A Haymarket publication

November 1984

MSX COMPUTING

ISSUE ONE

MSXpansion!
— build up your system with add-ons

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games, applications and utilities put through their paces

DISC SYSTEMS
myth or reality? — we look at CP/M compatibility

DEPARTMENTS
graphics, games, music
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make the most of MSX BASIC graphic commands

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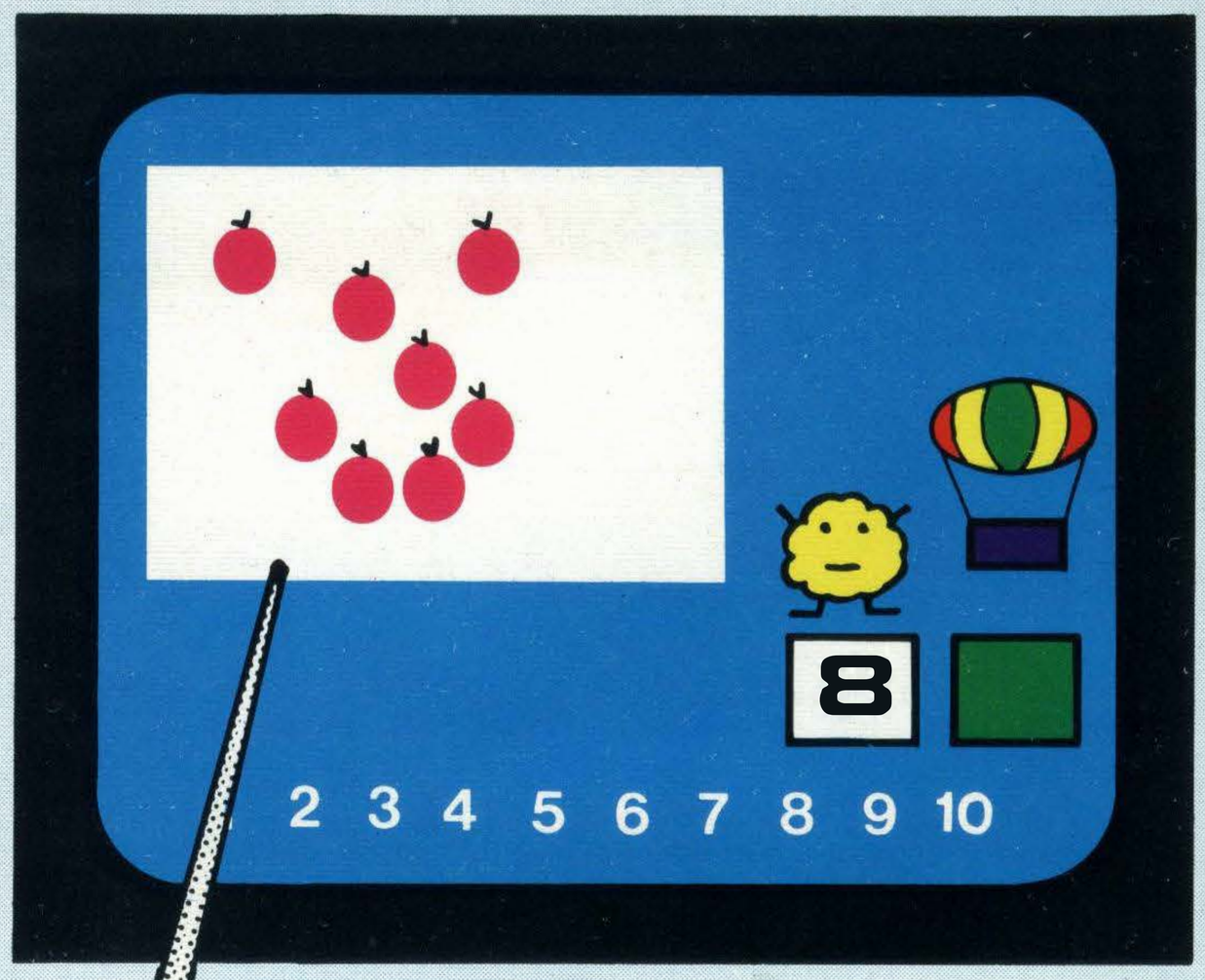

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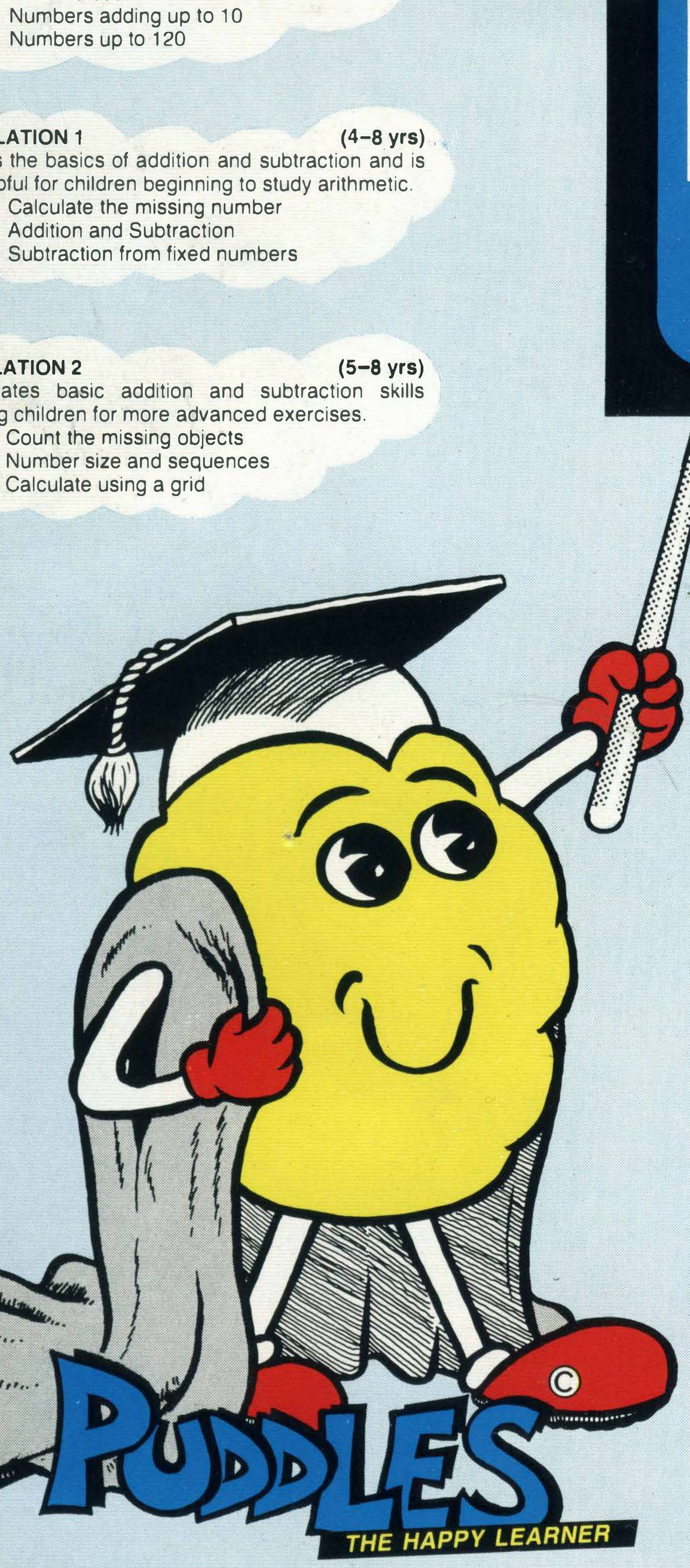

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ISSUE ONE

MSX COMPUTING

'Ground control to Toshiba. You're looking good. You are cleared to dock with Spectravideo SVI-728.'

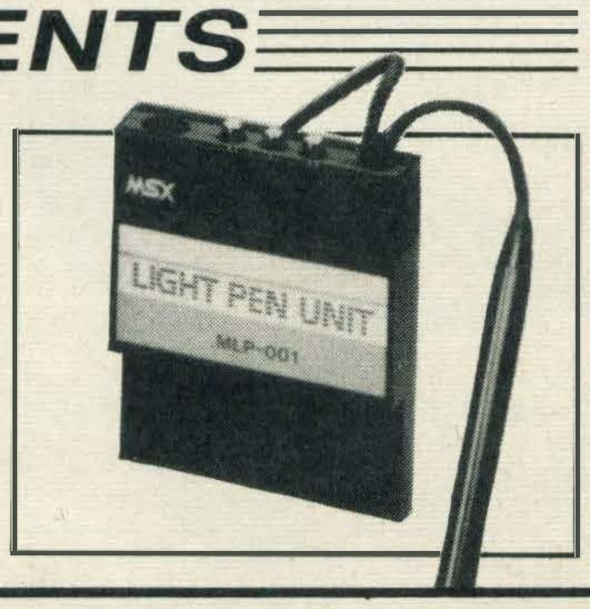
MSX boldly goes where no computer system has gone before. In an historic link-up, a Toshiba HXP570, four colour plotter receives its instructions from a Spectravideo micro while ground control runs CP/M on a disc system—just two ways your micro can expand.

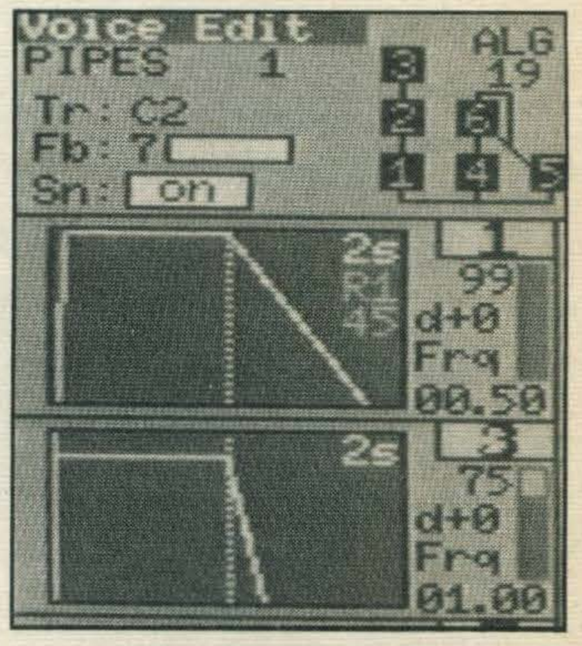
WELCOME

FEATURES

DEPARTMENTS

Each month our special interest pages will bring you the fullest details and newest ideas





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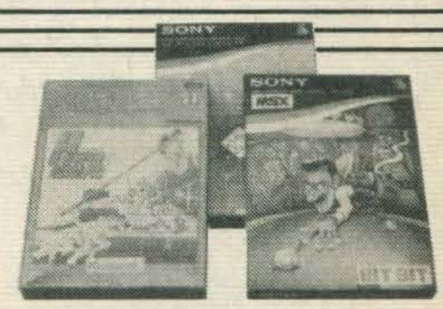

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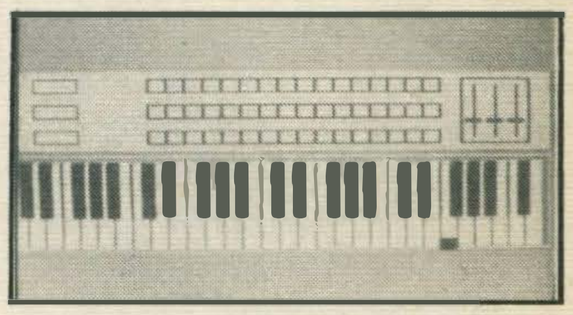

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WELCOME TO MSX COMPUTING

A brand new magazine for a new breed of computer

MSX computers have arrived in Britain. They're now on sale in the shops around the country — and they will revolutionise the home computer market. They may even revolutionise the way we think about computers and the way we use them.

The world's first standard for home computers is here, and so is *MSX Computing* — a magazine designed to help you, the user and potential user, to understand and exploit these machines. *MSX Computing* isn't just a magazine about a standard — it intends to become the standard others will have to follow.

Elsewhere in these pages, and in the pages of our sister magazine *What MSX?*, you'll find a full description of what MSX computers are and what they can do for you. We've covered everything you'll need to know before buying a machine, and a lot that'll help you get started with it when you've bought it.

But once you've got an MSX computer, you'll need a constant flow of information about MSX computing. *MSX Computing* will provide it. News about new products — peripherals, add-ons, new machines, new software. If it's got anything to do with the MSX system, you'll read about it in *MSX Computing*. Hints and tips about programming? Lots. Program listings to type in and RUN? A wide variety. Tests on key peripherals? Regularly. Incisive software reviews? On games, on business, on any software written for MSX.

'MSX Computing *will be playing an active part in developing services on MSX-Net, the Telecom Gold-based network for MSX owners. If you're on the 'net you'll be able to reach us'*

The December issue will be packed with interest. Included will be the second part of our series about using MSX Basic, which will build up to a handy reference guide for the keen programmer. There'll be test reports on printers and monitors and an exclusive review of the first MSX 'music' micro — written by a well-known name from the music industry. Don't miss the competition to win the first set of Activision games for the MSX format (over £1,000 worth of prizes!).

There'll be reviews on all the latest software (and we're expecting lots), and pages of program listings. And there will be our exclusive 'MSX departments', covering computer networks, music, graphics, business uses and games. Plus our experts answering your MSX queries and problems.

As if that wasn't enough, *MSX Computing* will be playing an active part in developing services on MSX-Net, the Telecom Gold-based network for MSX owners. If you're on the 'Net, you'll be able to reach us through electronic mail, and you may even be able to download software featured in the magazine (that's under development at the moment).

The important thing to remember is that *MSX Computing* is here to help you — the MSX owner and user — to get the most out of your machine. We need you, and we hope you'll need us. Tell us about your experiences — problems, ideas, praise or anything. Tell us what you want, and we'll do our best to provide it within the pages of *MSX Computing*, Britain's first MSX user magazine — and the best.

Look out for the December issue, on sale November 21st, price 85p. Order it from your newsagent now!

WE NEED YOUR PROGRAMS

If you've been hacking through MSX and developed a useful little program you'd like to share with our readers, don't hesitate to send us a copy. Tapes only, please (and don't send the master), and if the LIST is good enough for readers to RUN, we'll pay a good rate and give you credit as well!

Show report

Our reporters found plenty of interest at one of the largest computer shows held in the world

MSX made its first significant public appearance at the September PCW Show. Though none of the major manufacturers took stands, many software companies had MSX computers on view and in use.

Microdealer UK took the opportunity to show the AVT Goldstar, a Korean-made MSX machine selling for under £240. It is previewed in *What MSX?*, but it's worth a quick summary here. The specification is basic MSX, as is the keyboard layout. The machine is attractively designed, although the keyboard response can't be numbered among the best. But at the price it's hard to complain.

Microdealer UK was also showing a most interesting baseless joystick. It has a capsule of mercury inside, detecting stick movements and thus affecting the screen object. It should be in the shops soon.

Hudson Soft is a major Japanese software manufacturer. Its products are being imported by Kuma, and many are reviewed in this issue. For the future, it plans to convert Stop The Express, a best seller on the Commodore 64. You have to run along the tops of railway cars, avoiding villains, leaping gaps and so on.

Pretty Sheep is another game due for release next year, where you have to shepherd sheep into a pen against the clock. A wolf may hamper you and there's a girlfriend to meet too. It's aimed at young children and is already a big hit in Japan.

HuCALC is a business oriented program due soon. It is a spreadsheet and seems to have virtually everything you could want.

Two new accessories were also displayed on the Hudson Soft stand. They are made by Mitsumi Components.

The first is called the Quick Disk Drive. It takes 2.8in disks, each of which can store 64K of data on each side.

Access is sequential, though an operating system to give random file access is planned. Access time is eight seconds to load an entire side and the whole unit interfaces to a cartridge port. The price in Japan is around 35000 Yen (about £110). Discs cost the equivalent of £1.50 each.

The Mitsumi Joy-Card is a type of joystick. Measuring 12cm by 6cm, it has an eight-way rocker switch and two fire buttons. When available, it should cost around £10.

Touchmaster was displaying its new touch sensitive pad, with all sorts of programs running. Users touch symbols on a pad overlay, instead of using the keyboard. No MSX version of the pad is available yet, but the company plans one for the very near future.

Premiere Microsystems had a few MSX programs on show too, including a sophisticated word processor called Wordmate. It is to cost around £25 and looks promising. Premier also has a machine code monitor, a gambling compendium, a home accounts pack and several other programs due soon.

Reaction to MSX at the show was fairly mixed. A number of software companies are taking a wait-and-see approach. They're biding their time until machines are here in sufficient quantities to make heavy investment worthwhile. Others were very eager to get started on writing software, but were waiting to receive machines from the MSX working group.

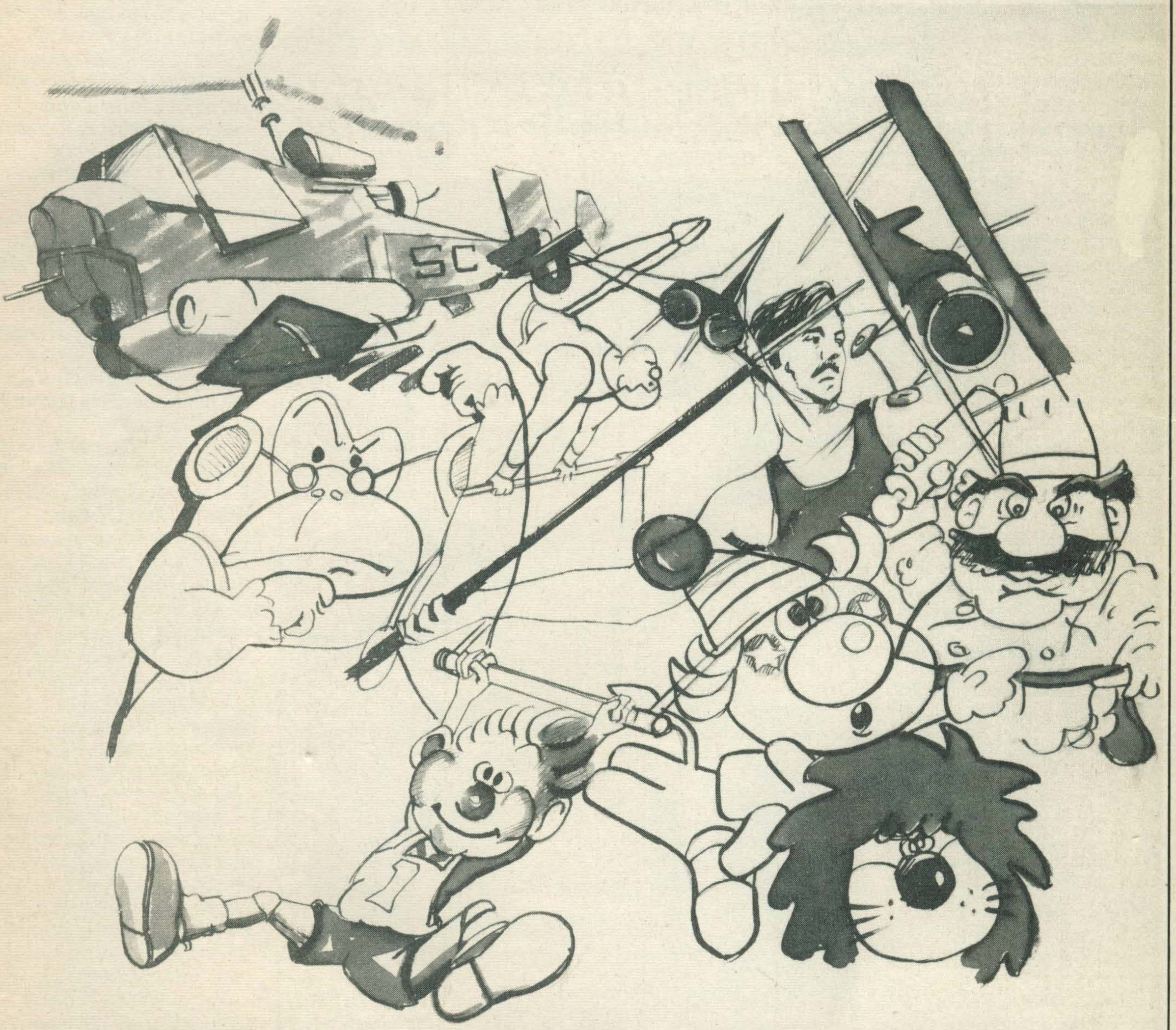
The working group also managed to create some ill feeling on the press day by dragging a large group of journalists, kicking and screaming, down to the South of France, when they should have been living it up in Olympia.

Overall, though, the response to MSX was encouraging. There seems to be a general awareness in the trade that those companies involved in the home micro business can't afford not to be involved.

Just a few of the items on the stands at the recent PCW show at Olympia, London

Konami®

MSX



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GRAPHIC DESIGN

Starting off our series on MSX Basic, Tom Sato investigates the finer points of computer graphics

The first thing you will want to do when you have bought your computer is to write some simple programs. One of the best introductions to computer programming is through computer graphics, because it is relatively easy and can produce some interesting effects.

MSX BASIC is equipped with a wide range of graphics commands and here we shall investigate how to use four of them—namely LINE, COLOR, CIRCLE and PAINT—to draw

pictures on the high resolution graphics screen.

To start with, let's look at the high resolution mode on the MSX. It has a resolution of 192 by 256 pixels or points (figure 1) and you can use any of 16 colours. To enter this mode you must execute:

SCREEN 2

If you try typing in SCREEN 2 as it is, all you'll see is a flash and the computer will return to text mode. You must use the SCREEN statement within a program. Also, to stop the computer from forcing the display back to the text mode, you will need an infinite loop at the end of your graphics display program in order to hold the computer in the graphics mode.

Therefore the general configuration of a graphics demonstration program will look like:

10 SCREEN 2
. . .
. . . your program
. . .
9000 GOTO 9000 (this is the infinite loop)

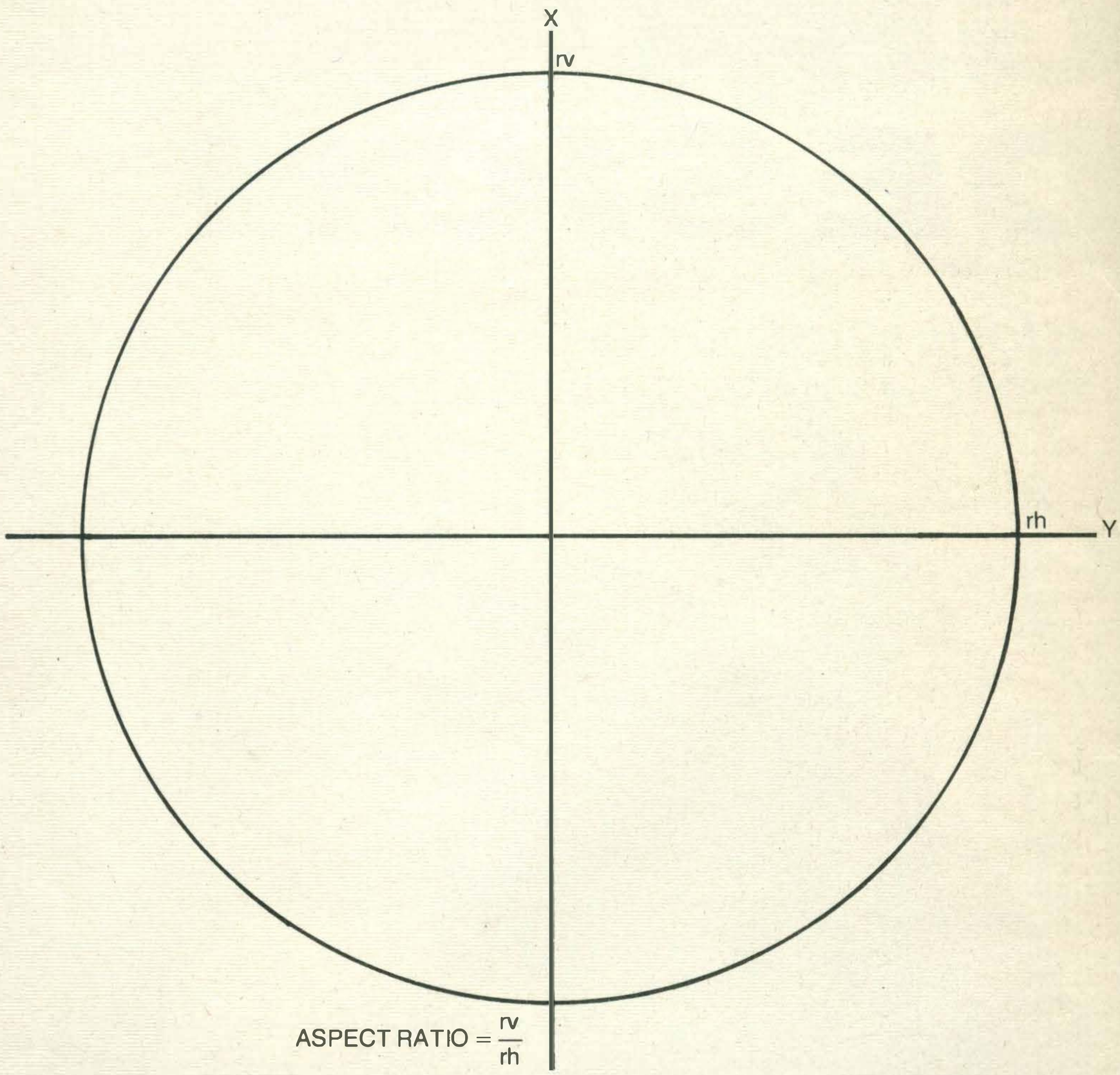


Figure 1

Having entered graphics mode, one of the first things you should do is to change the background, border and foreground colour. There is a choice of 16 colours;

0 transparent
1 black
2 medium green
3 light green
4 dark blue
5 light blue
6 dark red
7 cyan
8 medium red
9 light red
10 dark yellow
11 light yellow
12 dark green
13 magenta
14 grey
15 white

Using the COLOR command, which has the syntax:

COLOR <foreground colour>,<background colour>,<border colour>

you can select the colour of the display. Bear in mind that the colour of the graphics screen does not change unless a CLS statement is executed.

Let's say you want a light yellow foreground, a black background and a medium red border. The program will look like this:

```
10 SCREEN 2
20 COLOR 11,1,8
30 CLS
40 GOTO 40
```

Now that we have sorted out the display colour, let's look at the LINE command and the 'co-ordinates specifier'. To draw a straight line you have to give two co-ordinates — the start and the end points — using the following syntax:

LINE (<co-ordinates specifier>)–(<co-ordinates specifier>)

The screen, as mentioned above, is 192 by 256 pixels with co-ordinates (0,0) at the top left hand corner and (255,191) at the bottom right hand corner.

There are two ways of specifying co-ordinates. One is to give the absolute position on the screen i.e. (100,75). The other is to give a relative position from the last co-ordinate referred to by the program i.e. STEP (0,10). STEP (0,10) refers to the position which is 0 points off-set in the X direction and 10 off-set in the Y direction, from the last point visited.

To draw a straight line from co-ordinates 20,20 to 20,100 use either:

LINE (20,20)–(20,100)

or

LINE (20,20)–STEP(0,80)

These give the same result. It is also possible to abbreviate the first co-ordinate specifier. The computer will assume the last co-ordinate visited to be the starting address, e.g.

LINE –(50,100)

Take note that you always require the '–' minus sign with the LINE statement.

If you want to draw a line in a different colour to your foreground colour, that colour is specified at the end of the line statement. For example, to draw a line in black:

LINE (10,10)–(10,100),1

where the last number, 1, refers to the colour of the line.

This is not all that the LINE statement can do. It can also draw rectangles and squares in colour, as well as give you the option to fill the rectangle drawn. To do this you need to use the 'B' prefix (B stands for Box), give the co-ordinates of the top left hand corner of the rectangle in the first co-ordinate specifier, and the bottom right hand corner in the second. To draw a square it is probably easier to use the relative co-ordinates and give the length of the sides. This is a short demonstration program.

```
10 SCREEN 2
20 LINE (10,10)–(40,20),
   15,B
. . rectangle in white
```

```
30 LINE (80,20)–STEP(20,
   20,),10,B
. . squares with sides 20
40 LINE (50,100)–(80,120),7,
   BF
. . rectangle filled in cyan
50 GOTO 50
```

The BF in line 40 means Box Fill, and will fill the rectangle with the colour specified, in this casecyan.

It is worth mentioning that the square drawn in figure 2 will not strictly be a square, despite the factthat in terms of co-ordinates all four sides are of length 20. This is because the UK version of the MSX system gives a more squashed picture than the Japanese one.

There is nothing to remedy this situation but to draw a vertically long rectangle to make it look square on the TV screen. The same goes for circle drawing, with which we will deal next.

