computer memory; (verb) the process of transferring data into memory.

Input Line - the amount of data* which can be entered at one time. In SEGA BASIC, this is 248 characters.

Internal date-format - data* in the form used directly by the computer. Internal numeric data is 8 bytes* long plus 1 byte which specifies the length. The length for internal string data is one byte per character in the string* plus one length-byte.

Integer - a whole number, either positive, negative or zero.

I/O - Input/Output; usually refers to a device function. I/O is used for communication between the computer and other devices (e.g. keyboard, disk)

Iteration - the technique of repeating a group of program statements; one repetition of such a group. See Loop.

Line - see input line, print line, or program line.

Loop - a group of consecutive program lines which are repeatedly performed, usually a specified number of times.

Mantissa - the base number portion of a number expressed in scientific notation*. In $3.264E + 4$, the mantissa is 3.264.

Mass Storage Device - an accessory device*, such as a cassette recorder or disk drive, which stores programs and/or data* for later use by the computer. This information is usually recorded in a format readable by the computer, not people.

Memory - see RAM, and ROM, and mass storage device.

*SEE DEFINITION

35

GLOSSARY

Noise - various sounds which can be used to produce interesting sound effects. A noise, rather than a tone, is generated by the SOUND subprogram* when commands 4 and 5 are specified.

Null String - a string* which contains no characters and has zero length.

Number Mode - the mode assumed by the computer when it is automatically generating program line* numbers for entering or changing statements.

Operator - a symbol used in calculations (numeric operators) or in relationship comparisons (relational operators). The numeric operators are +,-,*,/,. The relational operators are , ,=, ,=,.,=,,=,=

Overflow - the condition which occurs when a rounded value greater than 9.9999999999999E+99 or less than -9.9999999999999E-99 is entered or computed. When this happens, a warning is displayed, and the program* stops.

Output - (noun) information supplied by the computer; (verb) the process of transferring information from the computer's memory onto a device, such as a screen, line printer, or mass storage device*.

Parameter - any of a set of values that determine or affect the output of a statement* or function*.

Print Line - a 38-position line used by the PRINT statement.

Program - a set of statements which tell the computer how to perform a complete task.

Program Line - a line containing a single statement*. The maximum length of a program line is 248 characters*.

Pseudo-random number - a number produced by a definite set of calculations (algorithm) but which is sufficiently random to be considered as such for some particular purpose. A true random number is obtained entirely by chance.

RAM - random access memory; the main memory where program statements and data* are temporarily stored during program execution. New programs and data can be read in, accessed, and changed in RAM. Data stored in RAM is erased whenever the power is turned off of BASIC is exited.

Reserved Word - in programming languages, a special work with a predefined meaning. A reserved word lmust be spelled correctly, appear in the proper order in a statement* or command* and cannot be used as a variable* name.

ROM - read-only memory; certain instructions for the computer are permanently stored in ROM and can be accessed but cannot be changed. Turning the power off does not erase ROM.

Run Mode - when the computer is executing* a program, it is in Run Mode. Run Mode is terminated when program execution ends normally or abnormally. You can cause the computer to leave Run Mode by pressing BREAK during program execution (see Breakpoint*).

Scientific Notation - a method of expressing very large or very small numbers by using a base number (mantissa*) times ten raised to some power (exponent*). To represent scientific notation in SEGA BASIC enter the sign, then the mantissa, the letter E, and the power of ten (preceded by a minus sign if negative). For example, 3,264; -2.47E -17.

Scroll - to move the text on the screen so that additional information can be displayed.

Software - various programs which are executed by the computer, including programs built into the computer. Cartridges* programs, and programs entered by the user.

Statement - an instruction preceded by a line number in a program. In SEGA BASIC, more than one statement is allowed in a program line*.

String - a series of letters, numbers and symbols treated as a unit.

Subprogram - a predefined general-purpose procedure accessible to the user through the statement in SEGA BASIC. Subprograms extend the capability of BASIC and cannot be easily programmed in BASIC.

Subroutine - a program segment which can be used more than once during the execution* of a program, such as a complex set of calculations of a print routine. In SEGA BASIC a subroutine is entered by a GOSUB statement and ends with a RETURN statement.

Subscript - a numeric expression which specifies a particular item in an array*. In SEGA BASIC the subscript is written in parentheses immediately following the array name.

Underflow - the condition which occurs when the computer generates a numeric value greater than -1E-100, less than 1E-100, and not zero. When an underflow occurs, the value is replaced by zero.

Variable - a name is given to a value which may vary during program execution. You can think of a variable as a memory location where values can be replaced by new values during program execution.