The CIRCLE command is as versatile as the LINE command, so let's start with how to draw a circle on the screen.

To draw a simple circle you must specify the centre of the circle and its radius. If the centre of the circle is outside the screen or the radius is too large to accommodate the entire circle, the computer will only draw up to the edges. There is no need to worry if you go beyond the actual display screen. The CIRCLE command's syntax is as follows:

CIRCLE <co-ordinates specifier>,<radius>, <colour>

The co-ordinates specifier is the same as the LINE command and both the relative and the absolute format can be used.

Try this simple program.

```
10 SCREEN 2
20 CIRCLE (100,80),70,15
30 GOTO 30
```

If you RUN this program, you will notice that the circle is slightly flattened. You can remedy this by giving an aspect ratio of 1.4 to the circle. The aspect ratio is the ratio of the vertical radius to the horizontal radius and is used in producing ellipses (see figure left):

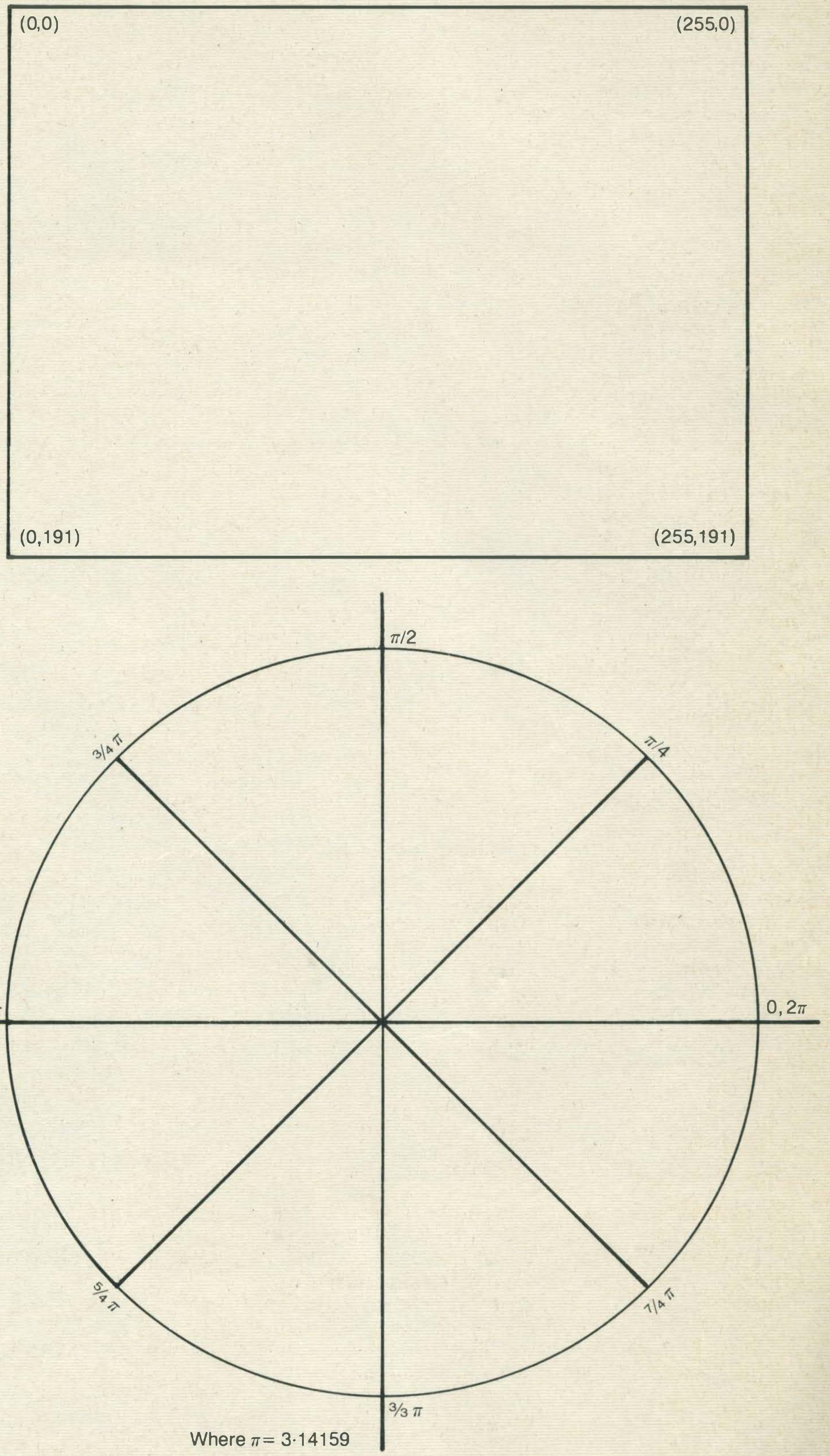
CIRCLE <co-ordinates specifier>,<radius>, <colour>,,,<aspect ratio>

Don't worry about the extra commas between colour and aspect ratio—we'll deal with those later.

Using the above syntax for ellipses we can now draw a true circle on the display as follows:

```
10 SCREEN 2
20 CIRCLE (100,80),70,15,,,
   1.4
30 GOTO 30
```

To draw a horizontally elongated ellipse, the aspect



Where π = 3·14159

ratio must be less than 1.4, and for a vertically elongated one, more than 1.4. If you omit the aspect ratio, the computer will assume it to be 1.

With MSX, it is even possible to draw just an arc:

CIRCLE <co-ordinates specifier>,<radius>, <colour>,<start angle>,<end angle>,<aspect ratio>

The start angle is the angle where the arc begins and the end angle is where it finishes. The angle must be in radians and it is as indicated in figure 4. You may have noticed already that MSX does not provide you with the value of PI so you either have to define PI or work it out. The simplest and the most accurate way to calculate PI is to use the formula PI=4*ATN(1). Here is a short example program:

```
10 SCREEN 2
20 PI=4*ATN(1)
30 CIRCLE (100,80),70,15,0,
   PI/4,1.4
40 GOTO 40
```

It is even possible to draw two lines from each end of the arc to the centre, to give a fan shape. This technique is used in making pie charts, and is achieved by means of simply adding a minus sign to the start and end angles in the CIRCLE command. Here is a simple example to draw a pie shape:

```
10 SCREEN 2
20 PI=4*ATN(1)
30 CIRCLE (100,80),70,15,=
   0.1,=PI,1.4
40 GOTO 40
```

Lastly, we come to the PAINT command. This fills in an area of the screen with a specified colour. In high resolution graphics mode, you must surround this area with a line. This border line must be the same as the PAINT colour, otherwise the colour will spill over the edge. You must also specify the position at which PAINTing is to start. The co-ordinate specifier for PAINT is exactly the same as the CIRLE and LINE commands:

PAINT <co-ordinate specifier>,<colour>

Another point to bear in mind is that there is a certain colour restriction in mode 2. If you see a smudge effect when you are PAINTing, this is because you are limited to two colours in each 8×1 pixel block (8 horizontal) — one foreground and one background. In order to avoid plotting more than two colours it is a good idea to paint the largest area first and repaint the smaller one over it.

You may use any of the 16 colours but you must remember that the area to be painted must be totally enclosed.

```
10 SCREEN 2
20 CIRCLE (100,80),70,15,,,
   1.4
30 PAINT STEP (0,0),15
40 GOTO 40
```

STEP (0,0) in line 30 means start painting from the centre of the circle defined in line 20.

To summarise the points made so far, we have devised a simple graphics demonstration program . . . so get typing!

```
5 REM** PENGUIN **
10 SCREEN 2
20 COLOR 1,5,5
30 CLS
40 CIRCLE (118,160),11,10,,,,.4
50 PAINT (118,160),10
60 CIRCLE (83,160),11,10,,,,.4
70 PAINT (83,160),10
80 CIRCLE (100,60),30,1,,,,.9
90 PAINT (100,60),1
100 CIRCLE (100,115),48,1,,,1.3
110 PAINT (100,115),1
120 LINE (100,60)-(150,80),1
130 LINE -(165,90),1
140 LINE -(125,90),1
150 LINE (75,75)-(35,70),1
160 LINE -(45,80),1
170 LINE -(70,90),1
180 PAINT (38,71),1
190 PAINT (150,81),1
200 CIRCLE (100,65),20,15
210 PAINT (100,60),15
220 CIRCLE (92,63),5,1,,,1.5
230 PAINT (92,63),1
240 CIRCLE (108,63),5,1,,,1.5
250 PAINT (108,63),1
260 CIRCLE (100,103),25,15,,,1
266 PAINT (100,103),15
270 CIRCLE (100,123),26,15
280 PAINT (100,143),15
290 CIRCLE (100,83),26,10,.2,3,.2
300 CIRCLE (100,80),26,10,3.3,6,.33
305 PAINT (100,83),10
310 CIRCLE (100,78),15,10,3.3,6.2,.9
320 PAINT (100,90),10
330 PAINT (100,79),10
340 CIRCLE (100,83),12,6,,,,.2
350 PAINT (100,83),6
360 GOTO 360
```

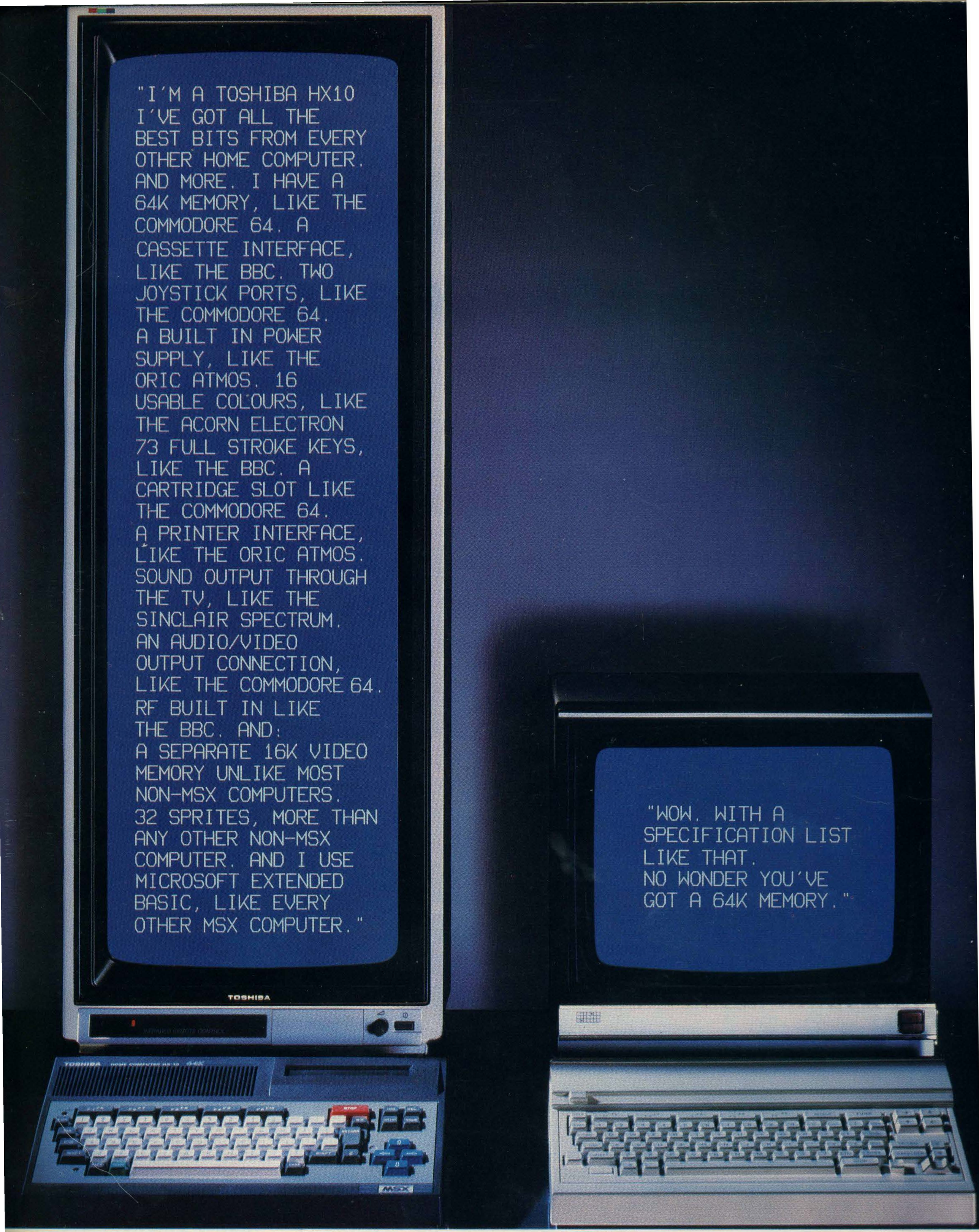
LIST OF SYNTAX

COLOR [<foreground colour>][,<background colour>][,<border colour>]

LINE [<co-ordinates specifier>]-<co-ordinates specifier>[,<colour>][,<BBF>]

CIRCLE <co-ordinates specifier>,<radius>[,<colour>][,[-]<start angle>],[-]<end angle>[,<aspect ratio>]

PAINT <co-ordinates specifier>[,<colour>]



You'd expect one of the best-selling home computers in Japan to have a specification list as big as its memory.

But the Toshiba HX10 doesn't just limit itself to that.

It was developed along with other Japanese home computers to operate on one language: MSX. You can swap programs, games, cassettes, even peripherals like disk drives, printers, and joysticks: they're all compatible with every other MSX computer.

All of which makes MSX the system of the future.

So if you want a computer that won't be obsolete in a few years, buy an MSX. If you want one of the best-selling MSX computers in Japan, buy a Toshiba HX10.

TOSHIBA MSX

FOR MORE INFORMATION ON THE TOSHIBA HX10 CONTACT TOSHIBA (UK) LTD., TOSHIBA HOUSE, FRIMLEY ROAD, FRIMLEY, SURREY GU16 5JJ. TEL: (0276) 681691.

PERIPHERALS

System stretching peripherals

Widen your computing horizons. Expand your micro with peripherals

At last the MSX microcomputer revolution is underway. The manufacturers include household names like Sony and Sanyo, Pioneer and Yamaha — names which through success and reliability in the TV and hi-fi marketplace offer a high security to the home computer buyer.

But there's more to MSX than brand name security. The concept of compatibility behind the MSX system forges a broad, well-defined path through the present home computer chaos of 'Will it work with my Spectrum?' and 'That's the fourth BASIC variant I've learnt today'.

MSX means that for the first time in the short history of home computing, the user is being offered a system with full software portability, plus access to all MSX peripherals, regardless of manufacturer.

Coming from a general consumer elctronics background, you can bet your bottom dollar that MSX manufacturers are keen to sell computer-related hardware from their other fields of electronics interest.

This means that the MSX

EXPANSION

Spectravideo already has plenty of peripherals ready

computer will fit centrally into what has been described as 'electronic living'. JVC will no doubt be 'biasing' its MSX peripherals towards video tape editing — JVC did invent VHS (Video Home System), after all. Pioneer will be pushing its MSX tie-up with video disc while Yamaha will undoubtedly be selling its MSX computer into music-making homes.

Unlike other home computer systems, MSX micros will allow, tempt almost, the user to expand his/her use of computers into fields beyond games playing and hacking. The success of MSX will lie in its ability to offer users a broad range of peripherals not only for games but advanced programming education and in time 'entry level' business use. The possibilities are endless and limited only by the imagination.

Most of the MSX machines have the same standard I/O attachments. Joystick ports, usually two for game playing; a Centronics parallel printerport for obtaining hard copies; cassette ports for plugging in standard mono cassettes; cartridge ports for connecting any data or memory cartridges, games, 80 column cards and the like. There is also the choice of an RF output, sometimes RGB, or composite video port so that you can either plug your machine into your TV or fork out and buy a monitor, which allows mum to watch 'Coronation Street' without interruption!

'Currently most of the MSX manufacturers are producing a limited selection of peripherals'

The key fact to remember is that no matter what MSX machine you purchase you can run software written for any MSX computer whether it's on tape, disc or held in a plug-in ROM cartridge and can connect peripherals from any MSX manufacturer.

Currently most of the MSX manufacturers are producing a limited selection of peripherals to coincide with the launch of their machines with a promise of more to follow. We thought it would be helpful to lead you through the maze of plug-ins, and add-ons and look at the first crop of peripherals to hit the high street, and help you make the most of your computer.

Yamaha has its eye on one particular area of the market, namely the home music makers and aspiring composers. The Yamaha CX5M computer (one of the most expensive MSX machines costing around £600) is specifically designed for a wide range of music generation, programming and editing tasks, and for interfacing with music keyboards, synthesisers, rhythm aids and other dedicated music peripherals.

As the CX5M is a MIDI compatible computer, that is, it's fitted with the standard Musical Instrument Digital Interface, its music-making potential can be expanded by attaching accessories like interface units, and

'Yamaha has its eye on one area of the market, namely the home music makers and aspiring composers'

synthesisers like the DX7 which costs around £1399. But, for such a sum you may not only get 23 programmable performance parameters and 145 voice parameters, but you can also invent a new sound literally from scratch and store the sounds in internal memory. The DX7 also has a small lcd screen, but you can only see one parameter at any one time.

Spectravideo, at the moment, seems to be concentrating on standard attachments such as extra memory, disc drives, data recorders and an 80 column card. The company's 320K disc drive is very useful as an external memory unit with its large memory capacity and

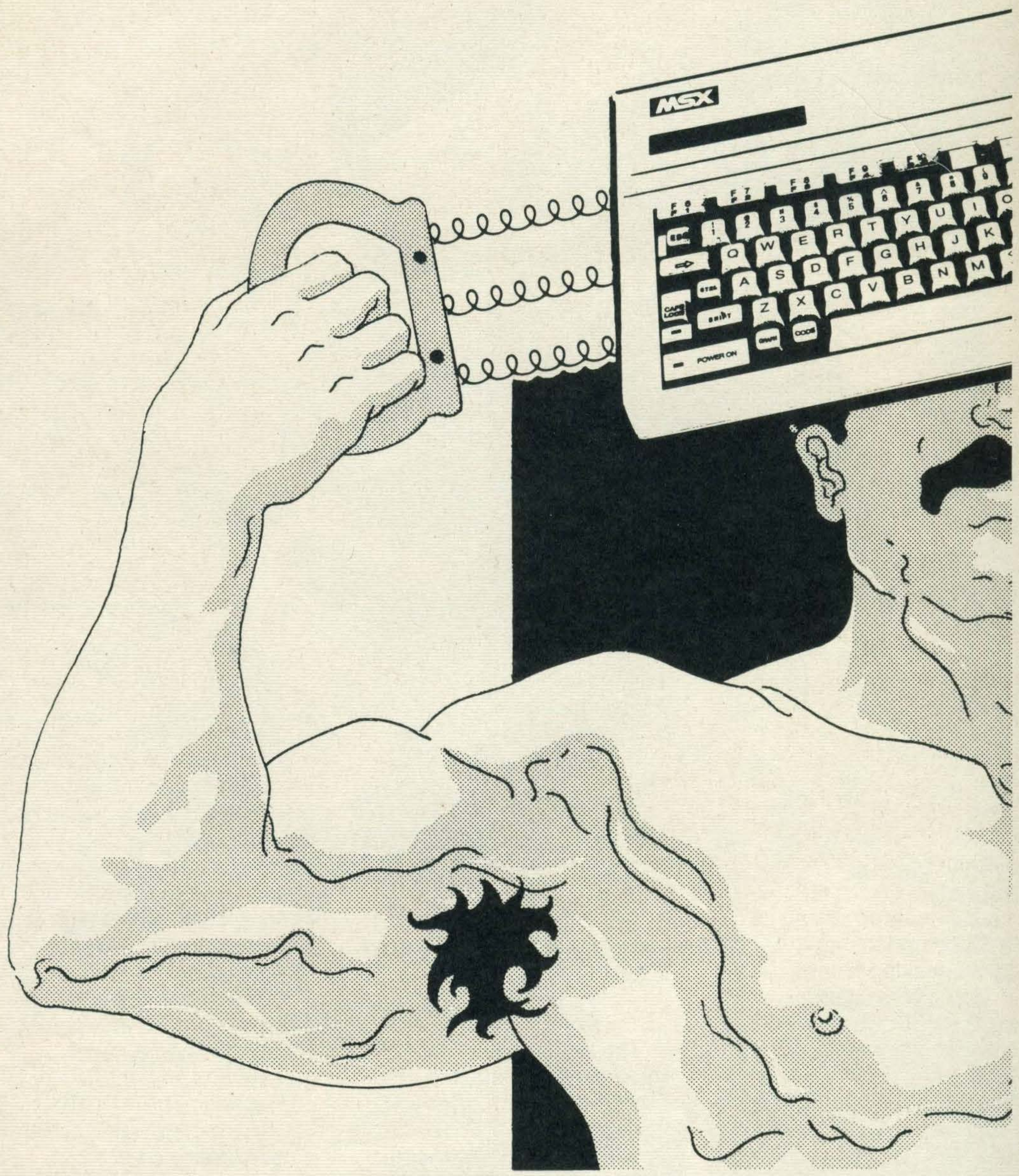
Sony has set the standard for 3½ inch disc drives

high access speed. It is also designed to run other MSX compatible operating systems as well as MSX DOS. Spectravideo's 80 column card costing around £112 plugs into the cartridge slot and transforms your machine into a professional terminal with an 80 character per line display. With this cartridge and the SVI disk drive, any of the sophisticated CP/M programs already available on the market can also be run on your computer.

As this is the age of information gathering and accessing remote information on-line is increasingly essential, Spectravideo will also be offering a 300 baud modem with an RS232 interface.

Additional memory capacity can also be acquired using a 64K RAM expansion cartridge, which means that you can run a lot more software and assemble programs more quickly.

'Spectravideo expects all its peripherals to be available in time for the launch of its machine'



In expectation of a rapidly developing MSX games market, Spectravideo has also improved the design of the 'Quickshot I' joystick, for £12.95 with a second fire button and a better contoured grip. The company expects all its peripherals to be available in time for the launch.

Toshiba, who also plan to launch a machine, the HX 10, in September, will be offering a limited number of accessories. Disc drives will not be available until the spring, at the earliest. But, this isn't really a problem because you can, if you're in a hurry, plug in one from Sony or Spectravideo.

Spectravideo will be making available a high quality 105 characters per second dot matrix printer for £439.95. There will also be a data recorder priced at £29.95 which will have top mounted controls, a tape counter, and, when used for audio recording, a voice level sensor system which stops the tape when there is no sound.

Sanyo's MSX machine, the MPC-100, is the only machine at the time of going to print to offer the option of a lightpen for games and graphics, which will be priced at £89.95. A joystick for £12.95 will also be available at the launch in October. It is quite likely that Sanyo is market-watching and will probably launch more products early next year.

Sony's MSX computer, called 'Hit-Bit', will also be offered with a selection of accessories, one of which is a rather expensive joystick at £19.95. For the spectacular price of £65 you can have a remote controlled wire-less joystick, ideal for the computer buff who likes to work from the comfort of his armchair. A four-colour plotter with high resolution that can handle all sizes up to A4 is on the cards as is a 360K disc drive, and a data recorder.

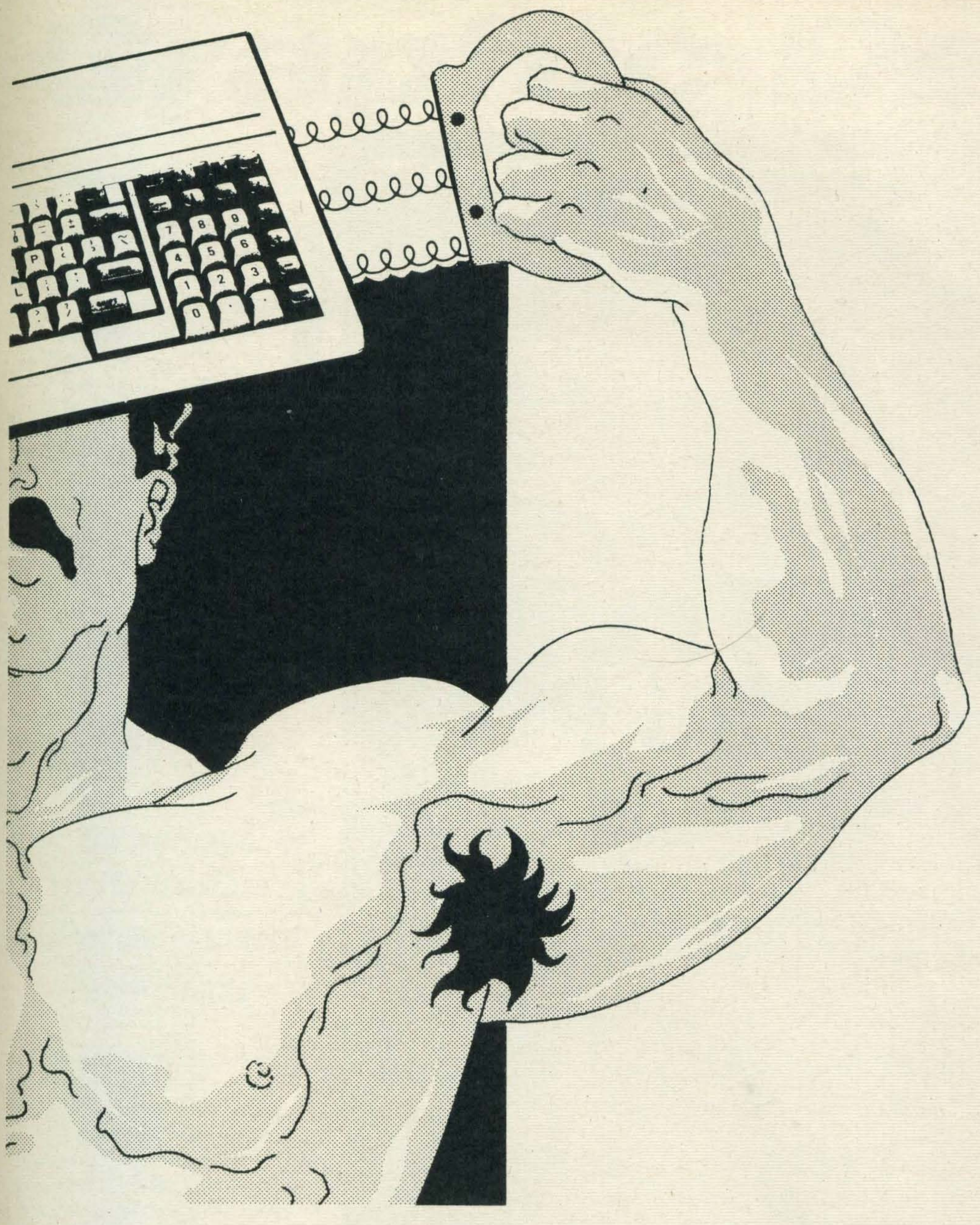
According to Richard Kennedy, general manager of Canon's systems division, his company's machine, the V20, will be arriving in the high street in October. Shame about the peripherals, which are only available in Japan. However, there are rumours that the situation might change by April.

JVC's machine, the HC-7GB, also expected here in October, will be offered with a better selection of peripherals than most of the other computers. These will include a joystick at £12.95 and a very pretty and very pricey data recorder for £89. According to Stephen Michaelis, the company's assistant marketing manager, it resembles a hi-fi cassette deck and capable of very high speed data transfer.

'It won't be long before a second generation of MSX machines hits the high street stores'

Michaelis said his company also plans to offer a 5¼ inch disc drive, data recorders, 3½

EXPANSION



inch disc drives, monitors, printers and a synthesiser for music composition, but these won't be available until early next year.

A couple of manufacturers like Pioneer and Hitachi are sitting tight and watching what happens in the market place before launching any products. Pioneer said that a launch isn't likely until the spring of 1985.

Hitachi are playing hyper-safe and holding off a launch until the first half of 1985, which could mean a machine as early as January or as late as June. The company's marketing and sales director Les Burrage said 'we intend to be market leaders in this field, we are not prepared to launch a product with insufficient stocks, that cannot meet the demands of our customers'. We reckon this means that when the company does launch its MB-H80 there will be a full complement of peripheral devices, including printers, interfaces, cassettes and disc drives.

What of the future? What can we expect? Well, at the very least, machines will be upgraded and it won't be long before a second generation of MSX machines hits the high street stores.

And, as each manufacturer has its own marketing plans, different ideas and overheads, we anticipate developments in graphics, sound, general business use and networking. Already in Japan, users can enjoy computer and laser disc games, very sophisticated graphics and video art. Graphics tablets are widely used. These look like flat pads with a pen attached. The pen is then used to pick out particular colours and shapes on the pad, allowing you to draw your own pictures and superimpose graphic designs on still TV pictures.

Interactive video disc systems are a big hit in home entertainment, mainly because people are fascinated by moving images in full colour. Systems available in Japan like Pioneer's LD 7000 laser disc player can be connected to the MSX machines, and has features making interactive programming possible.

Video Art is very appealing to all budding home movie buffs. Using a video art tablet it's possible to make very professional quality picture changes. For example, you've probably seen the wonderful special effects obtained on 'Top of the Pops', whereby spirals and sparkling star bursts appear on screen. This will soon be within reach of the home computer user. 'Wiping' edits and sophisticated fades will be easy meat.

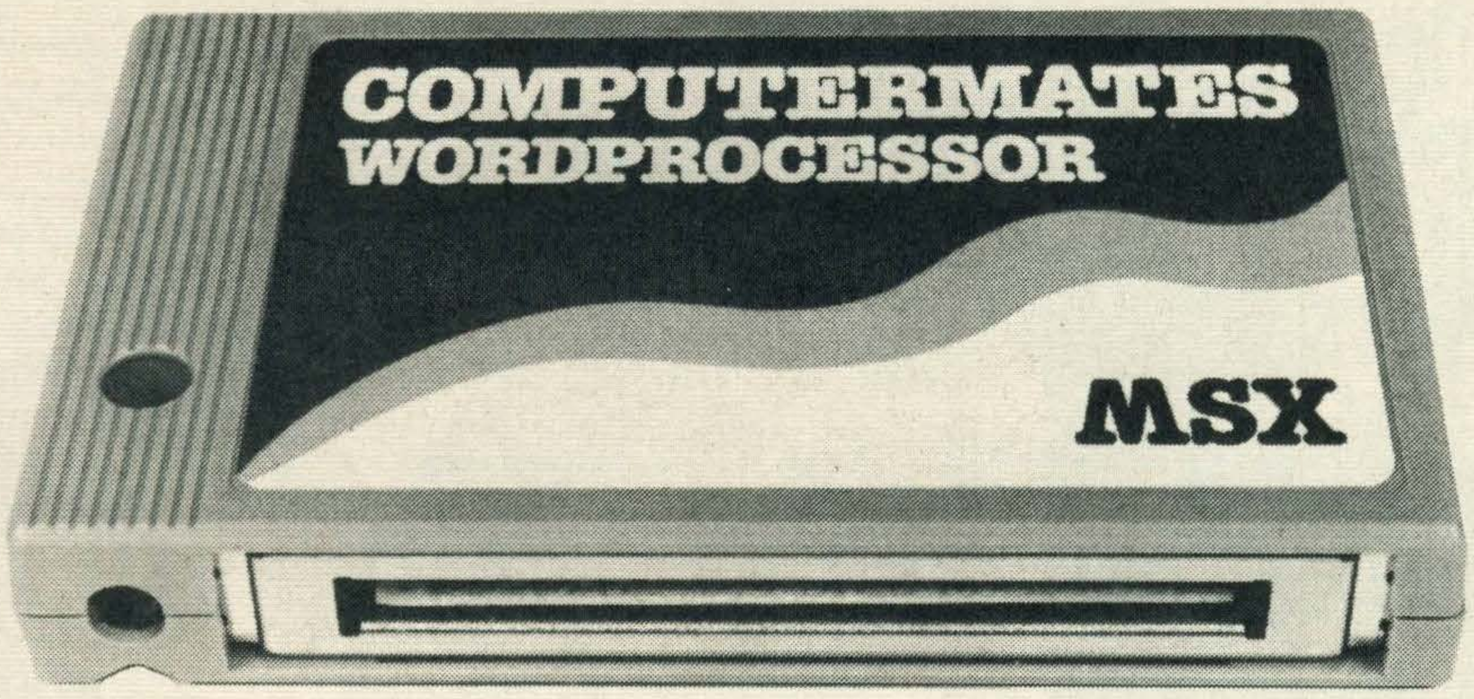
'In the business application area we expect to see many manufacturers offering wp facilities'

In the business application area we expect to see word processing facilities, compatibility with CP-M, and more 80 column cards. The second generation of MSX machines may well herald the introduction of a 40-80 column switch.

It's also conceivable that Canon may think of linking photocopiers with its V20, that even plug-in bubble memory will also appear in the long term and that for the music orientated machines, magnetic readers will be introduced so that music scores can be fed straight into your computer.

As more peripherals come onto the market your standard MSX machine can be greatly expanded. You can have a good beginner's system for a few hundred pounds that could consist of your own home television if you can't afford to splash out on a monitor, a data cassette or standard cassette and you're all set to run a variety of low cost software.

A good home management system would cost a few more pennies, but you could have good quality word processing, electronic home banking, monitor financial records and communicate with other machines . . . and that's just for starters. MSX is limited only by your imagination and spending power.



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DEPT.

Graphic Detail

Go and see any contemporary science fiction film and gasp in amazement as computer-generated graphics sequences fill the screen with colour and action.

MSX graphics may not be able to generate sequences for *Tron* or *The Search For Spock* — yet — but with the help of the graphics department, we should have you well on the way to amazing your family and entertaining your friends, even the boring ones.

MSX BASIC contains its own graphics macrolanguage that is quite remarkable in its versatility. We have correspondents beavering away, getting to know how it

'One day we may all be able to generate Hollywood standard special effects'

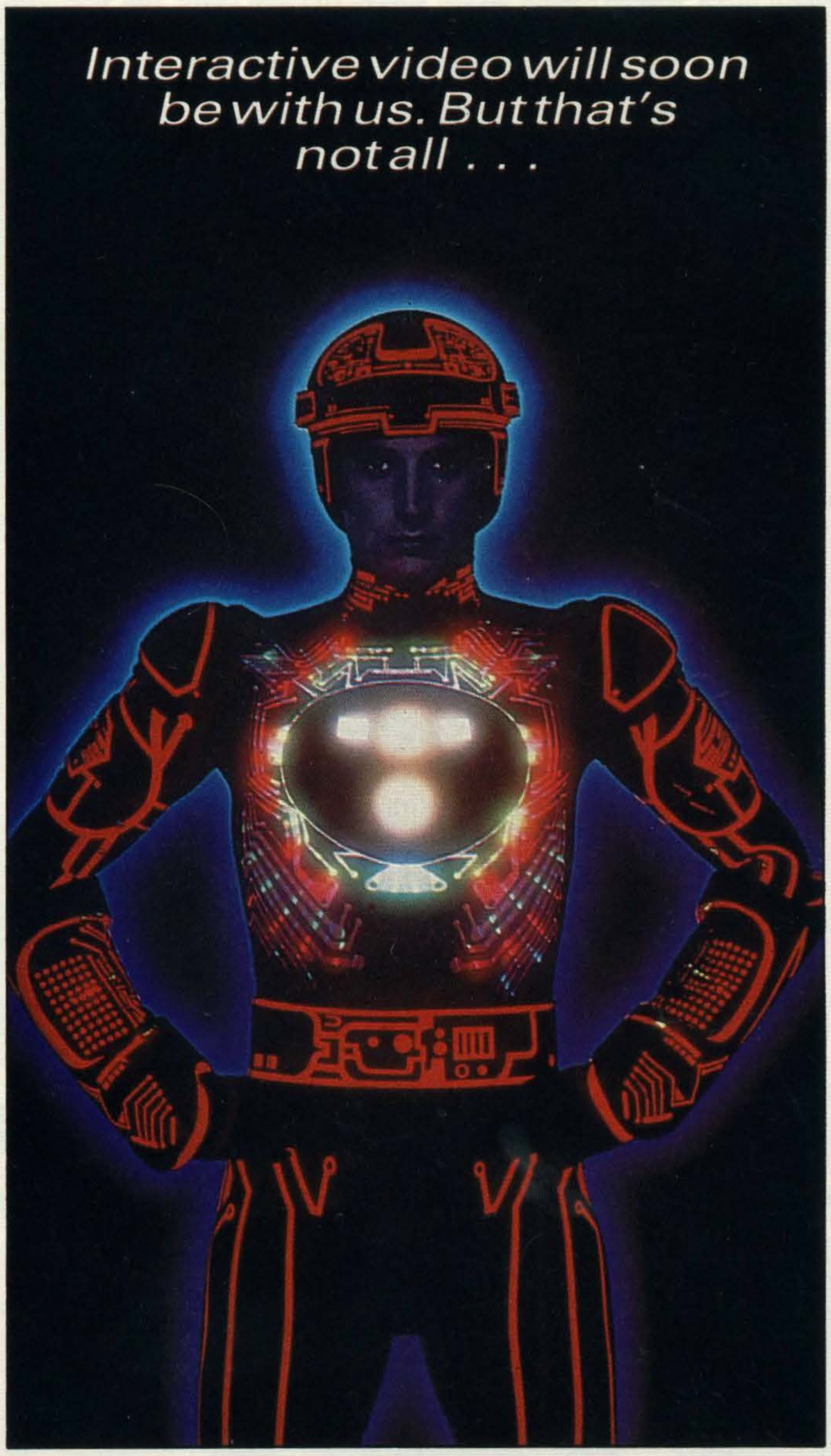
works, and we will be bringing you the fruits of their endeavours in each issue.

We want help from you too. If you come across any graphics routines that produce dazzling effects in a few lines, we want to see it.

Graphics packages are starting to become available too, and these make the task of the would-be computer da Vinci much easier. We have had the chance to play with both Sony and Sanyo versions — they are impressive.

The Sanyo paintbox works with its light pen. It displays a palette of colours and effects. Pressing the light pen to the appropriate place on the screen sets that attribute. You then draw with the light pen as you might with a pencil or paint brush.

If you don't like what you create, you can rub it out and start again. You can print the results using a colour printer (we've been using the Canon PW-1156A), and you could



Still from Tron, (courtesy of Walt Disney Productions)

frame them. Computer art doesn't yet hang in the Tate, but the time may one day come when it's hung in every self-respecting gallery.

Sony's paint box works with its trackball or a joystick. You move a small paintbrush around the screen, over the palette to change settings. It enables copying of part of the image, reduction or enlargement — we played for hours, and look forward to having a sample in the office.

Touchmaster is another accessory that could be used for graphics. This has a large pad, and with suitable software, you could simply lay a picture on the pad and trace over it. The movements of the tracer would be picked up and transferred to the screen. Connect up a printer and you have instant copies with any corrections you might want.

Of course, if you want to make the most of the graphics capabilities of your MSX computer, you'll need a decent monitor. TV pictures may look good, but compared to a high resolution monitor, they are as a Metro to a Rolls-Royce.

The ability to transfer information from one computer to another, via the telephone system, opens up even more possibilities for the graphics fan. He or she can

'Computer art doesn't yet hang in the Tate, but the time may one day come'

create an image in one continent and have it on the other side of the world in the time it takes to make a telephone call. With the promise of peripherals to analyse pictures into individual pixels, it makes the world of computer images a much smaller place.

Even more exciting is the work being done on interfacing with video discs. Pioneer is pioneering the way in this. (Ouch!). It has machines in Japan that will play games against the backdrop of filmed images on a video disc. You won't get more realistic graphics than that with anything less than a NASA mainframe.

In the home, some manufacturers have talked about the possibility of using MSX computers to add titles to videos. You'll be able to really spruce up your holiday videos, and if still video photography takes off, there's yet another avenue to explore. (Holiday snaps on floppy disc?)

Computer graphics are thus likely to be a field that delivers plenty of excitement, while allowing the more creative among us to work with a new medium that is only just being exploited.

One day we may all be able to generate Hollywood standard special effects from the comfort of our own living rooms. When that becomes feasible, you'll read it first in these pages.

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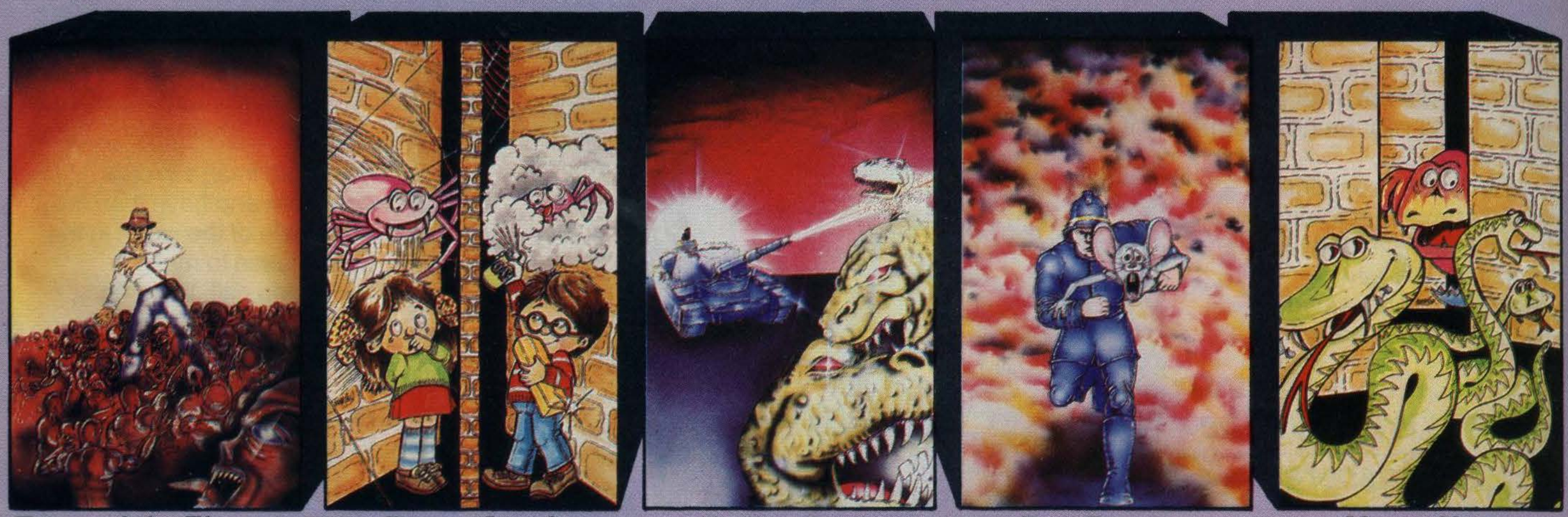
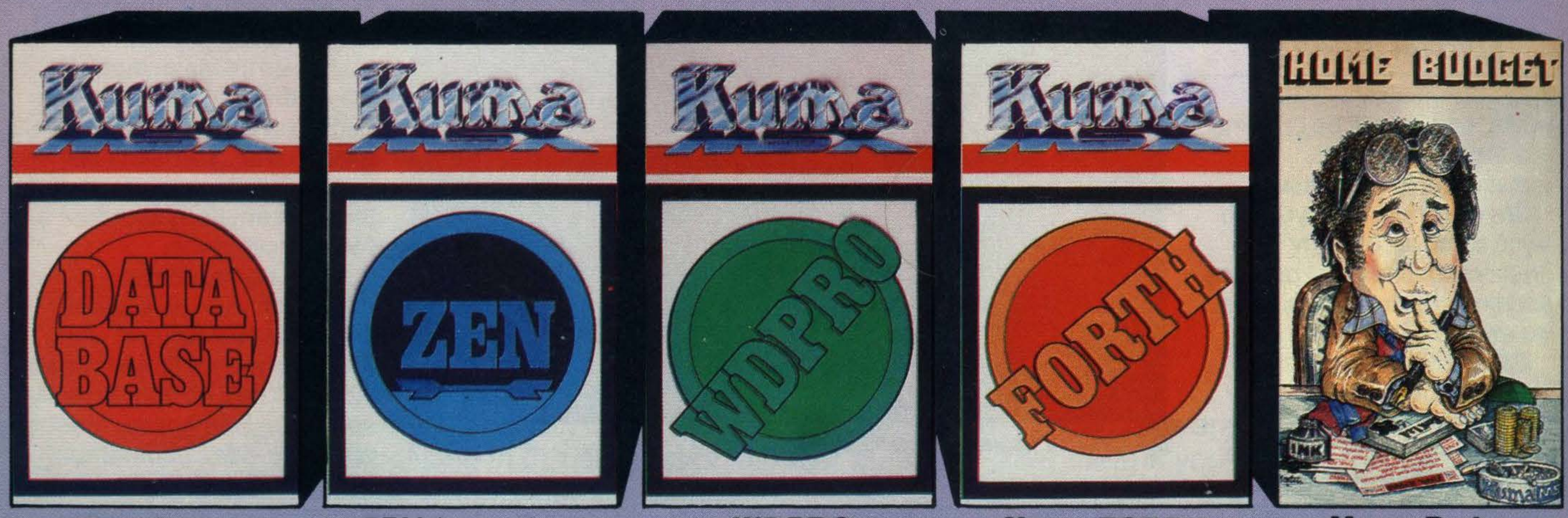


Eric and the Floaters | **Binary Land** | **Driller Tank** | **Fire Rescue** | **Hyper Viper**



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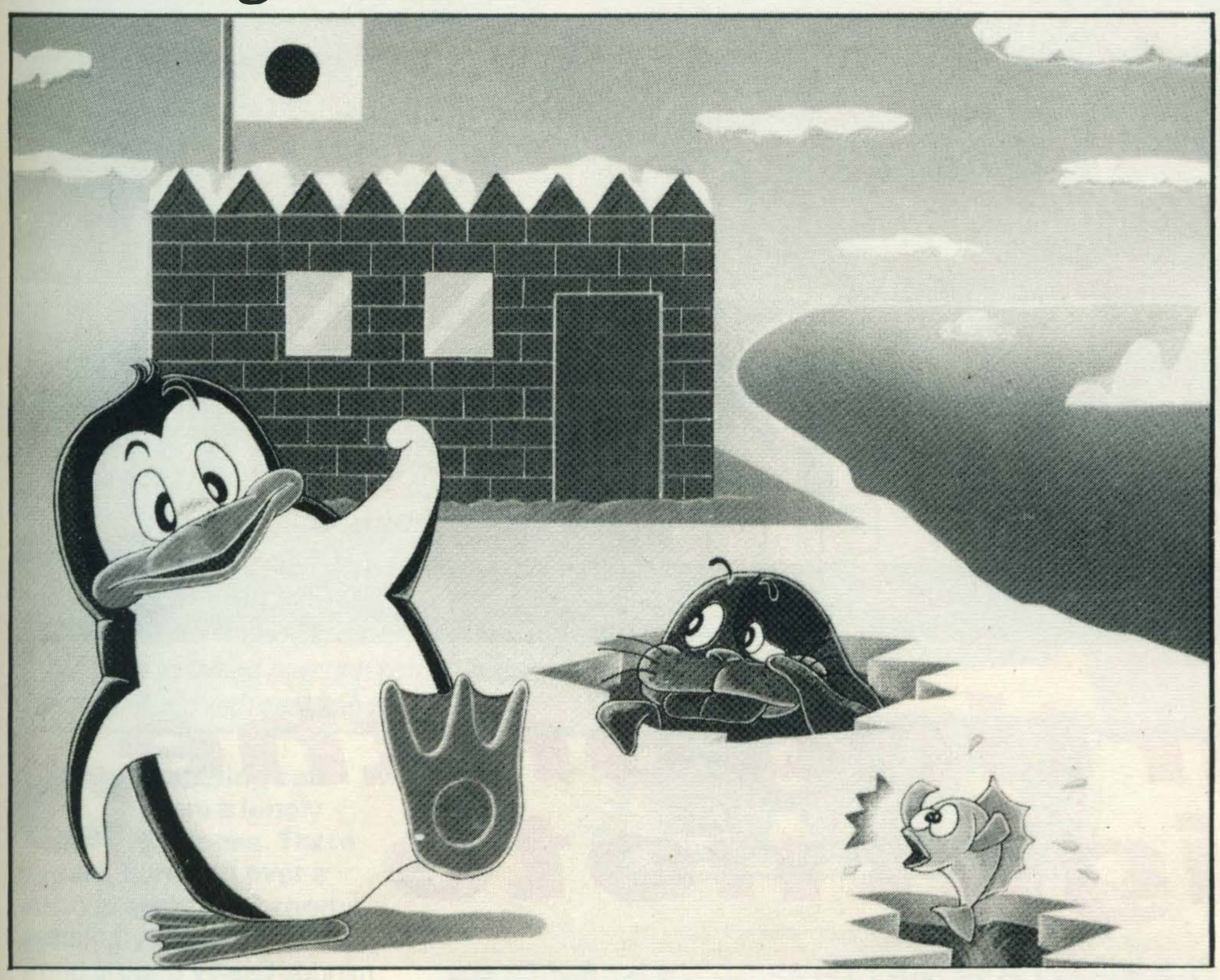


Konami's Antarctic Adventure uses MSX's graphics to the full

Drop those joysticks and let the aliens have some peace for a few moments. Welcome to the Games Department — the place for joystick duellers and adventure addicts of all kinds.

Every month we'll be bringing you the latest news on games under development, how new technology is being used in games and giving you the chance to help fellow players beat their programmed foes.

At the moment we've got new games coming in by the post, by personal delivery, in finished condition or with some way still to go. Some are pretty dire, but the good games are extremely difficult to leave alone.

Konami is a new force on the UK games scene. It is well known for its arcade games that have stripped kids of their pocket money for months. Track and Field was one of Konami's products, and it's bringing in an accessory for that game now — a small pad which has two buttons on which you pound away. There's a whole series of Track and Field games lined up for the future, so the accessory could become pretty popular.

Antarctic Adventure is a Konami mega-hit in Japan. Konami must be looking at conversion to non-MSX machines, but at the moment, you'll have to be an MSX owner to play.

Konami sells all its games on cartridge. This ups the price, though it does speed up loading. The great British public has in the past been unwilling to spend extra for convenience's sake, so Konami's agents will have to work hard to sell games at prices of £15 or more.

Other software companies seem likely to try and make a few bob out of MSX at the start. MSX games aren't likely to be the cheapest around, at least until there is a large user base out there buying games in large quantities. Companies like Mastertronic will charge low prices of course, but it is up to you to make sure games suppliers get the message — we want quality but we want it without getting an overdraft.

The future for MSX gamesters looks bright. What with Pioneer's video disc — you haven't heard about that? It's magic. Against a filmed backdrop, recorded on a video disc, you play your game. Fantasy has never been so realistic. Plenty of hardware will be needed, but if video disc interfacing catches on, today's computer games will seem about as exciting as Tic Tac Toe.

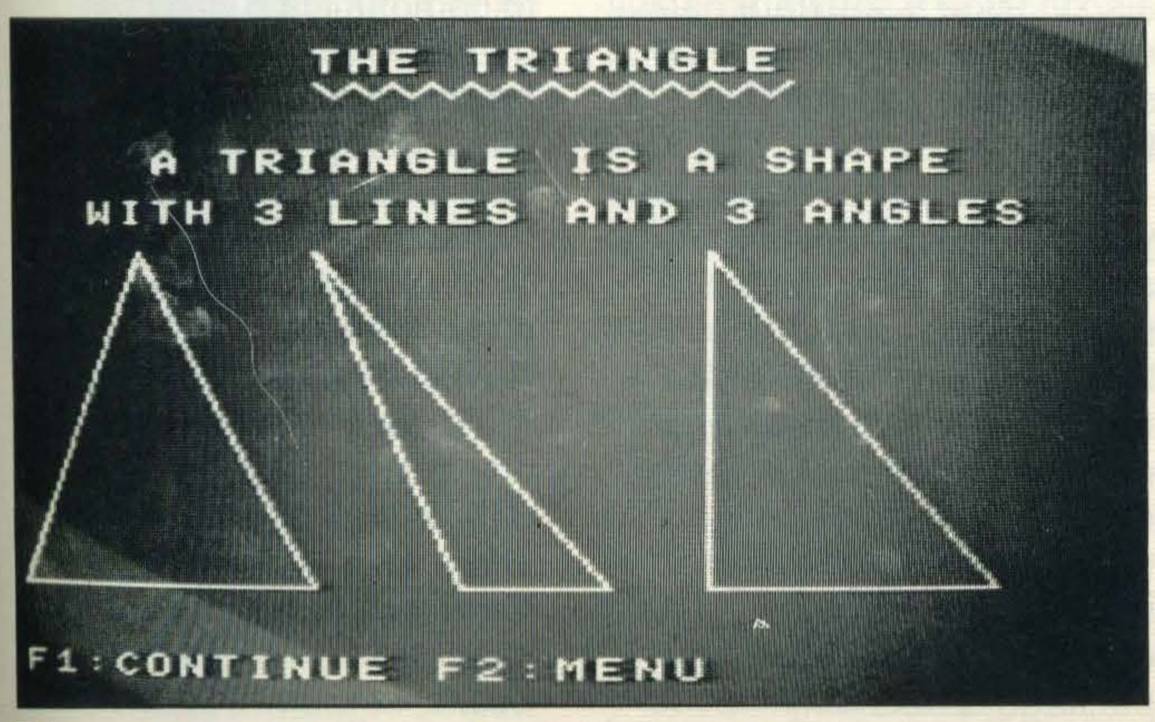
There are some pretty crass games about at present. Any new computer inevitably breeds inferior software at the start of its life. If you come across any games that deserve to be zapped, let us know and we'll warn others.

We want plenty more from you too. Certain games are going to become big sellers, and there are going to be an awful lot of people out there getting frustrated in their attempts to beat them. If you can help in any way, this is the place to show off.

So, if you have any tips for getting out of tricky situations in MSX adventures, drop us a line. If you have any machine code routines to give arcade game players extra lives or some other such advantage, send us a card. If you can achieve an off the clock score, we want to know.

We also want to see any good games you invent. If you reckon others would enjoy playing them, send a tape of the program. And if it's good enough we'll pay and publish.

That's what the Games Department has in store for you. If it has to do with games, this is the place for it. Now, back to those aliens, until next month.



This programmer shall remain nameless

DEPT.

Starting on the right note

Making music with MSX microcomputers

JVC, Hitachi, Sony,Sanyo, Yamaha. These badges all appear on some of the best and most popular hi-fi equipment available, and they're all names which have become synonymous with home audio equipment.

Not surprising, then, that these people's MSX microcomputers should provide some interesting sound and music facilities, and that dedicated music interfaces to music synthesisers and suchlike will soon be appearing alongside the micros themselves.

The basic MSX standard specifies a separate chip to take care of all the sound facilities in the computer — General Instruments' AY-3-8910 or another chip of equivalent standard. Every MSX micro has three sound channels — or voices — each with a range of eight octaves giving generous sound facilities to the home user.

This kind of facility could previously only be found on superior home micros like the BBC B micro — but MSX goes a lot further. This separate sound chip means that the sound facility works independently of the main processor, allowing it to handle the screen or printer or so on, while you compose the music.

Each month we will be looking at how to make the most of your MSX micro's music and sound capabilities. We will be investigating the musical possibilities within BASIC — and beyond.

We will also keep you up-to-date on the latest musical add-ons which can be linked up to MSX micros thanks to the development of a little gadget called the MIDI interface. MIDI stands for Musical Instrument Digital Interface and is the pathway to creating and composing 'real' music with your MSX.

Yamaha is the prime subscriber to this area of computing, with its computer the CX5M Music Computer. The CX5M costs £599, but that does include a piano-type keyboard as well as the conventional MSX computer which will take non-dedicated MSX software as well. It will also include a software cartridge which controls the synthesiser built into the CX5M.

Although Yamaha has, as you would expect, several stand-alone intelligent synthesisers as well, the keyboard with the CX5M is totally dumb and relies entirely on the microcomputer for its control.

The all important MIDI interface is also built in to the computer — the whole package is definitely appealing to a musically minded user.

on the other hand, JVC is also gearing itself up for the musically minded, and will be selling a musical keyboard with MIDI output to link up to its micro early in November. The difference here is that the keyboard is capable of stand alone operation and has built-in loudspeakers.

The problem is that, although the keyboard will be available then, the MIDI interface which will allow the keyboard and the JVC micro to communicate won't be available until January or February next year. Never mind, though, you should be able to get hold of one from Yamaha in the meantime. There is quite a price differential too — the JVC KB600 keyboard costs £629.

These are just a couple of sound products that we will be putting through their paces in the months to come. Look out for next month's 'hands on' review of Yamaha's music micro.

Dial M for Micro

No man's an island now that computers can communicate with each other

Computing can seem a lonely business. There you are, hunched over a micro in some back room, seemingly cut off from the world around you. But there's no need for that, because your computer can now easily communicate .

You can have access to more than a quarter of a million pages of information on Prestel, which has a section aimed especially at micro owners. You can download software, some of it free, much of it at reduced prices, send messages, read weather reports, reviews, news, book holidays, hotels, and a host of other things.

Telecom Gold is another BT service, originally aimed at businesses but now opening up to consumers. On it you will find MSX-NET. A subscription to that allows you to send messages and telexes world-wide. There will be pages of information, including some from us. *MSX Computing* will be supplying information and services via the 'Net, including a chance to download our listings.

Other possibilities include bulletin board systems (BBS), usually run by other enthusiasts, where you can read or post messages. Unlike most other communications systems, BBSs are free to users. Then there are the professional information networks, such as the services run by news agencies.

Switchable protocols allow maximum flexibility

The basic system for communication is very familiar — it's the standard telephone line. This will carry computer signals as well as voice, although the signals first have to be converted into a suitable form with a modem (MOdulator/DEModulator).

Because of the long distances the signal has to travel, communications also make use of a serial output, rather than the sort of parallel output used for a printer. This is because signals running in parallel tend to get out of step with each other, resulting in gibberish at the other end of the line.

As MSX computers don't currently have a serial output port, you have to buy one separately. JVC and Kuma are both making suitable RS232-compatible adapters which plug into the versatile cartridge port. These units also carry communications software which is needed to handle the input and output.

The signals are also sent at different rates, measured in *baud*. For example, most bulletin boards run at 300 baud (roughly 300 bits per second). Prestel and other viewdata services send data to you at a faster 1200 baud (because there's a lot of it), but receive it from you at 75 baud. The two systems therefore need different software and modems — or types which can be switched.

The software which comes packaged with the current RS232 cartridges is for viewdata systems, like Prestel, and so is unsuitable for bulletin boards. But it is not too difficult to write software yourself, to turn your micro into a dumb terminal. This is a machine which simply sends characters down the line, and prints any characters it receives on the screen. You can't do much more — like down loading software — but for bulletin boards a dumb terminal program should be enough.

Communications is going to be one of the biggest boom areas in computing, and we at *MSX Computing* intend to be heavily involved.

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Need convincing? well, if reading this special first issue isn't enough, here's a flavour of some of the things you'll find in **MSX Computing** in the next few months.

Our goal is quite simple. We want to help anyone with an MSX machine to get the most out of their computer. We'll be covering *all* possible uses for MSX micros — from sophisticated sound synthesisers for musicians to worldwide computer networks. and if killing aliens isn't enough, our hardened games junkies will be giving the low-down on all the best games to hit the MSX market. (Dragging our adventure addicts away from the screen is already a problem!).

If you want to get inside MSX Basic and start writing real programs, our experts will provide the best possible guidance — taking you where no manual has gone before. Mystified by machine code? We'll explain it all. If you fancy exploiting your MSX micro to the full, we'll be there — ready to help out even if your sights are set on becoming a software millionaire.

MSX Computing will also guide you through the maze of peripherals and add-ons that'll be on the market — with expert help on joystick selection for games freaks and disc drives and printers for enthusiasts and business users. You can be sure that if our testers rate a product, you'll be satisfied with it.

Whatever your uses, **MSX Computing** will be your essential MSX handbook.

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Down to Business

Can MSX tempt business users?

A good word to use to describe MSX microcomputers is versatile. Because as well as being very good games machines, they can also be a lot more besides, with the possibilities increasing as more and more MSX products arrive on our shores from the Far East and beyond.

It may come as a bit of a surprise to you that MSX micros will make very effective home business machines, a fact made possible by Microsoft's choice of the Z80 processor as the heart of the system.

Had you tried to buy a machine with MSX specification two years ago, you'd have been looking at business machines — and paying a lot of money for the privilege.

Using the Z80 microprocessor brings a number of benefits. It's probably the best known processor around, and consequently software producers feel at home with it. The Z80 is also at the core of the CP/M operating system. The initials stand for Control Program for Microcomputers which is essentially a piece of software that creates a 'standard' (sort of) environment inside the computer in which other programs can run — using disc drives to store the software and data.

MSX also has one of these 'house keeping' programs, called MSX-DOS (or Disc Operating System) which you use, naturally enough, with disc drives. MSX-DOS is rather useful because it's compatible with the current version of CP/M (CP/M-80 2.2), and because it uses the same disc format for the storage of data as another disc operating system, MS-DOS, which is closely related to PC-DOS as used in the successful IBM PC.

This has some extremely you hook a disc drive up to your MSX micro, it will run CP/M compatible programs — and there are literally thousands of those, covering every conceivable business application including word processors, accounting systems, spreadsheets for financial analysis and just about anything else you can think of.

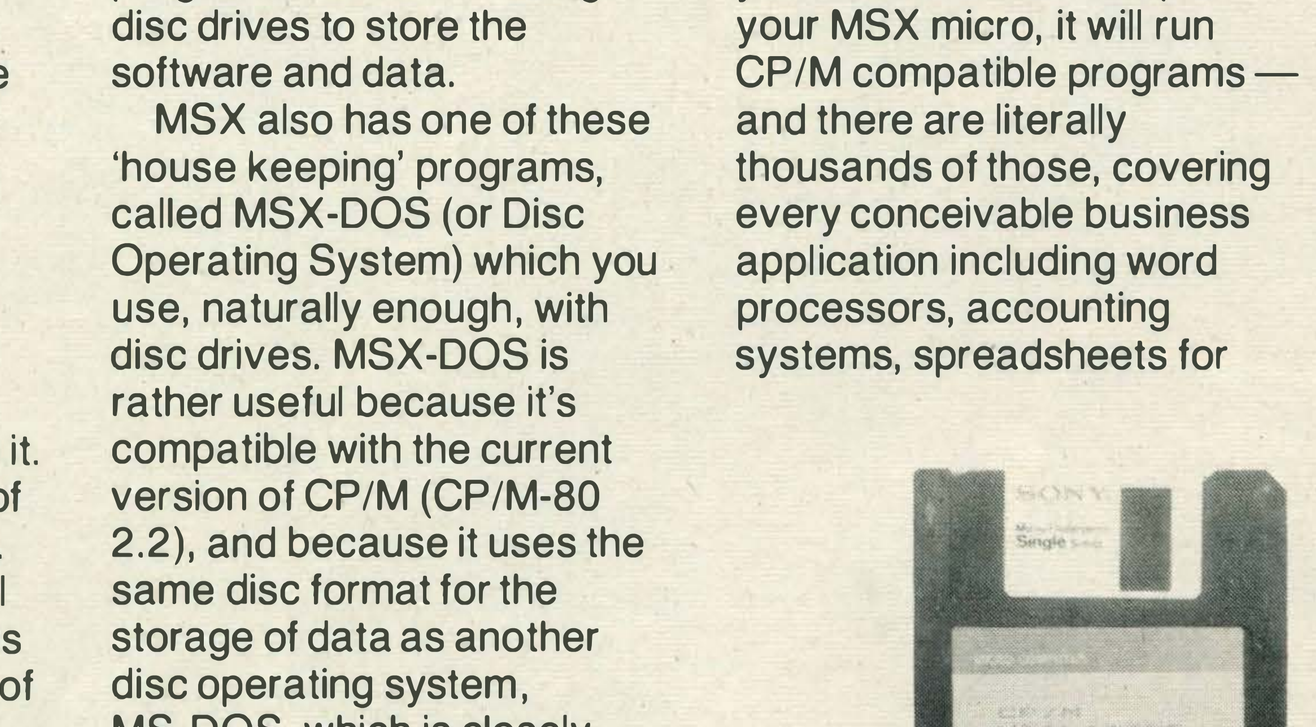
The other nice touch is that if you happen to have an office micro which runs under MS-DOS (Apricots, Sanyos and many others), then you can take the discs home and read the data off them into your home MSX machine.

So far so good. It looks as though your MSX machine could grow into a 'real' business micro system. There is a drawback at the moment, though. The standard MSX computers allow a maximum of 40 characters to be displayed across the screen, whereas most business software — and especially word processors — need 80 characters across the screen (in jargon, an 80 column display).

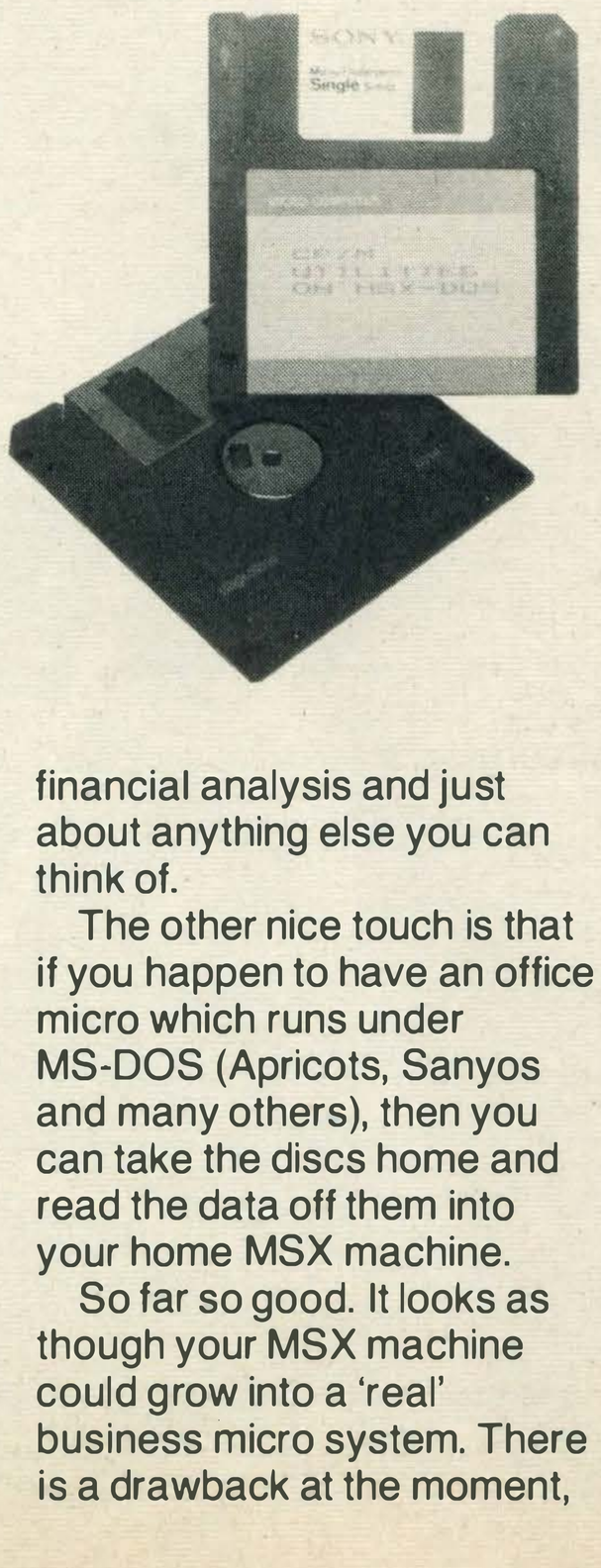
There are rumours that the next generation of MSX machines will have a simple switch to allow you to select between 40 and 80 columns, but for the time being Spectravideo is shipping an add-on which plugs into the cartridge slot and provides a real 80 column screen. (Canon is planning to introduce a similar product over here in the spring of 1985). Using that card and a disc drive, we've been able to run Wordstar, possibly the best known and one of the most powerful word processor programs, on a standard 64K MSX machine.

Disc drives are available now, for instance the 3.5 inch disc format devised by Sony, so there's little to stop you using an MSX machine in a small business. One software company — rejoicing in the name Farmfax — is already producing an MSX business software package for use by farmers. Some word processing programs (40 col) are already out, and there are a few stock control and spreadsheet packages available as well.

All of this means that MSX computers, as well as being games machines, are also capable of doing 'real' business work. We'll be looking every month at new software, old software and hardware add-ons that open up this business world, and we'll be exploring the ways that an MSX computer can be made to pay for itself. Just turn to *MSX Computing*'s Business Department for professional help.

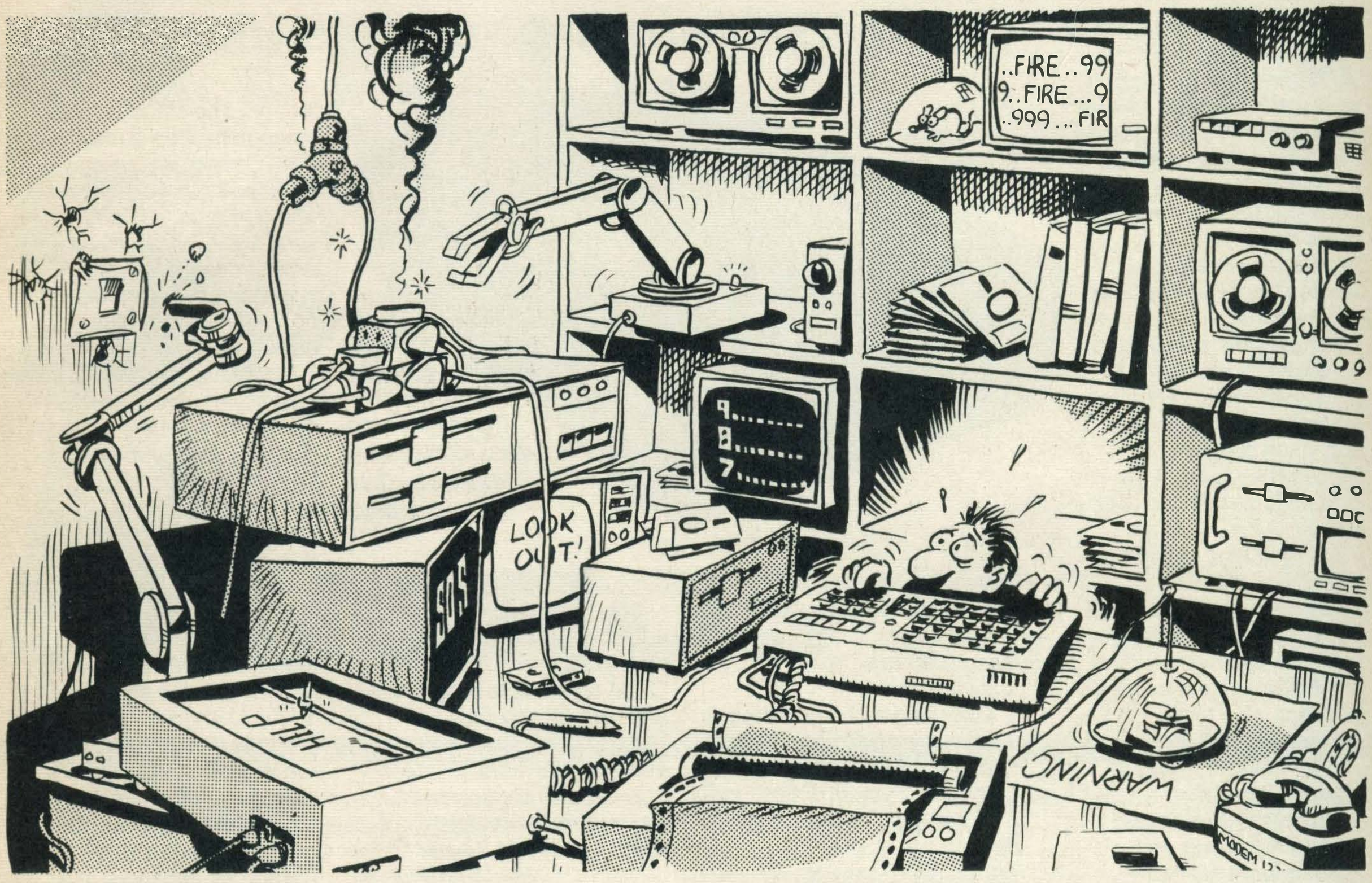


Many business systems need mass storage such as provided by a disc drive



Above: most disc drives need interface units. CP/M, right, is a standard language for business programs

Taking control



Bored with games? There is an alternative

There's more to computing than just playing games. As computing power gets cheaper, more and more applications are being found for home micros. One area which is becoming increasingly popular is robotics.

This is where your computer starts to relate to the physical world. The micro can do something as simple as turning the central heating on and off (although using a £300 computer to do the job of a £2 thermostat isn't exactly making the best use of technology whether it's fun or not).

More interesting is the idea of having a central control unit in charge of a wide variety of devices — TV, video, hi-fi, burglar alarm, washing machine, lights, heating, games centre, doorbell/entryphone, and so on. Indeed, many people regard that kind of application as the future for MSX, particularly when they get the whole computer on to one chip.

In the educational world, simple robots known as *turtles* are used with the language Logo to teach children programming and maths. The turtle is a small motorised buggy equipped with a pen which can be raised or lowered, enabling the suitably programmed computer to draw patterns or pictures on the floor (or preferably on some paper on the floor!). This is felt to have more relevance to children than abstract patterns on a TV screen.

But as well as being useful, robotics can also be fun. It's rather amusing to have your own 'droid wandering around the house, entertaining your friends and scaring the cat (or even scaring your friends and entertaining the cat!).

Linking the robot to the computer is achieved using the expansion port or second cartridge socket. This can be programmed to send information to control the robot, or receive information back from sensors. And the joystick ports are also handy for receiving data — the computer can detect a closed microswitch in a collision sensor the same way it detects a fire button being pressed.

Home robotics is still in its early days. Most of the people involved in it spend long hours over hot soldering irons. You can't just attach a motor or light sensor direct to the computer. Some sort of interface or switching circuitry (such as a relay) has to be used to convert low-voltage, low-current computer signals into the kind of power needed by most external devices. And the chances are you'll have to build it yourself.

But things are changing. Several companies are now making interfaces, arms, turtles and vision systems at prices which home enthusiasts can afford. These can easily be adapted for MSX computers — indeed, most robots don't care what is controlling them. And several companies are already making the minor modifications to their hardware for MSX use.

Of course, you also need software to control the hardware. You can't just type in 'Wash the cat' and hope that the computer knows what you mean. Quite the reverse, in fact — controlling the Input/Output ports used by robots can be fairly tricky. That's where we come in. *MSX Computing* will be looking carefully at the world of robotics. We'll be listing programs to help you stay in control, reviewing hardware, and giving you ideas about how to build your own.

Electric SOFTWARE

A New Name to Generate Excitement!

BUZZ OFF!

32K MSX Cassette

Zoom around and eat as much delicious fruit as you can — it's as easy as that! — except that the spider's web grows alarmingly each time you take a bite!

If you avoid the web, you have the chance to steal the 'Golden Fruit' from right under the spider's nose.

Ten levels of hilarious arcade action with high resolution graphics and multi-channel sound.

Versions for Commodore 64 and 48K Spectrum also available.

SHARK HUNTER

32K MSX Cassette

The eskimo community is under attack! — Ice-floes sweeping downstream threaten to tear apart the flimsy nets which hold the vital fish stocks — while from the sea marauding sharks attempt to break into the pens and eat the fish.

Our hero must, single-handedly, melt the floes, kill the sharks and repair the nets to ensure that, at the end of the year, there is enough fish for his village to survive.

This highly animated arcade action game has high-resolution graphics and multi-channel sound.

Versions for other computers to follow

and coming soon!..

THE WRECK

32K MSX Cassette

An exciting 3D "Adventure" game — Danger and treasure abound as you swim around the sunken liner — and who knows what may be lurking in the murky depths . . .

Electric SOFTWARE

Electric Software Ltd., 8 Green Street, Willingham, Cambridge CB4 5JA.
Dealer enquiries: phone Mike Hall on (0954) 81991.

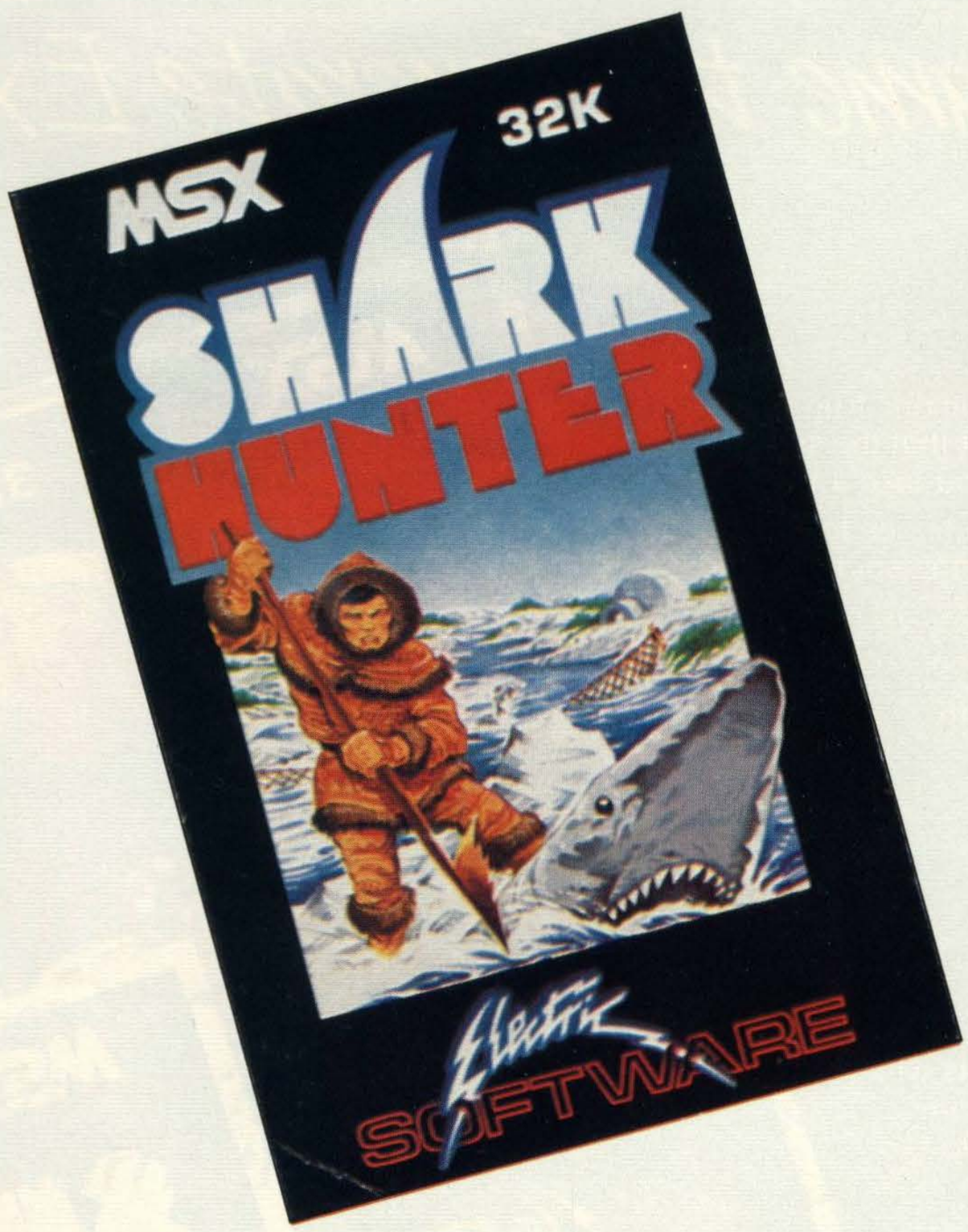
REVIEWS

Software scene

Every piece of software that you find within these pages will have been rigorously put through its paces by our dedicated team of micro hackers. We'll do our best to provide you with a straightforward, no thrills guide. And, at the end of every review you'll find our no-nonsense opinions. If a game or accounting package isn't worth the money or the graphics are lousy, then we'll warn you.

As more software becomes available in the coming months, manufacturers will be doing their best to spoil you for choice. That's where *Software Scene* comes to your aid. We aim to help you find your way through the jungle and sort out the good, the bad, and the totally indifferent.

Programmed bugs to bugged programs — we've wrestled them all!



SHARK HUNTER

Supplier: Electric Software (0954) 81991
Type: Arcade game
Format: Cassette
Price: £9.95

I always thought sharks liked to bask in warm waters, not ice cold water. Anyway, this game casts you as an Eskimo protecting your village's stocks of fish, held in pens formed by nets strung between several islands and the banks of a river estuary.

There are two problems facing you though; ice floes which can sweep through your netting and sharks which are swimming upstream from the sea in search of lunch — first course fish, and the second course you.

Looking like Robert Shaw in a Father Christmas costume, you cross from island to island — either on passing ice floes, or by means of a brisk front crawl — with spear in hand rapidly approaching the deadly sharks with serious intent.

You are also kept busy mending broken nets, strengthening damaged netting and generally protecting your precious fish from cousin Jaws and family.

But be careful not to take a dip within range of any shark — they have voracious appetites and aren't fussy about munching the odd Eskimo.

The main graphics take up most of the screen, with a status line along the top showing which level you have reached, how many fish are left, current

and high scores and the player's name.

At the bottom of the screen are the words SPRING, SUMMER and AUTUMN in large capital letters, with a pointer gradually moving across the seasons as you progress.

Graphic effects are impressive, and the movement of the sharks is pretty realistic, sometimes swimming around in circles with just their fins showing, sometimes surfacing to chomp their way through nets — or you.

The throwing action of the Eskimo is well thought out, but it is all too easy to end up as shark fodder if you are not careful.

The problem is that, when using a joystick to play, throwing the spear is prompted by holding down the joystick's fire button, aiming it, then releasing the button. But as soon as you release the button, you move in the direction that the joystick is aiming — and invariably end up in the brink.

This niggle made it very difficult to progress beyond level one — which was as far as we could get.

Once you have been eaten, or all your fish have been gobbled or swum off, the computer plays a rather mournful dirge and clears the screen of sharks.

Finally the whole scenario scrolls to a forlorn Mrs Eskimo

with her papoose strapped to her back leaving the family's igloo with no hope of surviving the winter without food. Presumably muttering, 'I'm going outside now, and maybe quite sometime'.

A challenging, but rather frustrating game — it definitely needs lots of practice.

HJ

Graphics: *Killingly good*
Sound: *Variable*
User appeal: *One to get your teeth into*
Conclusion: *It's just the tip of the iceberg*

DEVPAC

Supplier: Hisoft (0582) 696421
Type: Assembler/Monitor
Format: Cassette
Price: £14.95

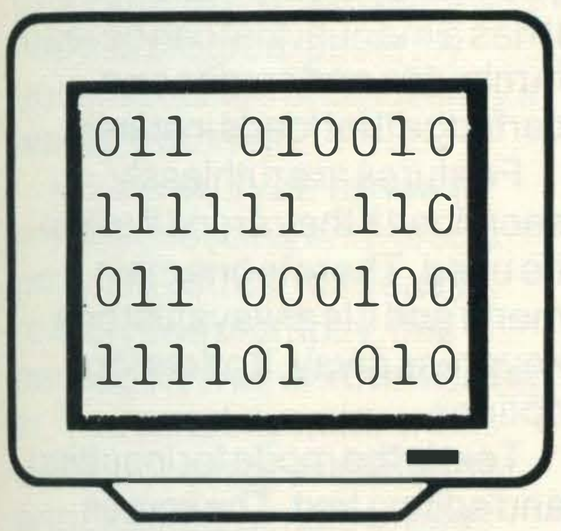
DEVPAC is the MSX version of Hisoft's GENS assembler for the Spectrum, Amstrad and other Z80 based machines. This product has always been well received as it is one of the most comprehensive products of its type.

Naturally, its ability to do almost everything can be rather confusing for the novice. It's certainly not for the person who knows nothing about machine code. But this is offset by the high standard of the manual supplied. No less than 26 pages of A4 describe DEVPAC and its integral editor, and it

includes a sample work session to get you used to the system.

Looking at the editor first, we find that it bears a strong similarity to that found on the Spectrum version. It goes a little further, however, as MSX machines have certain routines built-in to aid screen editing.

DEVPAC uses these to the full, so that the cursor keys, TAB and various CTRL combinations can be used in just the same way as they are in BASIC. This makes moving over into machine code a slightly less painful experience for the BASIC-trained beginner. And for the more experienced machine code programmer, it makes working both faster and easier.



The source file can be saved to tape, and can also be printed out for more leisurely study. It can also be assembled(!).

Assembly is invoked by typing 'A', at which point you are prompted to supply the table size and an option number. Don't worry if these terms confuse you. The system is explained adequately in the manual. And these features also have useful default values, so you don't have to worry about them right from the beginning.

The resulting machine code can be subsequently saved to tape by typing 'O', or it can be executed. You can also assemble it to an address different to its specified origin, to facilitate assembly of long pieces of code.

DEVPAC is perhaps most notable for two of its (so far) unique features — it is totally relocatable, and it can 'include' source from cassette.

The former means that it is possible to have both DEVPAC and the source text below the MSX ROM.
The latter means that it can assemble larger-than-RAM source files, loading each section from tape as it is needed. This was most welcome on the original Spectrum version, and adds to the rest of this package's virtues to make it close to unbeatable. *AD*

Features: *Good assembler — we await the disassembler*

Documentation: *Well thought out*

Ease of use: *Confusing at first, but easy after a bit of practice*

Conclusion: *A good bet*

HOME BUDGET

Supplier: Kuma (07357) 4335
Type: Home business
Format: Cassette
Price: £14.95

This is where you start justifying all that money you spent on your computer. It's also where you find out how much you've spent. So if you think your heart can take it, read on.

Home Budget is designed to keep track of where your money goes — from the mortgage and insurance down to the tins of catfood. And if you really want to know, it will tell you how much you should have left at the end of each month. Fortunately, it works with negative figures as well as positive ones!

After loading, you have to tell the computer whether you have a printer connected. It's a shame the program doesn't test for this itself. However, it doesn't take long to type Y or N.

The next step is to decide whether you want a key click. I asked for one, but still couldn't hear it.

The screen then clears and you are presented with a choice of creating a new file or loading one in from tape.

If you decide to create a new file, you're given the default list of headings. There are 12 for expenses and four for income. You can't alter the number of headings, but you can change what they're called. In fact, the default choice is pretty sensible, including things like mortgage, car, bills and so on. But you might want to have a section for software costs — unless you'd really rather not know.

The main work comes when you start entering data. You have to type in amounts under each heading for each month. You're given a chance to select which month and year you want to start in, and the chances are that, by the time you start using this program you'll have a few months to catch up on.

This means a boring task with most accounts programs. But what's annoying about the Kuma package is that, if you have several expenses under one heading, you have to add them up yourself, and then enter the total.

That said, the program is fairly well provided with features. You can view three months at a time, complete with balances. And there is a bar chart facility where, with a couple of keystrokes, you can have clear and colourful, 3D histograms of your income or expenses.

In most cases, pressing the ESCape key brings you back to the main menu. This includes an option to end the program. When you select that, the program asks if you want to save the file. That's a useful bit of error trapping.

Overall, the presentation is good, although I wish the background colour didn't change with each new screen. Some of the colour combinations can be difficult to read on screen.

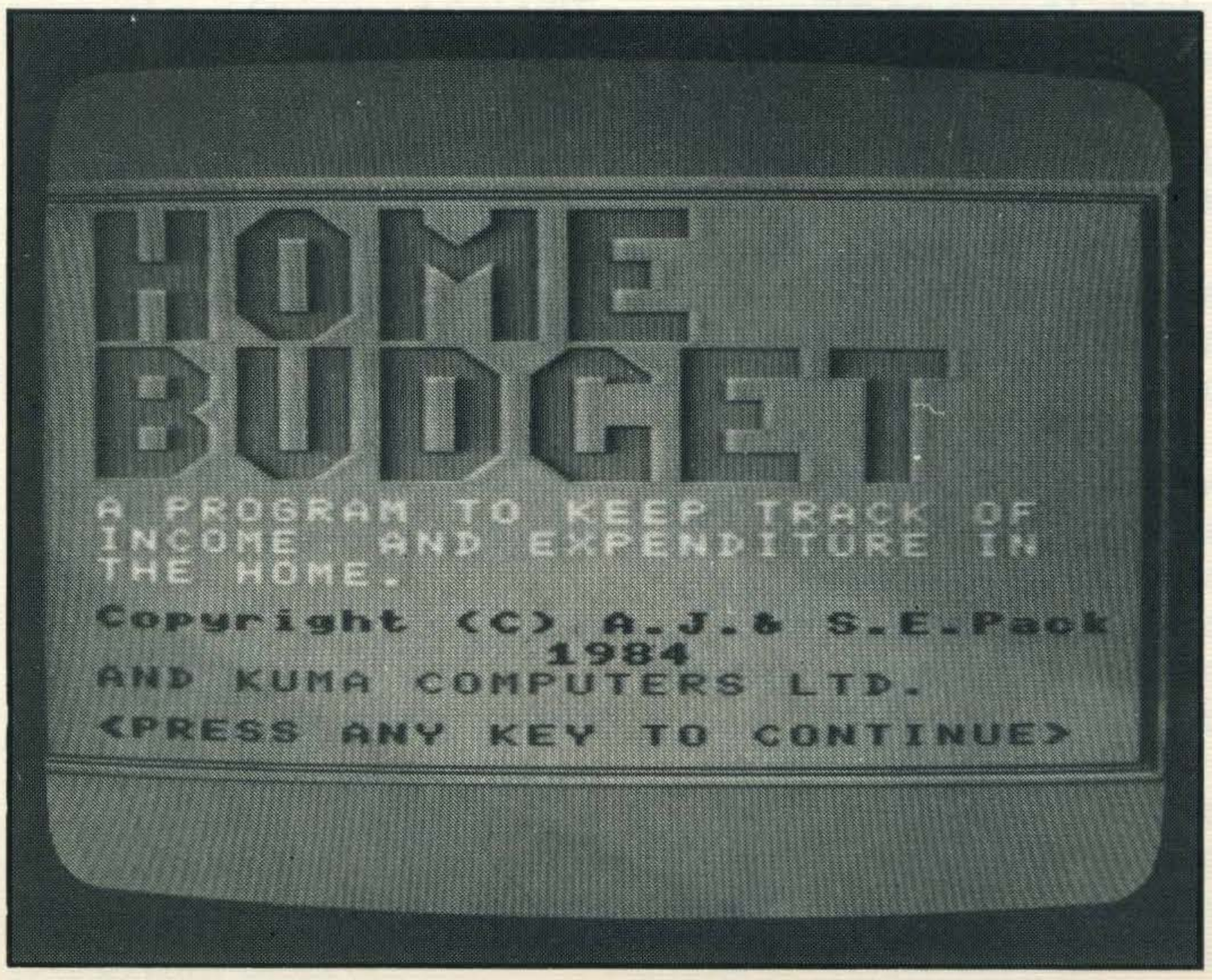
Lono

Presentation: *Neat, but a bit too colourful at times*

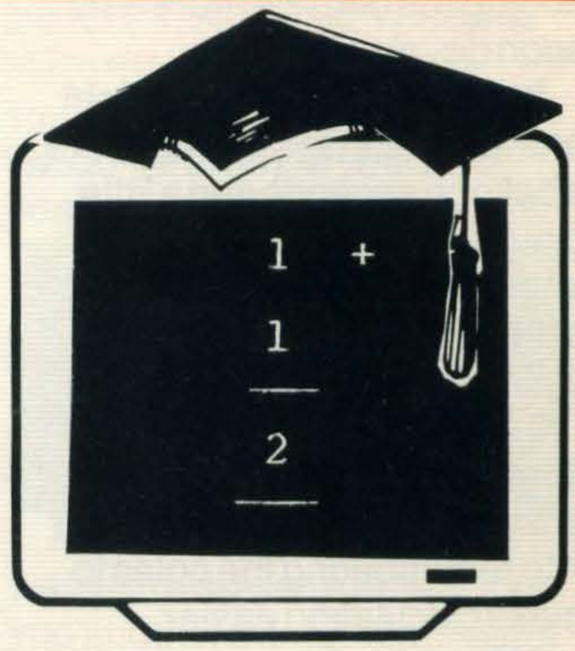
Features: *Well, you can't run ICI on it, but it has most of what you need*

Getting started: *Easy to understand*

Conclusion: *If you like home accounts, you'll like this*



INTRODUC-TION TO NUMBERS



Supplier: Morwood Products (04243) 5840
Type: Educational
Format: Cassette
Price: £14.95

This is a pack of three cassettes, each containing one program, aimed at teaching four to seven year olds basic numeracy. Morwood, who is bringing the programs in from Japan, is packaging the titles under the Puddles label, and this is just the first of many such packages.

All three programs have essentially the same approach. At the start, you can set a target level, where you estimate how many correct answers you will get. Your final performance is then judged on the relationship

between your actual score and this estimate.

You can also set the number of times you want to play. After each go, the target level is either automatically reset or a new one suggested according to your performance — a nice touch, that.

In the first game, objects are presented in a green square. You simply have to count them up. The second game has a car moving behind telegraph poles. Your job is to tell the computer how many poles are on the right of the car, and then how many are on the left. As the total number of poles is always 10, children eventually start to work out the second figure by deduction.

The final program also presents objects for counting, but there can be anything up to 120 at a time. These are presented in rows and so a systematic approach — counting rows, multiplying them by 12 (the number of objects in a row) and then adding the odd few more — is soon developed.

In all cases, if you get a right answer, a sun symbol appears, a balloon ascends and a little cloud figure smiles. A wrong answer results in the sun symbol being obscured by cloud and the balloon falling.

In the car and pole game, three successive wrong answers prompt the computer into renumbering the poles to make calculation easier.

At the end of the programs your performance is indicated by a small car taking one of three routes out of a tunnel. That's because the result depends on time as well as the number of right answers.

The graphics are ideal for kids; bold and colourful and with a minimum of text. We have one main gripe, though. Although in BASIC, the programs are two-part, requiring you to run the first part yourself, so an adult is still required to be present to load them in.

Lono

Graphics: *Chunky*

Sound: *Nearly missing*

User appeal: *Will keep our younger readers glued to their sets*

Conclusion: *Fast for BASIC, but too easy to crash*

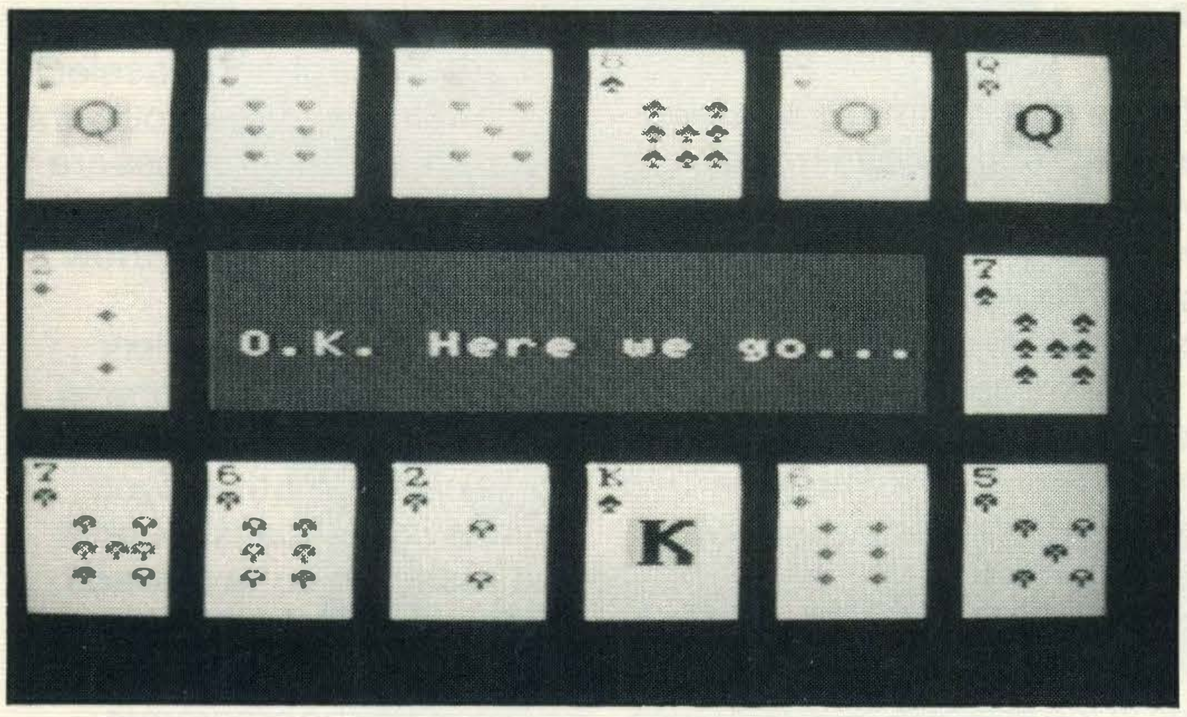
CRIBBAGE

Supplier: Kuma (07357) 4335
Type: Traditional game
Format: Cassette
Price: £5.95

I've always had trouble finding someone with enough patience to play cards with me. I can't stand the sarcastic comments as a bored partner waits for me to play another bad hand.

So I was quite pleased when a computer version of crib arrived in the post. Micros don't mind waiting for you to take your turn.

However, this opponent still manages a few sarcastic or smart-ass comments. If it's beating you it remarks,



'Programmed well, was I not?'. If you start thrashing it (which didn't happen very often) it comes back with: 'I wish I was programmed to cheat'.

Hmmm! Funny you should mention that. The computer doesn't actually cheat, but it does tend to get rather good hands. There's no difficulty level for you to set, so if you're not that good at crib, you're going to get thrashed quite a few times.

The graphics are generally excellent — especially the hand which appears to cut the pack.

All the text appears in a window at the top of the screen. The computer's hand is below that — face down, of course! And yours is at the bottom. The scoring board runs between the two hands.

There are a few annoying pauses. For example, there are several occasions when you have to enter a number to tell the hand where to cut the pack. I don't know why this couldn't have been done randomly. It also doesn't allow you to enter whole tens — 20, 30 and 40. It just ignores the 0 when you press it.

You also have to press the S key on occasions to shuffle the pack. This could have been made automatic.

After the hands have been dealt there is a pause while the computer thinks about which cards to discard. This gives you the chance to do the same thing, but I occasionally found myself waiting for the computer to catch up. Still, when it comes to playing, the program is pretty fast. And the program often apologises for taking so long!

As the game progresses the scores are marked on the peg board, with a hand moving the pegs. This gives an instant and graphic indication of the state of play.

Near the end, the program comes up with comments like, 'Curses. You are going to win' or, more likely, 'Thanks for playing and letting me win'. This is where you have to resist the temptation to throw the machine through the nearest window. But at least you get a chance to play again (if you choose not to the machine resets, so decide carefully).

This is a very good implementation of six card cribbage, I just wish it could play down to my level.

Lono

Graphics: *Ace*

Sound: *Cute. Dispensable*

Game quality: *A good deal of fun*

Conclusions: *A cut above the rest*

WORD PROCESS

Supplier: Computer Mates (0264) 810824
Type: Word Processor
Format: Cartridge
Price: £49

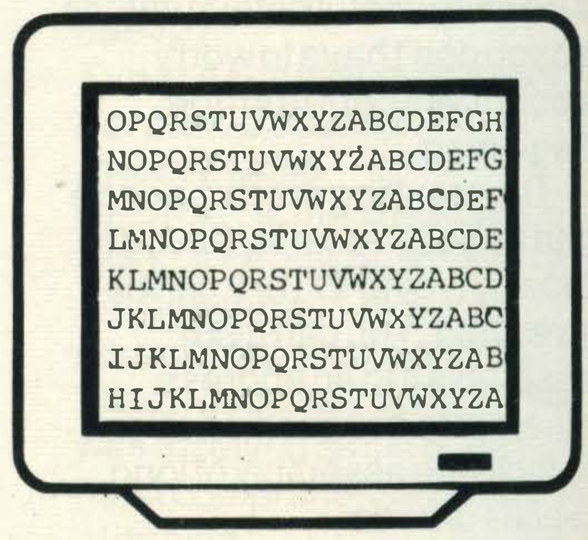
Too often we are bamboozled by specifications. Take word processors for example. The 'best' do everything but write text for us, yet to master all their facilities may take months. All we may really want a word processor for is to print a few standard letters, and improve the quality of them.

Computer Mates believes that simplicity is the answer. Its word processor is so simple, you'll be using it in half an hour. It has a manual that can be read in minutes and comes on a cartridge that loads instantly.

Features are ruthlessly sacrificed if they aren't likely to be used. There is one main menu and it is always just one keypress away. It offers four options.

Text is the mode for inputting and editing text. The screen clears and a status line shows how many characters you can enter and the page number. Up to 99 pages of text can be entered, if the memory allows.

When text is entered, words are broken at the end of the line. There is no opportunity to adjust the screen display. All you can do is insert or delete characters, overwrite or inset a whole paragraph with the TAB key. You use standard control



keys throughout. At the base of the screen, function key effects are displayed. They get you to other options, preceding or succeeding pages of text.

Print Layout is option number two. Here you can alter the width of the printed copy, page length, set justification and so forth. Setting parameters is simple.

Set Up Printer is option three. You can alter end of line codes and set underlining.

A print index page selects the range of paragraphs or text pages to be printed. If no printer is attached, printing is not carried out.

Text can be filed or loaded with option four. The program supports cassette, disc or data cartridge storage. Computer Mates sells 4K data cartridges for £40, 16K cartridges for £100. The latter will hold up to 32 screens of text, stored as it is entered. It is a reliable, fast means of storage, though a bit pricey.

That's the bones of this word processor. It has no fancy features, bar the cartridge storage. If you are used to programs like Word Star, you'll find this program absurdly under specified and possibly a waste of money.

However, if you're new to word processing and need a program you can use easily, reliably and promptly, this package is well worth investing in. You certainly will find this word processor user friendly and superbly simple to use.

Features: *All you need*

Getting started: *Ten year olds could use it*

Value for money: *You pay heavily for simplicity*

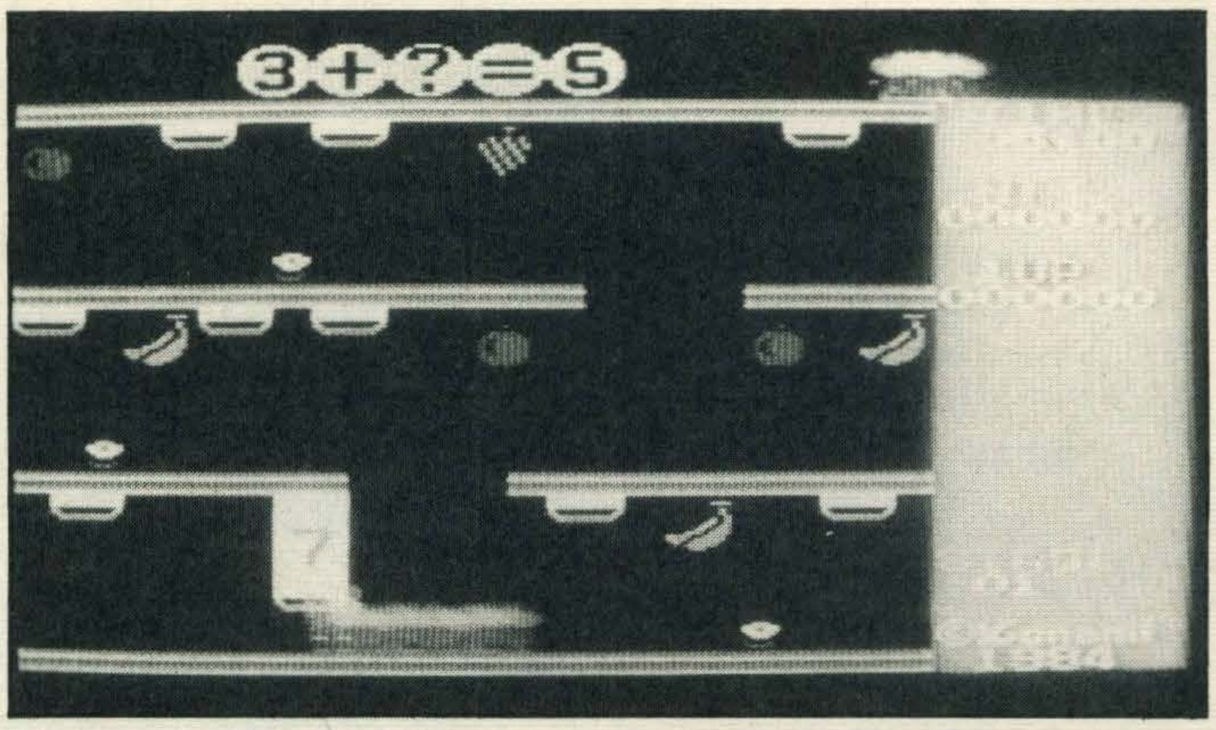
Conclusions: *If time is money, this is for you*

MONKEY ACADEMY

Supplier: Konami
01-429 2446
Type: Game/Education
Format: Cartridge
Price: £15-£20

I never knew monkeys had trouble with crabs. But if you, as the little blue monkey in this game, don't avoid or kill the scuttling crustaceans, you're going to have real problems.

There is a slight educational slant to this game, in that the object is to solve sums. At the start of each frame a row of balloons floats up. When they reach the top they burst, revealing an equation with one figure replaced by a question mark. You have to supply the missing digit.



The difficulty of the equation depends on the level selected. There are five, and you can change the level after each three frames if the harder ones get too much for you.

The top level has equations with brackets, the bottom one is simple addition, so there's plenty of choice.

Using a joystick or the cursor keys, you move the monkey around, jumping or dropping between the various levels. At regular intervals a crab appears at the top and works its way down. Be warned — this crab is a killer!

To get rid of the crab you have to throw food at it. Perhaps it dies of obesity, or really severe indigestion. Either way, you can get it before it gets you.

The food is in the form of fruit distributed liberally around the various levels. You have to jump to collect it, by pressing the space bar or fire button.

In fact, you do a lot of jumping. The answer to the sum is on a roller blind, which you have to pull down. Unfortunately, there are plenty of blinds with the wrong answer, and you can only look at one blind at a time.

When you find the right number, press SELECT or the second fire button and you're given the blind neatly rolled up. You then dash up to the top to give it to another monkey to complete the sum. Watch out for crabs though. With the number in your hand, you can't grab fruit.

You don't have to be Einstein to work out the maths, but you do have to be *fast*. The game is simple, but ludicrously addictive. It quickly reduced a crowd of semi-respectable journalists to a rabid, screaming rabble.

The program won't let you take the wrong number, but simply gives you a bad mark. Collect three of these and another blue crab comes out with a balloon containing the correct number. So there is an educational content, even if the learning seems too much fun.

Lono

Graphics: *Even the crabs are smooth*

Sound: *Adequate. Bearable, even*

Addictiveness: *Cancel the newspapers. You won't get time to read them*

Conclusion: *A great game*

ERIC & THE FLOATERS

Supplier: Kuma (07357) 4335
Type: Arcade Game
Format: Cassette
Price: £5.95

The action in this game takes place in a maze. What if you don't like the maze? Well, you just blow it up!

You're in control of some kind of crazed demolition man, who you move around using the cursor keys or joystick. A swift tap on the space bar or fire button deposits a large blue bomb with a fairly short fuse. As the fuse burns down, the bomb begins to shake, warning you that it's about to go off.

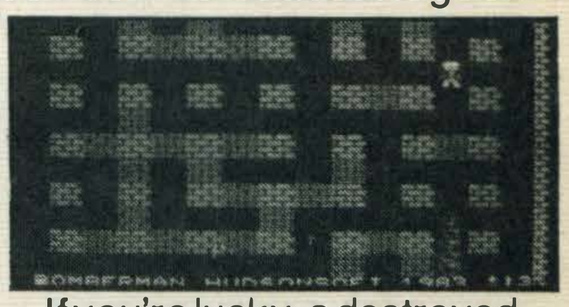
When it finally explodes, the bomb will blow out some of the weaker parts of the maze walls. It will also turn your man into a messy pile of pixels if you don't get him out of the way.

You can easily lay a string of bombs, up to a maximum of five. But be careful. The first one will set off the others, without waiting for their fuses to burn down. And you can't lay any more bombs until the previous five have gone off.

This pursuit may sound fairly leisurely, but there is a catch — you are being chased by some pretty unfriendly balloons. Yes, balloons. You can work out for yourself who is Eric and who are the Floaters. But it seems that the floaters have a voracious appetite for Erics. As you go through the frames, the balloons call in more and more of their mates.

What can you do about it? You can blow them up, of course. From time to time a balloon will turn red with rage and come straight for you. I found the best means of defence was to run away, dropping bombs on the way. You can often trap the balloon between two bombs, so which ever way it goes, it goes up in smoke. On the whole, though, the balloons are pretty smart, and will run away from your bombs.

The first frame starts with just one balloon. But each successive frame has more of the nasty creatures. You have to start thinking very fast or you'll get trapped between a balloon and one of your own bombs which is about to go off!



If you're lucky, a destroyed wall will reveal an exit, leading into another frame, or a chest of treasure, giving extra points. But don't blow these up, as this results in a busload of balloons swarming after you.

It's pretty addictive stuff — not too difficult, but with some nasty surprises. For example, every few frames you go into auto-bomb mode where you drop strings of bombs without pressing anything. That means you have to keep moving — fast. The best of the recent bunch from Kuma.

Lono

Graphics: *Neat and colourful*

Sound: *Enough to make you take cover*

Addictiveness: *Hang on a minute, while I have just one more go*

Conclusion: *A must for anarchists of all ages*

REVIEWS

ANTARCTIC ADVENTURE

Supplier: Konami
01-4292446
Type: Arcade game
Format: Cartridge
Price: £15-£20

At something between £15 and £20, Antarctic Adventure is probably one of the most expensive games around for MSX micros — but it is definitely one of the best and, dare we say it, worth the money.

Being in cartridge format, we expected the graphics to be good — and they certainly live up to expectations.

The game involves directing a penguin around the Antarctic, dodging hazards like ice patches, crevasses and

obstructive, if friendly, walruses.

You are directly behind the penguin, and the scenery scrolls realistically towards you — scrolling faster or slower as you increase or decrease the penguin's speed.

As he travels ever onward, the penguin's best tactic to save time is to dodge the hazards rather than jump over them — an important factor considering that each stage of his journey is against the clock.

Once the penguin has been right round the Antarctic once — that is, reached level 10 — he starts the circuit again, but this time with less time to do it in, and so on for each successive lap of the ice cap.

What really makes this game stand out (and this is Japan's No 1 game at the moment) are the graphics.

For instance, as the penguin moves along, his shadow moves with him, growing smaller as he jumps off the ground in a fairly realistic three dimensional manner. Each time he jumps, the penguin flaps his 'wings', and wiggles his tail — 'cute' is the only word to describe this mobile shirt-front.

You get the hang of high scoring fairly quickly. You can make your score even more impressive by getting the penguin to catch the flying fish and touching the flags that are dotted about.

At the end of each successful section of the circuit, the penguin reaches a cabin with a national flag running up the flag pole. When he gets to Japan the penguin actually jumps for joy.

There's one aspect to the game that may not be to your liking, however . . . the music. It's a cheerful little ditty, which I find very tuneful but which has the rest of the *MSX Computing* office gnashing their teeth and threatening immediate GBH if it's not turned down. Ah well, there's no accounting for taste.

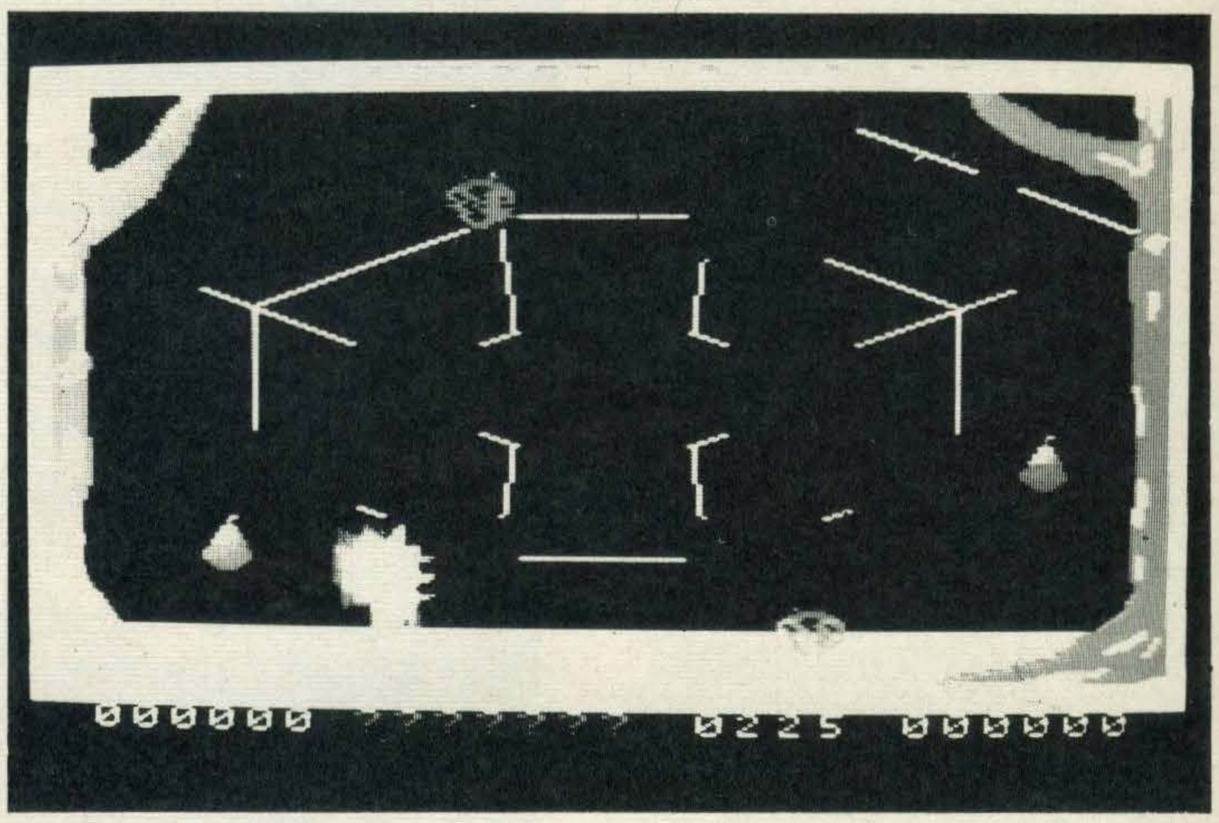
HJ

Sound: *Love it or hate it*
Graphics: *So realistic you'll reach for the sealskins*
Addictiveness: *Total*
Conclusion: *One of the best games so far*

BUZZ-OFF

Supplier: Electric Software
(0954) 81991
Type: Arcade Game
Format: Cassette
Price: £8.95

A game for all budding Arthur Askeys I suppose. You are Bertie the Bee, a member of the *Apidae* with an appetite.



Your aim is to stuff your little blue body (what kind of a bee has a blue body?) with as much fruit as possible.

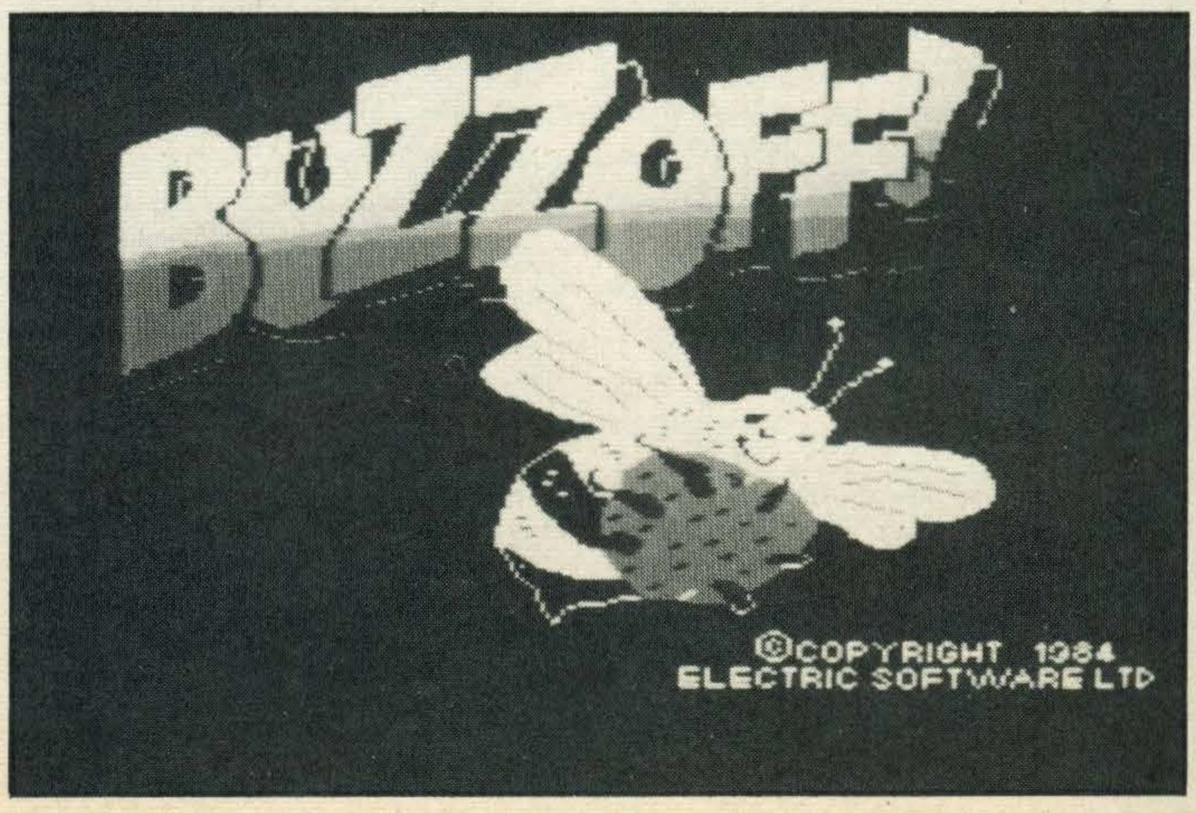
The catch is that each piece of delicious fruit eaten turns instantaneously into part of a spider's web; collide with the web and you're a dead bee, breakfast for a purple spider (this programmer certainly wouldn't have passed O level biology).

The game can be played with joystick or cursor keys; the latter are better as you only have four degrees of movement (Bertie cannot fly diagonally); you don't need a fire button as you eat the fruit by passing your head through it.

When you've head butted your way through the equivalent of a couple of tins of Libbys the spider lurking off-frame (obviously shocked by your success) drops his caterpillar breakfast. Release the larva with another head butt and you get a go at the spider's magic fruit.

Due to the instantaneous appearance of web where you've just gulped a fresh strawberry, cherry or lemon the game is difficult to play from the outset, as without developing a dithering approach you'll stun yourself on the web the instant you eat the fruit. Many players give up with scores of 25 and below simply because they can't get to grips with flying at right angles and making 180° exits post gorgement.

The graphics vary from the positively two-dimensional (Bertie and the fruits) to the wonderful (the purple iridescent spider) but the juxtaposition of the two styles is irritating. There are 10 levels varying only in the amount of web first present and in the



points needed to be gained for a replay. You have to wait to be eaten by the spider between frames which is infuriating.

There is little reward in a straight replay and little to be gained from progressing through the levels; the fruits appear randomly whatever level is chosen, only the web differs. *DGP*

Graphics: *Biologically unsound*

Addictability: *Only for the stubborn*

Getting going: *Slow*

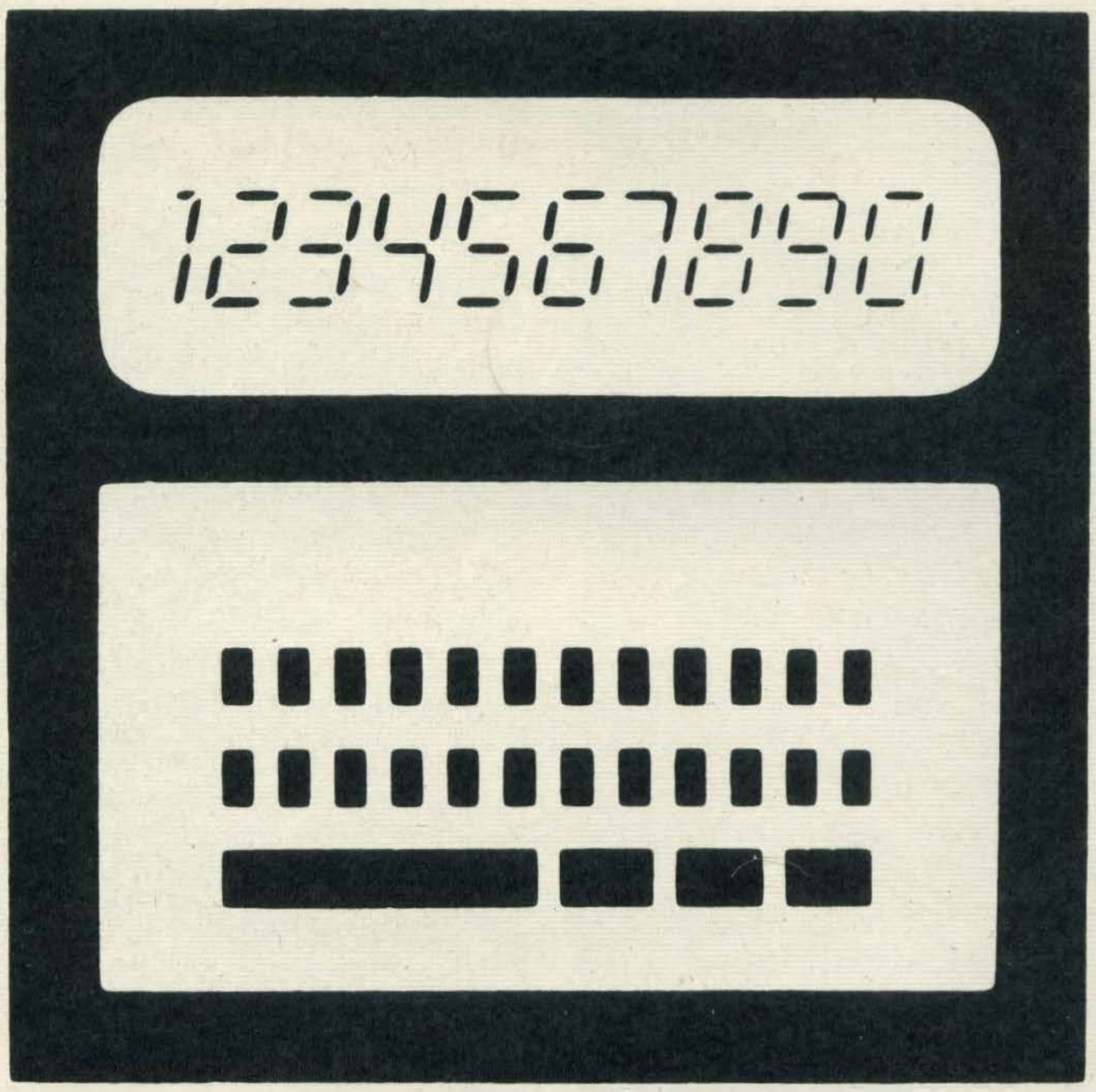
MEMO-CALC

Supplier: Micro-Aid (0209) 831274
Type: Database
Format: Cassette
Price: £14.95

One of the things people hope to use their home micros for is keeping records of their stamp, butterfly, recipe or aardvark collections. And so you can, so long as you've got some suitable software to take care of the filing.

What you need is a database. But these take a variety of forms, which vary greatly in terms of ease of use and versatility. For the home enthusiast the best type is probably one based on a card index system, and that's the approach Micro-Aid have adopted with *Memo-Calc*.

The review sample we had wasn't quite finished — there were no printer routines to allow you to get a hard copy of the contents. But we are assured that the final version will have that facility.



The program is very easy to use. It's a good idea to spend some time beforehand working out the best configuration for your particular application. But once you've done that entering the actual data is easy and reasonably fast.

To give you an idea of how much space is available for storing the records, the menu page gives a count of available memory. That way you know when you're running out.

Once the data has been entered, it can be modified, added to or saved to tape. The last option is reasonably fast but has the disadvantage of limiting you to three letter filenames. That makes it difficult to call the files anything really meaningful.

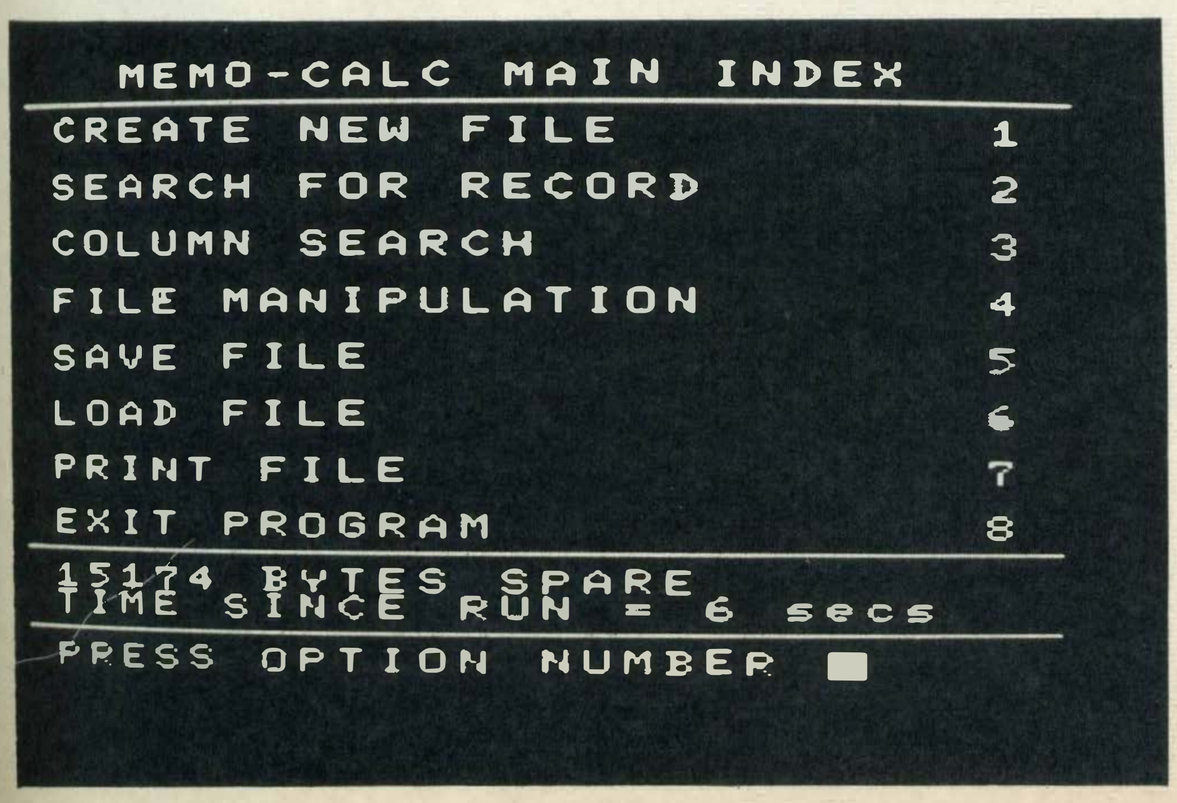
Should you create a new file, or load a previously recorded one, any existing data will be lost. So if you choose these options from the main menu the program asks you if you're sure before proceeding.

That's a good idea. Unfortunately they haven't included the same system on the option to finish using the programs. This stops the program and returns you to BASIC and, although you can simply re-run, all the data is lost.

To read the records you can search by a key field (such as a name) or a record number. The record is then displayed as a kind of one-line spreadsheet, allowing to scroll sideways to view the separate fields within the record.

At the same time, the screen displays a large list of other options. You can move backwards or forwards through the records, add or modify details, perform calculations, or view the whole record (like looking at the whole index card).

The program is reasonably versatile, giving enough space for the type of use outlined before. *Lono*



Ease of use: *Faster than writing record cards*

Versatility: *Perfect for recipes or addresses*

Documentation: *Good but unnecessary*

Value for money: *If you need it, it's worth it*

COMPUTER BILLIARDS

Supplier: Sony (0784) 61688
Type: Arcade game
Format: Cartridge
Price: £13-£15

How can you have faith in a game like this, which, in demo mode, manages to pot the cue ball? This is billiards as you've never seen it before, with all the excitement of watching Hurricane Higgins smoke another packet of fags while the referee cleans the baize.

The program is written and packaged for Sony by Konami, which has produced some really excellent cartridge software. But that company's main business, up to now, has been in making games for the arcades.

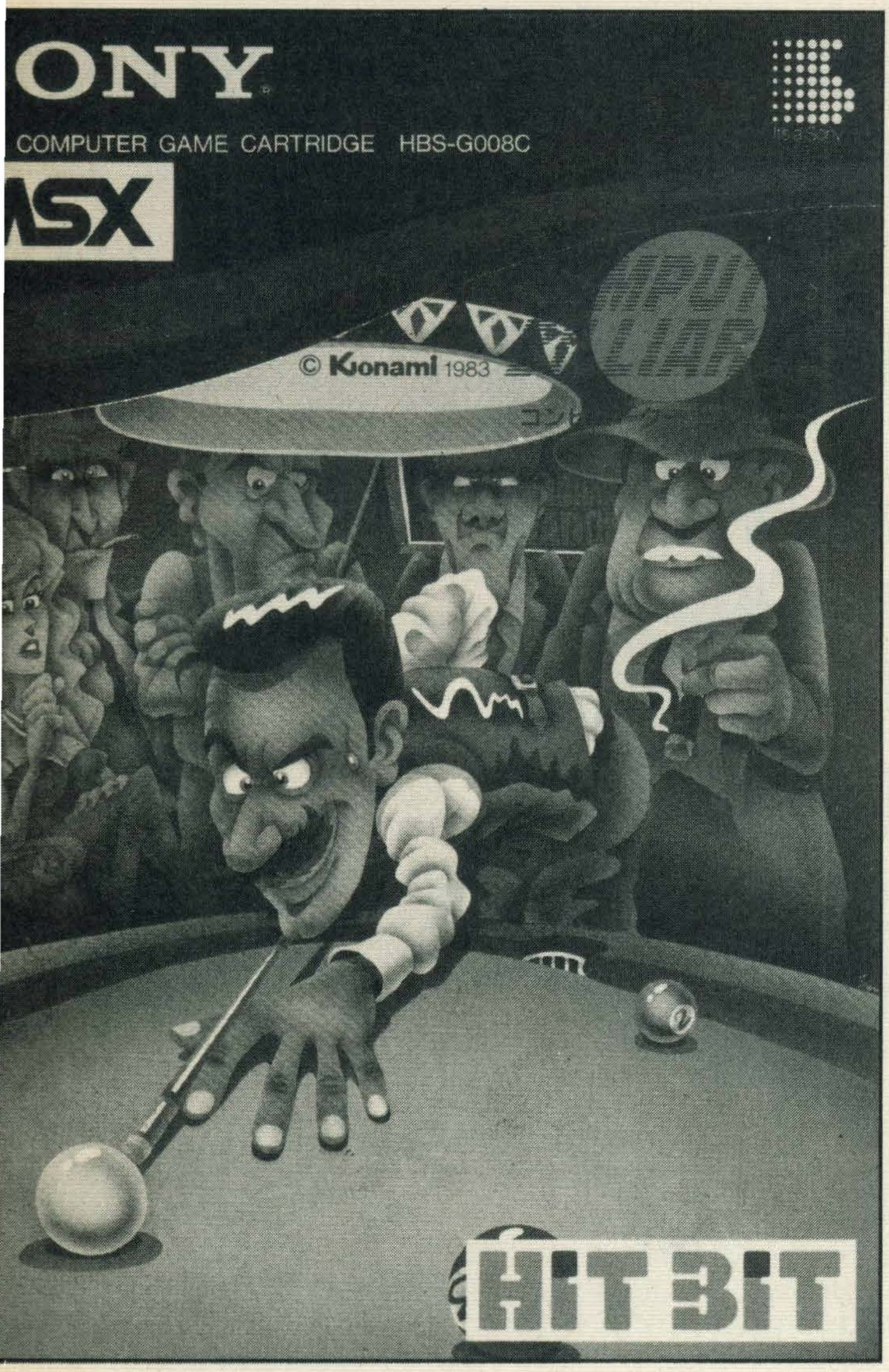
This product has all the hallmarks of a pub game. A passing colleague remarked that the main things missing were the greasy lines on the screen, where fingers have mapped out the next shot. It's

great to play after four pints of lager and a packet of cheese and onion. But in the cold light of day, it seems too simple to hold any real interest.

To line up your shot, you move a small white dot around the edge of the table. You use either a joystick or the cursor keys. A joystick is faster, but gives you slightly less control. You often wind up shuttling from side to side, trying to find the exact spot you want.

When you hit the space bar, or joystick fire button, the cue ball heads for this mark, hitting any balls that get in the way. The strength of the shot can be varied, on a scale of one to three. This is shown by a line of dashes. You shoot when the required number of dashes are showing.

REVIEWS



We kept using the strongest setting, which meant waiting patiently each time for the right strength setting. In fact it doesn't take very long but it seems longer when you're eager to see the dramatic results of your shot.

The reaction of the balls seems fairly accurate, although the pockets seem slightly oversized. Some balls went in even though they appeared to hit the cushion. All the same, most of the potted balls went in by sheer fluke, having bounced around the table for a while. There must be some significance there somewhere!

There's a reasonable plinking noise as they collide, although it makes the balls sound as if they're made of hollow aluminium.

The graphics are extremely plain. You don't need much, of course, but the scores and other information could have been presented in a more imaginative way.

Lono

Graphics: *Stunning is not the word. Boring might be*

Sound: *Turn it off — you won't miss it*

Addictiveness: *Only for hardened Pot Black junkies*

Value for money: *Spend the money on a cue, and play the real thing*

SUPER CROSS-FORCE

Supplier: Spectravideo
01-3300101
Type: Arcade game
Format: Cassette
Price: £6.95

Zap! Blam! Kerpow! Yep, it's alien time again. Once again we boldly go where . . . well, you know the story.

As these things go, this is a pretty simple but exciting game. You are in control of two ships — one at the top of the screen and one at the bottom.

Your fire goes in a straight line between the two ships. You can move them along the edge of the screen — from side to side and a little way up the edge — but you can't go into the frame.

The aliens fly into the frame dropping bombs. There are nine waves of them — some slow, some fast, some easy and some really, really nasty.

The first couple of waves bomb downwards. The next bomb upwards (a clever trick if you can do it). But later waves bomb in all directions. They also get smarter, sending clusters of bombs straight at you, rather than randomly as before.

After a while, some of the stages become predictable. The aliens fly in strict sine-wave patterns, and you soon find positions from which you can destroy all the ships almost as soon as they materialise in front of you.

But the harder bits easily make up for this, their sheer speed leaving you a sweat-soaked nervous heap.

As if dodging bombs with two ships wasn't enough, there's also a time limit for each frame. This is determined by your fuel supply, which runs out at an alarming rate.

Before you run out, there is a low fuel warning sound. A mothership then appears and drops extra fuel supplies by parachute (in space!). If you catch this, your life is extended.

When you reach the ninth level you receive an extra life, having started with four. After that, you go back to level one, and do it all over again.

The aliens explode with pleasing realism. Occasionally they appear to self-destruct, exploding when the shot wasn't even close. Mind you, they sometimes run onto their own bombs. Fast they are. Smart they're not.

There are several versions of the game. You can have one ship directly above the other, so that your lasers shoot vertically up the screen. Alternatively, you can have the ships staggered, giving diagonal fire across the screen.

There are one and two-player games, and an interesting dual game. This is where two players team up against the aliens, each person controlling one ship. This needs careful co-ordination. To top it off, there are different skill levels, the aliens getting faster with the more difficult ones.

You can play it on the keyboard. But for the sake of the machine, and your sanity, joysticks are highly recommended.

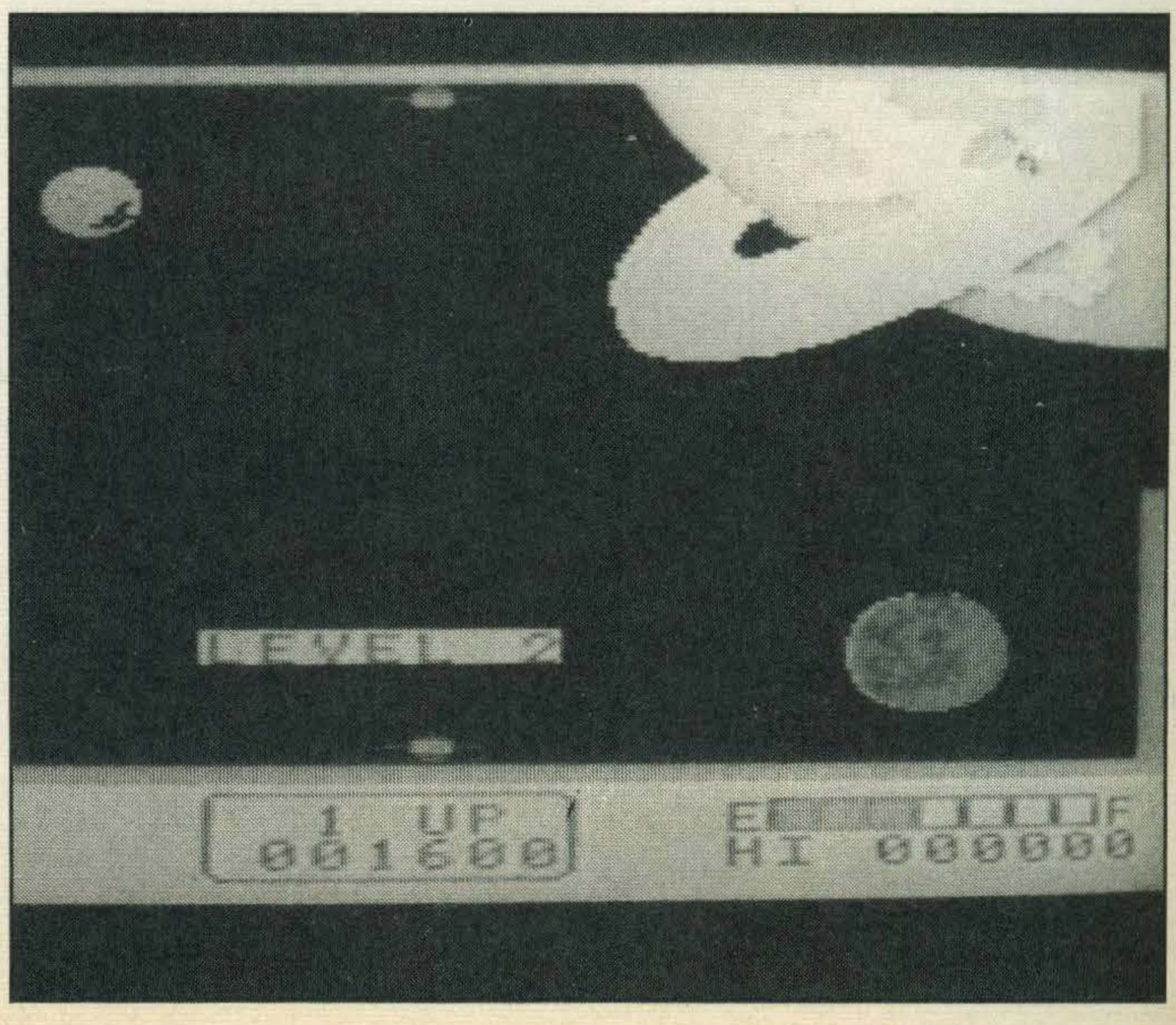
Lono

Graphics: *Faster than a speeding photon torpedo*

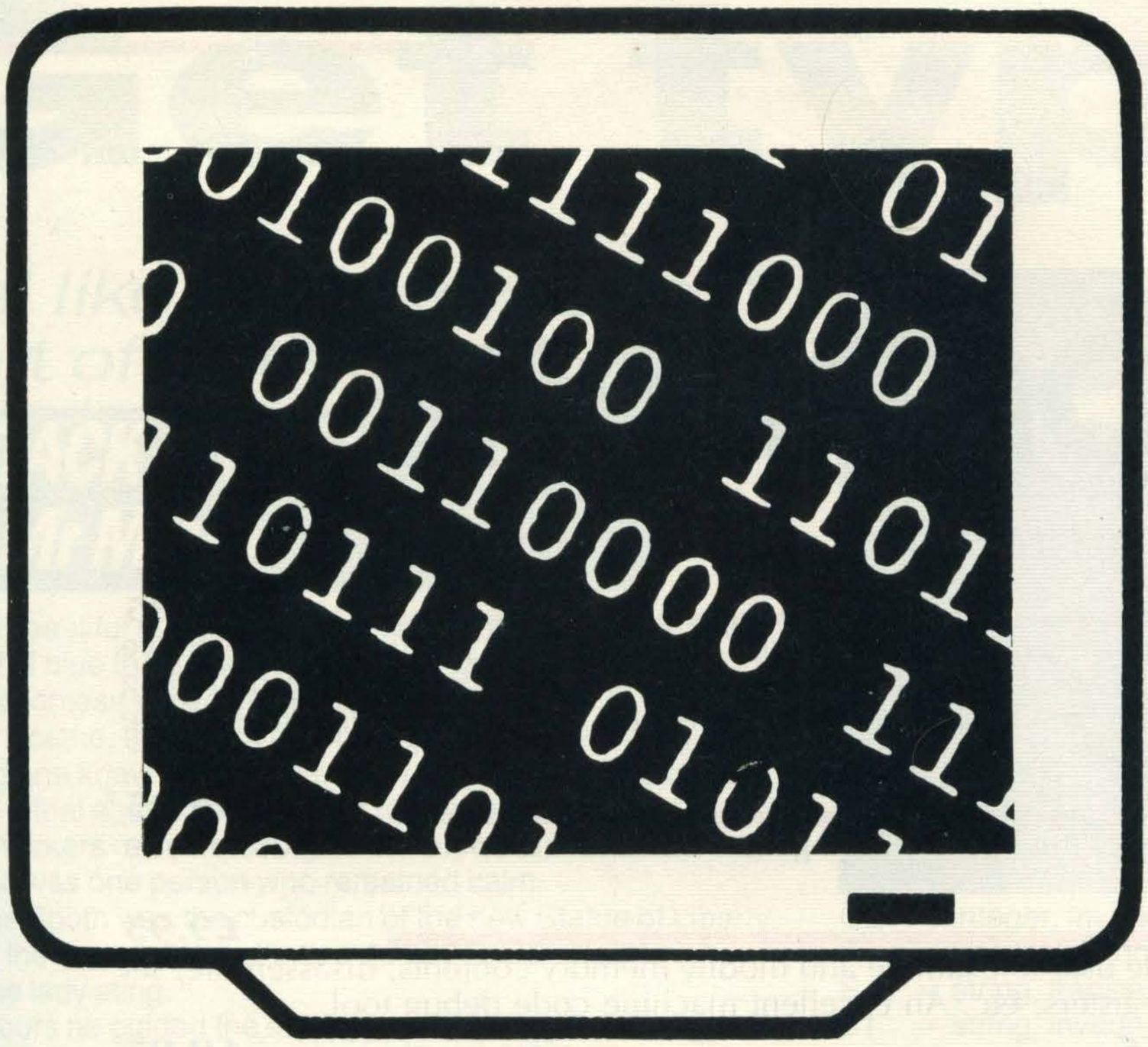
Sound: *Like I said. Zap! Blam! Kerpow!*

Addictiveness: *Who knew that aliens were so much fun?*

Conclusion: *Simple, but highly effective*



SOFTWARE



ZEN ASSEMBLER

Supplier: Kuma (07357) 4335
Type: Assembler/Monitor
Format: Cassette
Price: £19.95

This package was one of the first machine code development systems available for MSX machines. In fact, many of the other software houses have been using it to write their own MSX machine code programs.

But being first doesn't always mean being best. The speed at which this assembler appeared perhaps explains the rather backward editor, and the fact that only minimum facilities are offered.

The documentation supplied is deceptively thick. There's actually a lot more paper than facts. A thorough read of the manual reveals that only the first 10 out of a total of 73 pages are instructional text. The rest of this hefty volume is taken up with opcode lists and other interesting but not necessarily useful Z80 paraphernalia.

Once the program has been loaded (a fairly straightforward process) you are in command mode. From here you can enter one of 26 single letter commands, of which just about half are dedicated to the assembler and editor.

You can easily access the more usual monitor commands, such as memory move, disassemble and memory modification, with numbers being accepted in decimal, hex and, oddly, octal.

The monitor part of ZEN is a fairly reasonable implementation. But it lacks single stepping and the more advanced monitor features that come in handy during program development.

The assembler naturally needs text to assemble, and this generally has to be created by the program's own editor, which is a pity. Rather than going for a line or screen editor, both of which are easy to write on MSX machines, ZEN is equipped with an antiquated character editor.

This is similar to CP/M's ED, which has long been criticised as being a pain to use. So it is with ZEN. Although extra commands are present, so that lines can be identified should you want to find them, actually editing an existing line is virtually impossible.

The assembler is invoked by typing 'A', and then one of four options. These direct the listing to the screen, a cassette file, a printer (if fitted) or some other kind of external device.

Although ZEN does everything it is supposed, and claims, to do, it lacks both elegance and those features which would have made it a really useful tool. *AD*

Features: *A bit thin on the ground*
Documentation: *Merely satisfactory*
Ease of use: *Rough!*
Conclusion: *Not very useful for the price*

MAXIMA

Supplier: PSS (0203) 667556
Type: Arcade Game
Format: Cassette
Price: £7 to £8

After a couple of pretty dull introduction pages (white text on a black background) you get to the game.

It turns out to be yet another Space Invaders variant, with aliens moving across the screen dropping bombs while you shoot at them from below. It's about time these aliens realised that invading us just isn't worth their while. Nor is it worth yours if you're looking for a great game.

That's not to say this program doesn't have its good points. Unlike many MSX games we've seen so far, there is a choice of keys. You can use the default setting of ESC and 1 to move left and right, or the cursor keys, or choose your own keys for moving and firing. There's also a joystick option, which is probably the best way of playing the game.

The graphics are fairly good in a straightforward kind of way. Your four-sprite spaceship appears in a blaze of glory at the beginning, with a blinding flash and loud explosion. Strangely, we didn't get tired of this, even though it can sometimes be an annoying feature.

Movement is smooth, with stars whizzing down the screen behind the aliens, getting faster as the game progresses. When you hit an alien ship, it explodes like an expensive firework—bright, colourful and very satisfying.

Avoiding the returning fire is tricky, especially when the game starts to speed up. Bombs rain down in showers, and your attention tends to be concentrated at the bottom of the screen as you dodge the deadly precipitation. That's a shame because you tend to miss the pretty pyrotechnics of the exploding aliens. But you certainly earn your points.

A temperature gauge at the bottom of the screen seems to go into the red when you fire rapidly, and also as time goes on. So there's an effective time limit on each frame. Going into the red also seems to reduce your rate of fire.

The sound is good enough. There's a regular beat, which reminded us of Jaws. That's fairly appropriate as the aliens seem to chomp their way across the screen. Explosions are dramatic and the gun firing sound is like . . . well, a gun firing.

If you want an Invaders game, then this one will do. It's fast enough to keep you amused, and gripped to your joystick. But haven't we left all that Invader nonsense behind?

Lono

Graphics: *Smooth*
Sound: *Basic Invaders*
Originality: *On a par with a Japanese Rembrandt*
Conclusion: *Reasonable example of its type*

MSX

SOFTWARE

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Feel like doing it yourself? Start off with our listings

ATTACK ON NEW YORK by Mr Micro

It was a beautiful summer's day in New York and the sky was the kind of blue that New Yorkers love. Only light friendly clouds hung motionless above the famous skyline.

Then it came, the attack no-one expected. Where they came from, no one knew — but there were thousands of them. Each strange lethal shape firing photon torpedoes at the city.

New Yorkers ran screaming as the city collapsed about them but there was one person who remained calm.

James Booth was the custodian of the new Statue of Liberty. He was the man entrusted with a deadly secret. He knew how to make the lady sting.

For hours he guided the lady's hand directing the energy packets skyward. His aim and speed are now legendary. The attack was repelled, and no more have been seen since. Now you can re-live that historical day.

Variables used:

AH = floating point, high score
AP = floating point, player score
B = integer, bomb flag
CC = integer, count of city chrs
CL = integer, invader colour
F = integer, missile flag
H = integer, missile horizontal displacement
I = integer, transient data
J = integer, transient data
K = integer, transient data
OS = integer, invader lateral offset
R = integer, random number
S = string, transient alphanum.
S1 = string, invader1 pattern
S2 = string, invader2 pattern
SC = string array, city pattern
SP = string, transient sprite def
ST = string array, torch patterns
T = integer, trigger pressed on last cycle
V = integer, missile vertical displacement
X = integer, missile x co-ord
XB = integer, bomb x co-ord
XI = integer, invader x co-ord
XS = integer, torch top x co-ord
Y = integer, missile y co-ord
YB = integer, bomb y co-ord
YI = integer, invader y co-ord
YS = integer, torch top y co-ord

```
100 REM Attack on New York
101 REM -----------------
102 REM For MSX Computing
103 REM (c) Mr. Micro Ltd.
104 REM 1984 (Bootsy+Jim)
105 COLOR 1,0,4
106 SCREEN 1,2,0
107 CLEAR 1000
108 DEFSNG A
109 DEFINT B-R,T-Z
110 DEFSTR S
111 KEY OFF
112 SPRITE OFF
113 DIM SC(7),ST(8)
114 AH=50000!
115 GOSUB 361
116 SPRITE$(10)=S1
117 SPRITE$(11)=S2
118 REM
119 REM  title page
120 REM
121 FOR I=0 TO 9
122 PUTSPRITE I,(255,192),0,I
123 NEXT I
124 CLS
125 S="
126 PRINT S
127 S="
128 PRINT S
129 PRINT
130 PRINT
131 S="
132 PRINT S
133 S="
134 PRINT S
135 PRINT
136 S="
137 PRINT S
138 PRINT
139 PRINT
140 PUTSPRITE 10,(40,78),3,10
141 S="
142 PRINT S
143 PRINT
144 PRINT
145 PUTSPRITE 11,(40,102),5,11
146 PRINT S
147 PRINT
```

ATTACK ON NEW YORK"

"

CURSOR LEFT / RIGHT OR"

JOYSTICK MOVES TORCH"

SPACE BAR TO FIRE."

SCORES 1000"

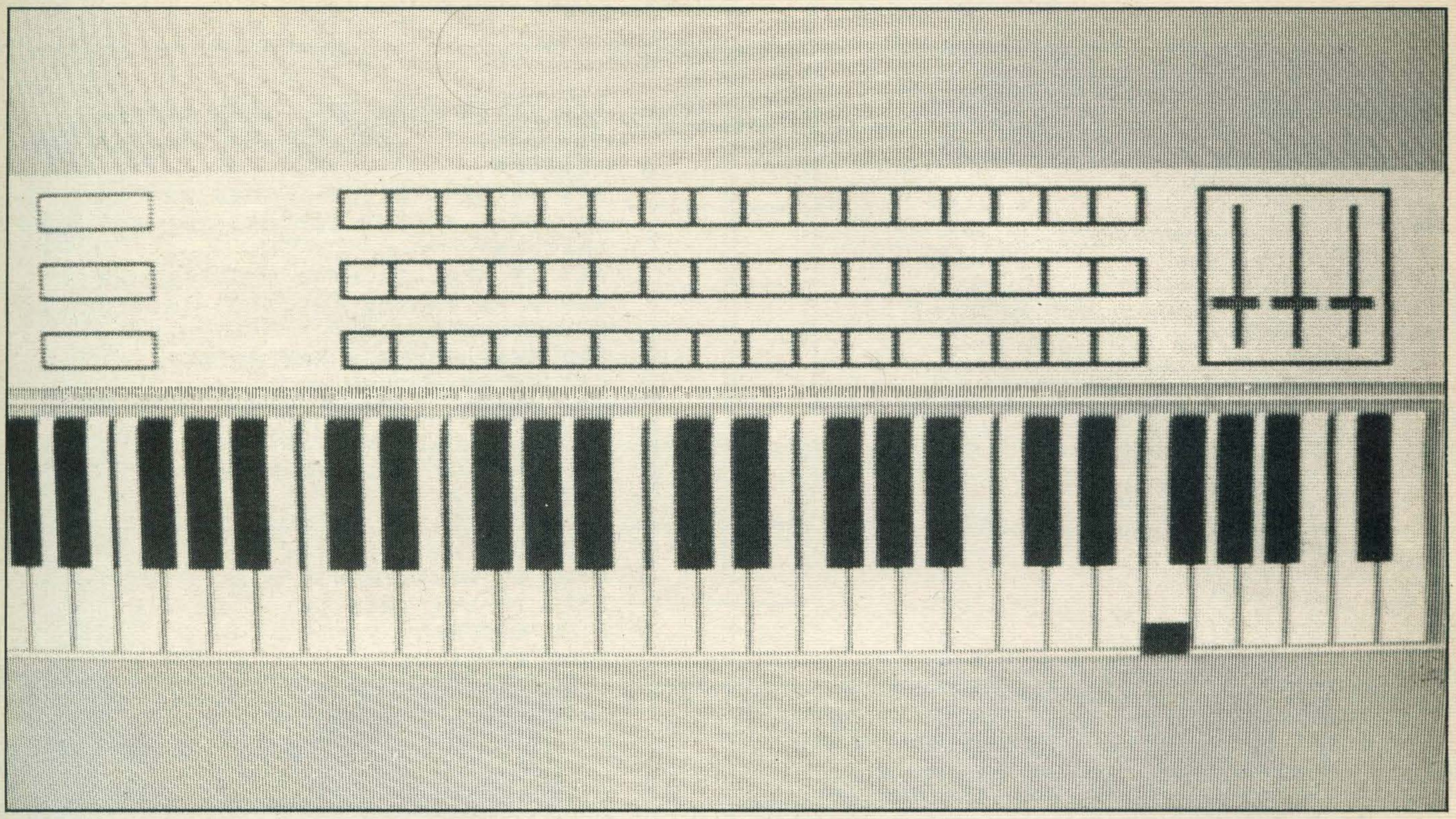
LISTINGS

```
148 PRINT
149 PUTSPRITE 8,(40,126),9,8
150 S="          SCORES 10000"
151 PRINT S
152 PRINT
153 PRINT
154 PRINT
155 PRINT
156 S="       ANY KEY TO START"
157 PRINT S;
158 S=INPUT$(1)
159 PUTSPRITE 8,(40,208),0,8
160 PUTSPRITE 10,(40,208),0,10
161 CLS
162 REM
163 REM  draw city
164 REM
165 CLS
166 SOUND 7,&B10111000
167 LOCATE 0,24
168 FOR I=0 TO 7
169 PRINT SC(I)
170 NEXT I
171 FOR I=0 TO 6 STEP 6
172 FOR J=0 TO 1
173 LOCATE 6+I,2+J+I
174 FOR K=232 TO 238
175 PRINT CHR$(K+7*J);
176 NEXT K,J,I
177 LOCATE 0,0
178 PRINT "HIGH:";
179 PRINT USING"#######";AH
180 AP=0
181 CC=129
182 REM
183 REM   initialise statue
184 REM
185 SPRITE$(4)=ST(4)
186 XS=128
187 YS=143
188 FOR I=0 TO 2
189 J=I*16
190 K=143+J
191 PUTSPRITE I,(128,K),14,I
192 PUTSPRITE 4,(123,139),6,4
193 NEXT
194 REM
195 REM initialise sprite
196 REM
197 CL=1
198 OS=-4
199 LOCATE 15,0
200 PRINT "PLAYER:";
201 PRINT USING"#######";AP
202 S=SPRITE$(7)
203 IF S=S1 THEN S=S2 ELSE S=S1
204 SPRITE$(7)=S
205 XI=255
206 YI=16
207 CL=CL+2
208 IF CL>9 THEN CL=3
209 REM
210 REM   move invader
211 REM
212 XI=XI+OS
213 I=OS
214 IF XI<-15 THEN OS=-OS
215 IF XI>255-OS THEN OS=-OS
216 IF OS<>I THEN YI=YI+8
217 PUTSPRITE 7,(XI,YI),CL,7
218 IF YI>182 THEN 349
219 IF YI<112 THEN 232
220 I=(YI AND 248)/8*32+32
221 I=I+(XI AND 248)/8
222 I=&H1800+I
223 IF VPEEK(I)=32 THEN 227
224 VPOKE I,32
225 CC=CC-1
226 IF CC=0 THEN 349
227 I=I+3
228 IF VPEEK(I)=32 THEN 232
229 VPOKE I,32
230 CC=CC-1
231 IF CC=0 THEN 349
232 IF B THEN 242
233 IF XI<4 OR XI>220 THEN 261
234 R=RND(-TIME)*4
235 IF R THEN 261
236 REM
237 REM   move bomb
238 REM
239 B=1
240 XB=XI+8
241 YB=YI+8
242 YB=YB+6
243 IF YB>191 THEN B=0
244 PUTSPRITE 8,(XB,YB),CL,8
245 I=(XB+5 AND 248)/8
246 J=(YB+4 AND 248)/8*32+I
247 J=&H1800+J
248 K=VPEEK(J)
249 IF K<224 OR K>227 THEN 261
250 VPOKE J,32
251 PUTSPRITE 8,(XB,192),CL,8
252 PUTSPRITE 9,(XB-3,YB-3),1,9
253 GOSUB 417
254 YB=192
255 CC=CC-1
256 IF CC THEN 243
257 GOTO 349
258 REM
259 REM   get joystick
260 REM
261 FOR I=0 TO 2
262 J=STICK(I)
263 IF J THEN I=2
264 S=INKEY$
265 NEXT I
266 T=0
267 REM
268 REM   move torch
269 REM
270 XS=XS+(2 AND XS<136 AND J=3)
271 XS=XS-(2 AND XS>120 AND J=7)
272 SPRITE$(4)=ST((XS-120)/2)
273 PUTSPRITE 4,(123,139),6,4
274 YS=143+ABS(XS-128)
275 IF F THEN 294
276 REM
277 REM   get trigger
278 REM
279 FOR I=0 TO 2
280 T=STRIG(I)
281 IF T THEN I=2
282 S=INKEY$
283 NEXT I
```

```
284 IF T=0 THEN 299
285 SOUND 0,100
286 SOUND 12,20
287 SOUND 13,3
288 H=XS-128
289 V=-(8-ABS(H))
290 F=1
291 REM
292 REM    move missile
293 REM
294 I=X>0 AND X<255 AND Y>YI
295 IF I THEN 301
296 F=0
297 H=0
298 V=0
299 X=XS-5
300 Y=YS-13
301 X=X+H
302 Y=Y+V
303 PUTSPRITE 6,(X,Y),15,6
304 GOSUB 312
305 IF T=0 THEN 212
306 SOUND 0,0
307 GOSUB 440
308 GOTO 212
309 REM
310 REM collision detector
311 REM
312 IF F=0 THEN RETURN
313 I=ABS(Y-YI)
314 J=ABS(X-XI)
315 K=1
316 IF I<5 AND J<8 THEN 321
317 I=ABS(Y-YB)
318 J=ABS(X-XB)
319 IF I>8 OR J>4 THEN RETURN
320 K=0
321 PUTSPRITE 6,(XS,YS),15,6
322 F=0
323 H=0
324 V=0
325 X=XS
326 Y=YS
327 IF K THEN 339
328 PUTSPRITE 8,(XB,192),CL,8
329 PUTSPRITE 9,(XB-3,YB-3),CL,9
330 YB=192
331 GOSUB 417
332 B=0
333 AP=AP+10000
334 IF AP>AH THEN AH=AP
335 LOCATE 22,0
336 PRINT USING"#######";AP
337 GOSUB 428
338 RETURN
339 PUTSPRITE 7,(255,16),CL,7
340 PUTSPRITE 9,(XI,YI-4),CL,9
341 GOSUB 417
342 AP=AP+1000
343 IF AP>AH THEN AH=AP
344 GOSUB 428
345 RETURN 198
346 REM
347 REM    end of game
348 REM
349 BEEP
350 FOR I=0 TO 10
351 VDP (7)=15
352 FOR J=0 TO 100
353 NEXT J
354 VDP (7)=4
355 FOR J=0 TO 100
356 NEXT J,I
357 GOTO 121
358 REM
359 REM  define city chrs
360 REM
361 RESTORE
362 FOR I=0 TO 31
363 READ J
364 VPOKE 1792+I,J
365 NEXT I
366 VPOKE 8220,177
367 REM
368 REM    define clouds
369 REM
370 FOR I=0 TO 111
371 READ J
372 VPOKE 1856+I,J
373 NEXT I
374 VPOKE 8221,240
375 VPOKE 8222,240
376 REM
377 REM define city outline
378 REM
379 FOR I=0 TO 7
380 FOR J=0 TO 27
381 READ K
382 R=RND(-TIME)*4
383 K=32 OR 224+R AND -K
384 SC(I)=SC(I)+CHR$(K)
385 NEXT J,I
386 GOTO 396
387 REM
388 REM    define sprites
389 REM
390 SP=""
391 FOR J=0 TO 31
392 READ S
393 SP=SP+CHR$(VAL("&h"+S))
394 NEXT J
395 RETURN
396 FOR I=0 TO 2
397 GOSUB 390
398 SPRITE$(I)=SP
399 NEXT I
400 GOSUB 390
401 S1=SP
402 GOSUB 390
403 S2=SP
404 FOR I=6 TO 9
405 IF I=7 THEN NEXT
406 GOSUB 390
407 SPRITE$(I)=SP
408 NEXT I
409 FOR I=0 TO 8
410 GOSUB 390
411 ST(I)=SP
412 NEXT I
413 GOTO 428
414 REM
415 REM  explosion sound
416 REM
417 SOUND 0,0
418 SOUND 3,0
419 SOUND 7,&B10110000
420 SOUND 12,50
```

LISTINGS

```
421 SOUND 13,3
422 FOR I=0 TO 500
423 NEXT I
424 PUTSPRITE 9,(255,208),1,9
425 REM
426 REM    initialise sound
427 REM
428 SOUND 0,0
429 SOUND 1,0
430 SOUND 2,0
431 SOUND 3,1
432 SOUND 4,0
433 SOUND 5,0
434 SOUND 6,255
435 SOUND 7,&B10111000
436 SOUND 8,16
437 SOUND 9,16
438 SOUND 10,0
439 SOUND 11,0
440 SOUND 12,8
441 SOUND 13,14
442 RETURN
443 REM
444 REM    program data
445 REM
446 DATA 0,96,96,0,0,0,0,0
447 DATA 0,6,6,0,0,0,0,0
448 DATA 0,0,0,0,0,96,96,0
449 DATA 0,0,0,0,0,6,6,0
450 DATA 0,0,0,0,0,0,3,15
451 DATA 0,0,0,3,15,15,247,251
452 DATA 0,0,62,255,255,255,255
453 DATA 255,15,255,127,191,223
454 DATA 223,223,188,224,254
455 DATA 255,255,255,255,255,15
456 DATA 0,0,0,128,240,63,255
457 DATA 255,0,0,0,0,0,0,192
458 DATA 224,31,63,63,63,31,15
459 DATA 3,0,255,254,254,253
460 DATA 251,247,129,0,255,255
461 DATA 255,255,255,254,240,0
462 DATA 251,247,215,185,127
463 DATA 255,31,3,247,241,237
464 DATA 251,255,255,255,248
465 DATA 223,175,247,247,247
466 DATA 227,128,0,240,248
467 DATA 248,248,224,128,0,0
468 DATA 0,0,0,0,0,0,0,0,0,0,1
469 DATA 0,0,1,0,1,0,0,0,0,0,0
470 DATA 0,0,0,0,0,0,0,0,0,0,0
471 DATA 0,0,1,0,0,1,0,1,1,0,1
472 DATA 0,0,1,0,1,0,0,0,0,0,0
473 DATA 0,0,0,0,0,0,0,0,1,1,0
474 DATA 1,0,1,1,1,1,0,0,1,0,1
475 DATA 0,0,0,0,0,0,0,0,0,0,0
476 DATA 0,1,0,1,1,1,1,0,1,1,1
477 DATA 1,1,0,1,1,1,0,1,0,0,0
478 DATA 0,0,0,0,0,1,0,1,1,1,1
479 DATA 1,1,1,1,1,1,1,1,1,1,1
480 DATA 1,1,1,0,1,0,0,0,0,0,0
481 DATA 1,1,1,1,1,1,1,1,1,1,1
482 DATA 1,1,1,1,1,1,1,1,1,1,1
483 DATA 1,0,0,0,1,0,1,1,1,1,1
484 DATA 1,1,1,1,1,1,1,1,1,1,1
485 DATA 1,1,1,1,1,1,1,1,0,1,1,1
486 DATA 1,1,1,1,1,1,1,1,1,1,1,1
487 DATA 1,1,1,1,1,1,1,1,1,1,1,1
488 DATA 1,1,1,1
489 DATA 0,0,0,0,30,30,30,30
490 DATA 30,30,32,7f,73,73,73,73
491 DATA 0,0,0,0,0,0,0,0
492 DATA 0,80,a0,f8,e0,e0,e0,c0
493 DATA 7f,3f,1f,3f,3f,3f,1f,1f
494 DATA 1f,3f,3f,3f,1f,1f,1f,1f
495 DATA e0,e0,f0,fc,fe,fe,fc,f8
496 DATA f0,f0,f0,f0,f0,f0,f0,f0
497 DATA 1f,1f,1f,3f,3f,3f,3f,3f
498 DATA 3f,3f,3f,7f,7f,7f,3f,3f
499 DATA f0,f0,f0,80,80,80,0,0
500 DATA 0,80,80,fc,fe,ff,ff,fe
501 DATA 3,7,1f,7f,b6,7f,1f,7
502 DATA 3,0,0,0,0,0,0,0
503 DATA 80,c0,f0,fc,da,fc,f0,c0
504 DATA 80,0,0,0,0,0,0,0
505 DATA 7,7,f,1f,35,7f,ff,f
506 DATA f,0,0,0,0,0,0,0
507 DATA c0,c0,e0,f0,58,fc,fe,e0
508 DATA e0,0,0,0,0,0,0,0
509 DATA 0,0,0,0,0,0,0,1
510 DATA 1,0,0,0,0,0,0,0
511 DATA 0,0,0,0,0,0,0,80
512 DATA 80,0,0,0,0,0,0,0
513 DATA 80,40,21,1e,1e,1e,1e,21
514 DATA 40,80,0,0,0,0,0,0
515 DATA 40,80,0,0,0,0,0,0
516 DATA 80,40,0,0,0,0,0,0
517 DATA 0,b,14,1d,2a,35,52,35
518 DATA 34,4a,55,38,17,9,6,0
519 DATA 80,e8,14,d2,2f,33,ed,a5
520 DATA f7,47,8b,f3,95,2e,f0,0
521 DATA 0,0,0,0,10,78,7f,7f
522 DATA 78,10,0,0,0,0,0,0
523 DATA 0,0,0,0,0,0,e0,e0
524 DATA 0,0,0,0,0,0,0,0
525 DATA 0,0,0,0,8,1c,3e,7f
526 DATA 73,0,0,0,0,0,0,0
527 DATA 0,0,0,0,0,0,0,0
528 DATA c0,c0,0,0,0,0,0,0
529 DATA 0,0,0,6,e,1e,1f,3
530 DATA 1,0,0,0,0,0,0,0
531 DATA 0,0,0,0,0,0,0,80
532 DATA c0,c0,0,0,0,0,0,0
533 DATA 0,0,f,7,f,3,3,1
534 DATA 1,0,0,0,0,0,0,0
535 DATA 0,0,0,80,c0,0,0,80
536 DATA 80,c0,0,0,0,0,0,0
537 DATA 3,3,7,1,1,1,1,1
538 DATA 1,1,0,0,0,0,0,0
539 DATA c0,c0,e0,80,80,80,80,80
540 DATA 80,80,0,0,0,0,0,0
541 DATA 0,0,0,1,3,0,0,1
542 DATA 1,3,0,0,0,0,0,0
543 DATA 0,0,f0,e0,f0,c0,c0,80
544 DATA 80,0,0,0,0,0,0,0
545 DATA 0,0,0,0,0,0,0,1
546 DATA 3,3,0,0,0,0,0,0
547 DATA 0,0,0,60,70,78,78,c0
548 DATA 80,0,0,0,0,0,0,0
549 DATA 0,0,0,0,0,0,0,0
550 DATA 3,3,0,0,0,0,0,0
551 DATA 0,0,0,0,10,38,7c,fe
552 DATA ce,0,0,0,0,0,0,0
553 DATA 0,0,0,0,0,0,7,7
554 DATA 0,0,0,0,0,0,0,0
555 DATA 0,0,0,0,8,1e,fe,fe
556 DATA 1e,8,0,0,0,0,0,0
```



MUSIC SEQUENCER
by Graham Bland

Graham Bland has written this highly useful program to help you explore the capabilities of MSX BASIC's sound facilities. Each of the three channels can be programmed with a sequence of 16 notes and spaces. These are then played in a continuous loop.

To put a note into a particular channel, you choose the latter with a function key, select the note by moving the marker with the cursor keys, then press the SPACE bar. A marker then appears in the row of boxes to show how many notes have been programmed in, and the position of spaces.

Carry on doing this until you've finished your tune. Then, if you insist on playing it, just press f4. The tune will continue to loop until you press this key again — or slightly after, as the sequence has to play itself out.

The volume at which each channel plays can be individually controlled with three function keys. Press a key and the volume increases, shown by a sliding control moving up. When it gets to the top the volume starts to come down again. Choosing different volume settings for the three channels can produce some interesting effects.

Other instructions are included at the beginning of the program. To re-read these, stop the program by pressing f9, and then run the program again.

```
10 REM *
20 REM * MSX Sequencer
30 REM *
40 STOP ON : ON STOP GOSUB 1190
50 L=24:IC=1:D1=1:D2=1:D3=1:KF=0:
KS=1
60 V1=5:V2=5:V3=5:C1=92:C2=92:C3=92
70 GOSUB 1210
80 SCREEN 2,0,0
90 DIM AP(16),BP(16),CP(16)
100 DIM PLOT(8,2),MT(30)
110 FOR I = 0 TO 29
120 READ A : MT(I)=A
130 NEXT
140 DATA 24,26,28,28,31,33,35,36,38,
40,41,43,45,47,48,50,52,53,55,57,59,
60,62,64,65,67,69,71,72,74
150 COLOR 15,4,4 : CLS
160 LINE (8,120)-(248,176),15,BF
170 LINE (4,116)-(252,178),15,B
180 FOR I = 16 TO 240 STEP 8
190 LINE (I,120)-(I,176),4
200 NEXT I
210 S=13 : K=0
220 FOR I=1 TO 4
230 FOR J = 1 TO 6
240 READ N : S=S+N
250 LINE (S,120)-(S+5,156),1,BF
260 K=K+1
270 NEXT J
280 RESTORE 300
290 NEXT I
300 DATA 0,9,15,8,8,16
310 LINE (4,64)-(252,112),15,BF
320 LINE (210,68)-(242,108),1,B
330 LINE (216,72)-(216,104),1,B
340 LINE (226,72)-(226,104),1
350 LINE (236,72)-(236,104),1
360 FOR I = 72 TO 192 STEP 8
370 FOR J = 68 TO 100 STEP 16
380 LINE (I,J)-(I+8,J+8),1,B
390 NEXT J
400 NEXT I
410 FOR I = 68 TO 100 STEP 16
```

LISTINGS

```
420 LINE (20,I)-(40,I+8),8,B
430 NEXT I
440 RESTORE 500
450 FOR I = 1 TO 8
460 FOR J = 1 TO 2
470 READ N : PLOT(I,J)=N
480 NEXT J
490 NEXT I
500 DATA 0,-2,2,-2,2,0,2,2,0,2,-2,2,
-2,0,-2,-2
510 FOR I = 1 TO 8
520 S$ = S$ + CHR$(255)
530 NEXT I
540 SPRITE$(0) = S$ : S$=""
550 RESTORE 600
560 FOR I = 1  TO 8
570 READ A : S$ = S$ + CHR$(A)
580 NEXT I
590 SPRITE$(1)=S$
600 DATA 255,255,255,0,0,0,0,0
610 X=200 : Y = 170
620 PUT SPRITE 1,(212,C1),6,1
630 PUT SPRITE 2,(222,C2),6,1
640 PUT SPRITE 3,(232,C3),6,1
650 FOR I = 1 TO 9 : KEY(I) ON : NEX
T I
660 ON KEY GOSUB 880,900,920,940,100
0,1040,1090,1140,1200
670 STRIG(0) ON : ON STRIG GOSUB 780
680 PUT SPRITE 0,(X,Y),6,0
690 IF STICK(0)=(0) THEN 680
700 X=X+PLOT(STICK(0),1)
710 Y=Y+PLOT(STICK(0),2)
720 IF X<8 THEN X=8
730 IF X>244 THEN X=244
740 IF Y<122 THEN Y=122
750 IF Y>174 THEN Y=174
760 IF KF=1 THEN GOTO 960
770 GOTO 680
780 IF POINT(X,Y)=15 THEN M=MT(INT((
X-8)/8))
790 IF POINT(X,Y)=1 THEN M=MT(INT((X
-13)/8))+1
800 PLAY "V=V1;L=L;N=M;"
810 IF AF>0 THEN AP(AF)=M : AF=AF+1
:LINE (AF*8+58,70)-(AF*8+62,74),1,BF
: LINE ((AF-1)*8+58,70)-((AF-1)*8+62
,74),15,BF
820 IF AF>16 THEN AF=0 : LINE (194,7
0)-(198,74),15,BF : RETURN
830 IF BF>0 THEN BP(BF)=M : BF=BF+1
:LINE (BF*8+58,86)-(BF*8+62,90),1,BF
: LINE ((BF-1)*8+58,86)-((BF-1)*8+62
,90),15,BF
840 IF BF>16 THEN BF=0 : LINE (194,8
6)-(198,90),15,BF: RETURN
850 IF CF>0 THEN CP(CF)=M : CF=CF+1
:LINE (CF*8+58,102)-(CF*8+62,106),1,
BF: LINE ((CF-1)*8+58,102)-((CF-1)*8
+62,106),15,BF
860 IF CF>16 THEN CF=0 : LINE (194,1
02)-(198,106),15,BF:RETURN
870 RETURN
880 IF BF=1 OR CF=1 THEN RETURN
890 AF=1 : LINE (20,68)-(40,76),8,BF
:RETURN
900 IF AF=1 OR CF=1 THEN RETURN
910 BF=1 : LINE (20,84)-(40,92),8,BF
:RETURN
920 IF AF=1 OR BF=1 THEN RETURN
930 CF=1 : LINE (20,100)-(40,108),8,
BF:RETURN
940 SWAP KF,KS : RETURN 960
950 IF KF=0 THEN GOTO 760
960 FOR I = 1  TO 16
970 PLAY "L=L;V=V1;N=AP(I);","L=L;V=
V2;N=BP(I);","L=L;V=V3;N=CP(I);"
980 NEXT I
990 GOTO 950
1000 L = L+ IC
1010 IF L>24 THEN L = 24 : IC =-1
1020 IF L<1 THEN L=1 : IC = 1
1030 RETURN
1040 V1=V1+D1
1050 IF V1>15 THEN V1=15: D1=-D1
1060 IF V1<0 THEN V1=0: D1=-D1
1070 C1=C1-(D1*2) : PUT SPRITE 1,(21
2,C1),6,1
1080 RETURN
1090 V2=V2+D2
1100 IF V2>15 THEN V2=15: D2=-D2
1110 IF V2<0 THEN V2=0: D2=-D2
1120 C2=C2-(D2*2) : PUT SPRITE 2,(22
2,C2),6,1
1130 RETURN
1140 V3=V3+D3
1150 IF V3>15 THEN V3=15: D3=-D3
1160 IF V3<0 THEN V3=0: D3=-D3
1170 C3=C3-(D3*2) : PUT SPRITE 3,(23
2,C3),6,1
1180 RETURN
1190 RETURN
1200 SCREEN 0,0:END
1210 REM USER INSTRCTIONS
1220 SCREEN 0,0: KEY OFF
1230 COLOR1,6:PRINT"MSX-SEQUENCER"
1240 PRINT"-------------"
1250 PRINT
1260 PRINT "Move the pointer using t
he": PRINT "cursor keys."
1270 PRINT "To select the note, pres
s":PRINT"the space bar."
1280 PRINT
1290 PRINT"The function keys are def
ined":PRINT"as follows:" : PRINT
1300 PRINT "F1 - Program Channel 1."
1310 PRINT "     Setup a series of 1
6 notes for " : PRINT "     channel
1."
1320 PRINT "F2 - Program Channel 2."
1330 PRINT "     Setup a series of 1
6 notes for " : PRINT "     channel
2."
1340 PRINT "F3 - Program Channel 3."
```

```
1350 PRINT "      Setup a series of 1
6 notes for " : PRINT "          channel
3."
1360 LOCATE 0,24: PRINT "Press any k
ey for more info...";
1370 A$=INKEY$ : IF A$="" THEN 1370
1380 CLS
1390 PRINT"MSX-SEQUENCER"
1400 PRINT"--------------"
1410 PRINT
1420 PRINT"F4 - Start/Stop music seq
uence" : PRINT"              playback."
1430 PRINT"F5 - Increase/Decrease pl
ayback": PRINT"              speed."
1440 PRINT"F6 - Increase/Decrease Ch
annel 1": PRINT"             volume"
1450 PRINT"F7 - Increase/Decrease Ch
annel 2": PRINT"             volume"
1460 PRINT"F8 - Increase/Decrease Ch
annel 3": PRINT"             volume"
1470 PRINT"F9 - Exit to BASIC."
1480 LOCATE 0,23: PRINT "Press any k
ey to run program.";
1490 A$=INKEY$ : IF A$="" THEN 1490
1500 RETURN
```

PATTERNS by Tom Sato

These two short listings by Tom Sato show how versatile the line drawing commands are in MSX BASIC. Both use loops to build up a pattern. In the case of 'polygon' (which has nothing to do with dead parrots) the loop moves around the origin from which lines radiate, eventually building up a regular shape.

The position of the origin is set using the PSET command. This plots a point using X,Y co-ordinates. A line is drawn from this point with the LINE command. Normally you would use two sets of X,Y co-ordinates, marking the start and stop points of the line. But having already marked the start position with PSET, only the second set is needed, together with the hyphen to indicate what's going on.

Try playing around with the COLOR command. You could also experiment with the formulae which determine the co-ordinates — lines 50,60 and 70 in 'polygon' and 50 and 60 in 'sine wave'.

```
10 REM polygon
20 S=10
30 R=90
40 FOR Z=1 TO S
50 A=(Z-1)*8*ATN(1)/S
60 X(Z)=R*COS(A)+123
70 Y(Z)=R*SIN(A)+90
80 NEXT Z
90 SCREEN 2
100 COLOR 10,1,1
110 CLS
120 FOR Z=1 TO S
130 FOR L=Z TO S
140 PSET (X(Z),Y(Z))
150 LINE -(X(L),Y(L))
160 NEXT L
170 NEXT Z
180 GOTO 180
```

```
5  REM SINE WAVE
10 SCREEN 2
20 COLOR 15,4,4
30 PSET(123,95)
40 FOR I=0 TO 125.8 STEP .2
50 X=90*SIN(I)+123
60 Y=90*COS(I)*SIN(I*.95)+95
70 LINE -(X,Y)
80 NEXT
90 GOTO 90
```

LISTINGS

SPRITE DEMO by Tom Sato

This short program by Tom Sato illustrates how you create and then print a sprite. MSX BASIC is extremely versatile in this respect, allowing a maximum of 32 to be created.

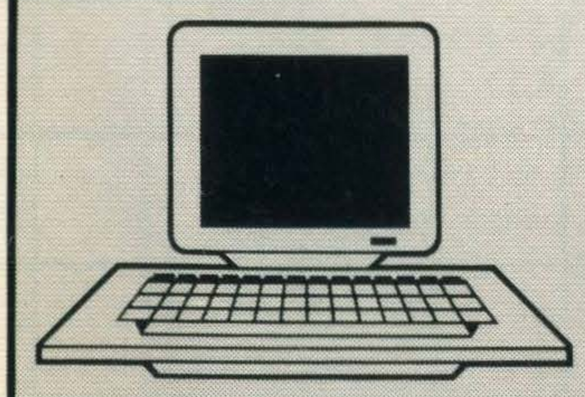
The actual defining of the shape takes place in lines 20 to 50. This loop reads each line of the character square in turn, from the DATA statements, storing the figure in S$. This variable is then used to define the sprite (in line 150). The rest of the program then uses loops to print the figure on the screen. You could experiment with this program by changing the 1s and 0s in the DATA lines to change the sprite's shape.

```
10 REM sprite demo
20 FOR I= 1 TO 8
30 READ A$
40 S$=S$+CHR$(VAL("&B"+A$))
50 NEXT
60 DATA 00011000
70 DATA 01111110
80 DATA 10011001
90 DATA 10011001
100 DATA 11111111
110 DATA 00100100
120 DATA 01000010
130 DATA 11000011
140 SCREEN 2
150 SPRITE$(0)=S$
160 COLOR 10,1,1
170 CLS
180 FOR J=0 TO 5.966 STEP .157
190 PUT SPRITE 0,(90*SIN(J)
    +123,90*COS(J)+90),10,0
200 NEXT
210 FOR I=0 TO 90 STEP .1
220 FOR J=0 TO 5.966 STEP .314
230 PUT SPRITE J/.314,(90*SIN
    (I+J)+123,90*COS(I+J)+90),10,0
240 NEXT
250 NEXT
```

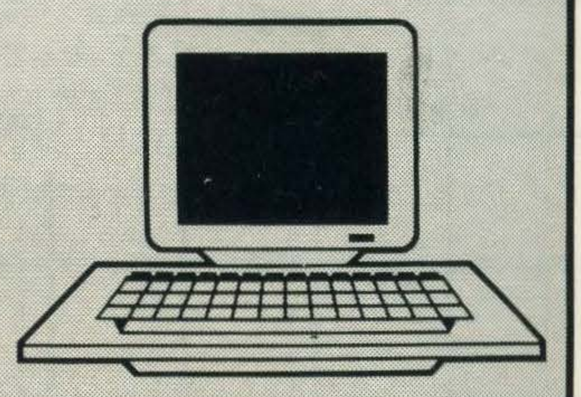
BOOBYTRAP by Juan Moore-Thyme

Fed up with people messing with your micro? Tired of klutzes tapping on the keyboard? This little program, written by one of our in-house saboteurs, will give any idle meddler a bit of a shock. It booby traps your machine so that, at the press of a key, an apparently dead screen springs into life, with an appropriately rude message. Choose your own message to suit your mood. But remember, you don't want to make someone so angry that he or she smashes up your beloved computer.

```
10 KEY OFF
20 FOR LOOP%=1 TO 3
25 REM Turn the screen off
30 COLOR0,0,0
35 REM Wait for a key press
40 Q$=INKEY$
50 IF Q$<>"" THEN GOSUB 120 ELSE 40
60 NEXT
70 COLOR10,6,9:CLS
80 PRINT:PRINT:PRINT:PRINT
85 PRINT:PRINT:PRINT
90 PRINTTAB(5);"I'VE HAD ENOUGH
   OF THIS!"
100 PRINTTAB(10);"TURN ME OFF!!!"
110 END
120 REM Message subroutine
130 COLOR12,11,9:CLS
140 PRINT:PRINT:PRINT:PRINT
145 PRINT:PRINT:PRINT:PRINT
150 PRINT TAB(5);"DON'T TOUCH
    THAT BUTTON"
160 PLAY"CDEF","DEFG","EFGA"
170 FOR N=1 TO 1000:NEXT
180 RETURN
```



This action packed section will appear in every issue of *MSX Computing*, crammed full of games and utility listings for MSX microcomputers. And, unlike any other magazine, every one will run, without fail, on your MSX micro.
As you grow more familiar with your own micro and become confident that you can produce a game or program to interest all our readers, why not send it to us, together with a copy on cassette?
We will of course pay for any listings we print, exactly how much depending entirely on the quality of the program, *not* the length! As a rough guide you can expect between £40 and £50 with anything up to £100 for a really ace program.



HISOFT

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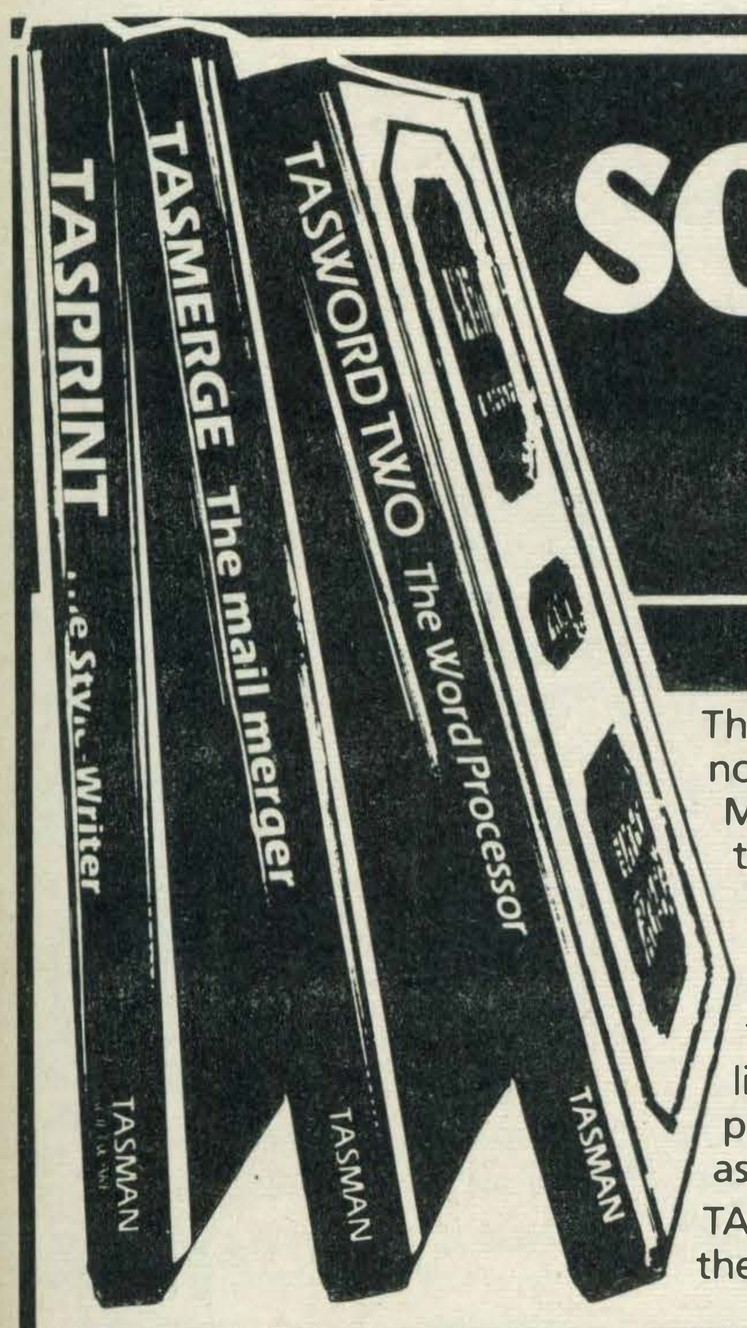

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POWER OF THE PERIPHERALS

Joysticks, monitors, printers, our team of testers will be putting them all through their paces

A computer is a hard-working dumb beast, and it's a beast that needs help. Help from the peripherals you plug into it — things like data recorders, disc drives, light pens, even that most basic of peripherals — the TV or monitor.

MSX computers are already well served by peripherals. There are lots of compatible bits and pieces you can add now, but as the number of people with MSX machines grows, so more and more peripherals — some weird, some wonderful — will hit the stores.

Choosing the right one for your machine and your uses is going to be a tricky business, and we're going to be doing our level best to help. Every month we'll be testing key peripherals with an eye on value for money and performance.

The basic criteria we'll be using are simple enough. Does it do what it should? Does it do what it should as well as it should? Does it represent value for money? Failure on any of these counts will mean that we won't recommend it.

The first question, 'Does it do what it should?', implies that we will be testing its operational suitability — things like how easy it is to use and set up. The second question, 'Does it do it as well as it should?', means that we will be looking inside the peripheral to determine how good it is from a technical point of view.

Value for money, for most people, will be the critical question. Can a £60 data recorder possibly be better value than a £20 one? The answer's yes, of course, provided that the data recorder is better built, has more facilities, and is likely to last longer and operate more reliably. Our expert testers will make value for money judgements that you'll find invaluable when adding bits to your MSX machine.

Let's look in a bit more detail at some of the things we'll be looking for when examining some of the more popular forms of peripheral.

TVs and monitors

To begin with, you'll probably use the domestic, common or garden colour telly with your MSX computer — and it should do quite a good job. But when everybody else wants to watch 'Minder' and you want to get a bit further with the adventure you're lot in, you may well start considering buying another TV or a dedicated computer monitor. (That' one reason why lots of 14 inch colour portables are being sold these days, say the TV marketing men.)

The most critical part of the TV is is screen and the way that your computer puts its picture on it. With most televisions, computers send their pictures to the screen as a UHF signal — which means tht they 'broadcast' the picture down a wire in the same format that the BBC broadcasts from Crystal Palace. For a higher quality picture, the TV should be able to cope with 'composite video' signals — which are the same as UHF less the 'broadcast' stage. For the ultimate in picture quality, the TV (by now it's become a monitor) should be able to cope with 'RGB' signals (Red, Green, Blue), where the computer directly controls the three guns that create the picture.

In all three forms of signal presentation, the most important factor from the user's point of view is the picture 'resolution', or apparent sharpness. We'll be examining portable TVs and dedicated computer monitors to see just how good they are at this essential task of presenting a nice

picture to the user. It's not only games that benefit, but business programs too — especially those that use an 80 column format. If the standard 40 column display doesn't look too good on your TV, then you can bet that 80 column will be unreadable!

Data recorders

In their simplest for, these are just glorified audio cassette recorders — the sort you sling in the caravan when going on holiday. But MSX data recorders will be coming from companies with justifiably high reputations for producing hi-fi cassette decks, and we'll be applying high standards to our judgements on them.

Their job is to record a series of beeps and whistles produced by the computer, which represent programs and program data. This is not dissimilar to the job of recording audio signals, and there are well established tests which can be applied to see how good they are. We will apply those tests.

Disc drives

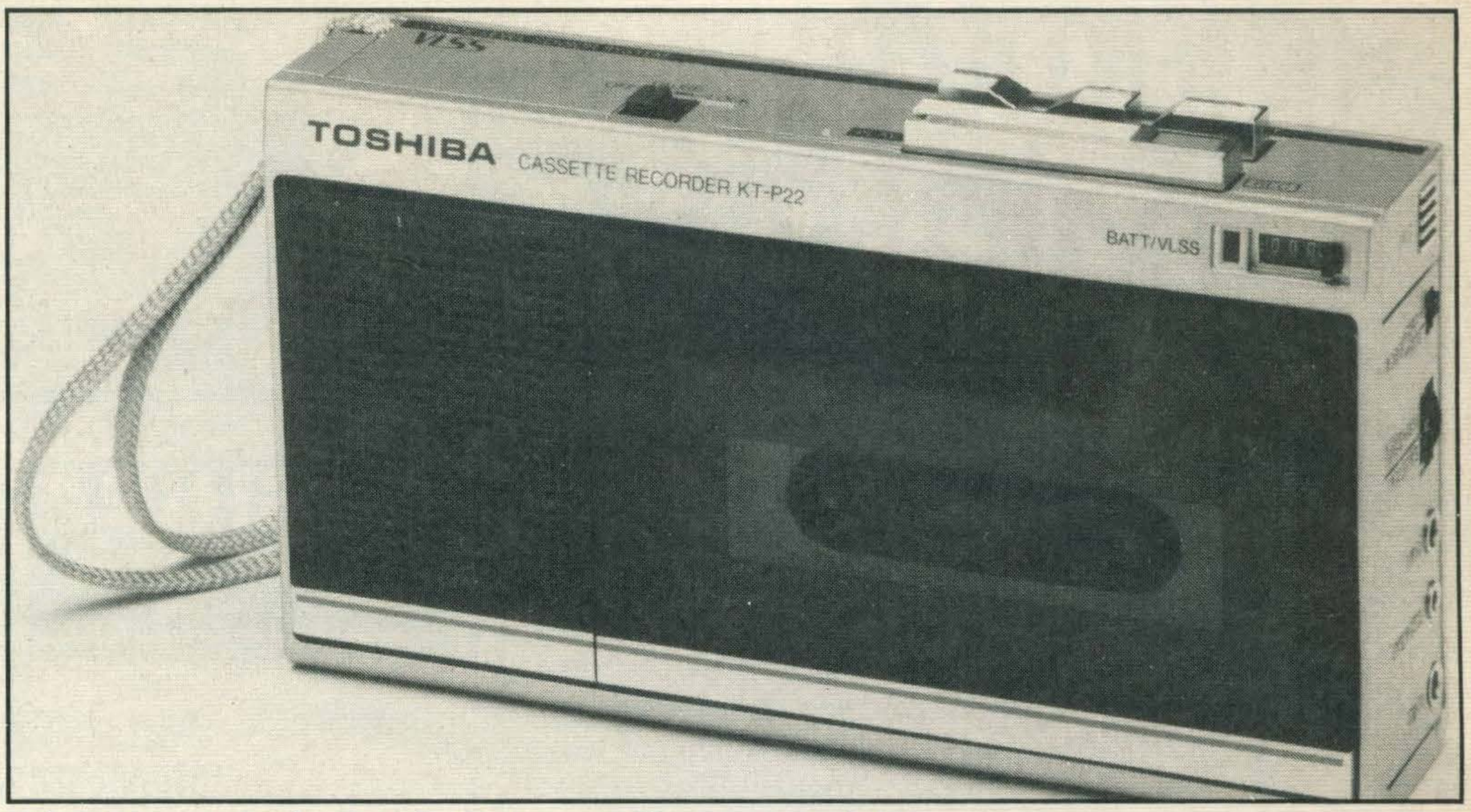
Disc drives, which offer 'better' mass storage of computer programs and program data than cassettes — because they're faster to use — are slightly more complex to test than data recorders. They rely on the same basic physics — magnetic recording — but are or sophisticated. We will be applying reliability and useability tests rigorously.

MSX owners should be well served with disc drives because many of the big Japanese companies are already big names in drive manufacture — especially Sony, JVC, Hitachi, Mitsubishi and Matsushita (Panasonic). Quality should not be a problem!

Joysticks

All MSX computers are fitted with 'cursor' keys, and these can be used with most games quite satisfactorily. But for some games, a joystick is a great help.

Joysticks are fairly simple devices, and personal preference for the 'feel' and 'responsiveness' of one stick over another is probably the most important factor. We'll be offering sound advice, because we play a lot of games — more than we should with a magazine to produce!



This data recorder for Toshiba looks more like a personal stereo

Printers

If you get into serious programming, or business uses become important, then a printer is essential. There are two main types — dot matrix and daisywheel — each with its own advantages and disadvantages.

The important factors in assessing a printer are the clarity of the print, the speed it prints things, the noise it makes (they can be loud!), and the range of chracters it can print. We'll be applying standard tests (like how long it takes to print a standard text), and allowing you to make your own judgements about print quality by showing examples.

One of the first MSX disc drives to appear

Graphics

There are hosts of add-ons linked with graphics — some of which, the printer/plotters, can be tested as printers (more or less). Other items, like light pens and touch pads/graphics tablets, are less easily assessed — but we'll be putting them through their paces and commenting on the sofware that drives them.

Systems

Apart from the 'obvious' peripherals, MSX computers from various manufacturers will interface with video recorders, musical keyboards, computer networks — almost anything you can think of. As these bits appear, we'll be asking experts to use them in the context of the whole computer system, and as specialist tools for their particularl task.

Who better than a musician to comment on an MSX synthesiser set up, or a video film maker to judge an MSX titling system?

Over the months, our tests on MSX peripherals and systems will build up to an invaluable guide for the MSX owner. Read in conjunction with the *What MSX?* buyers guide, they'll be the definitive guide to any MSX related purchase. We promise to put our readers' interests first.

Toshiba's joystick costs £12.95

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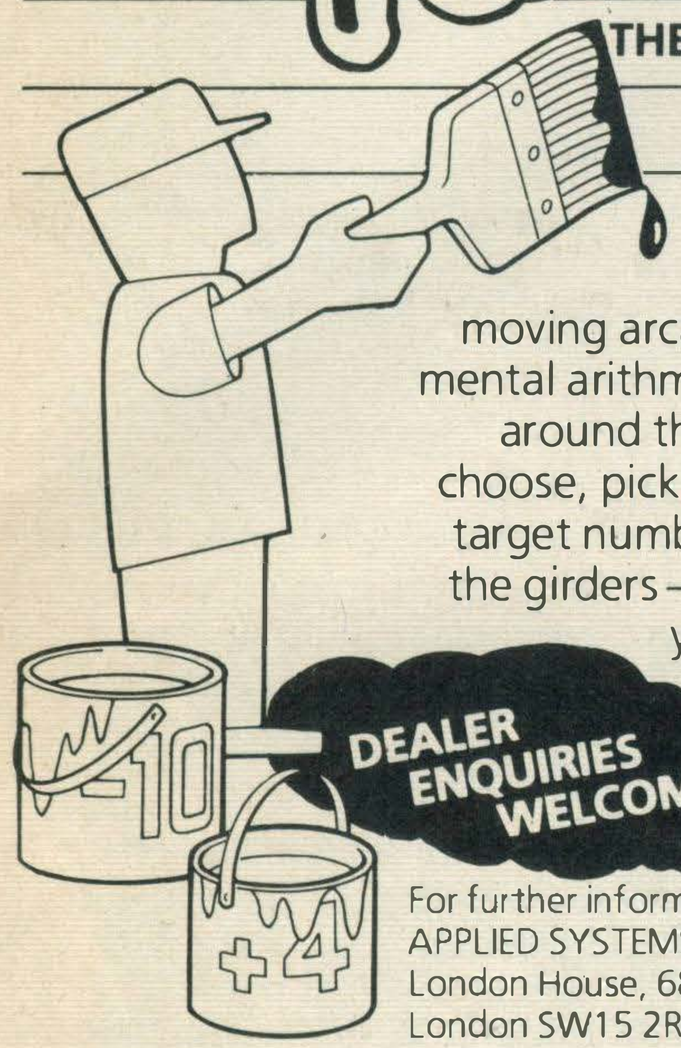

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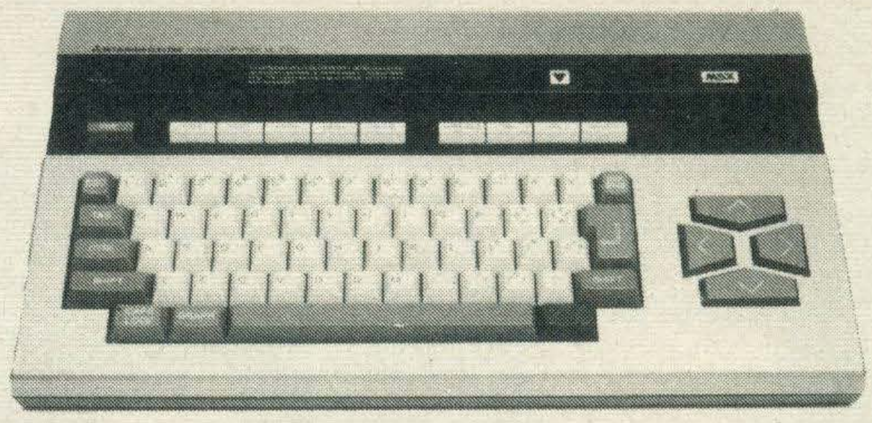

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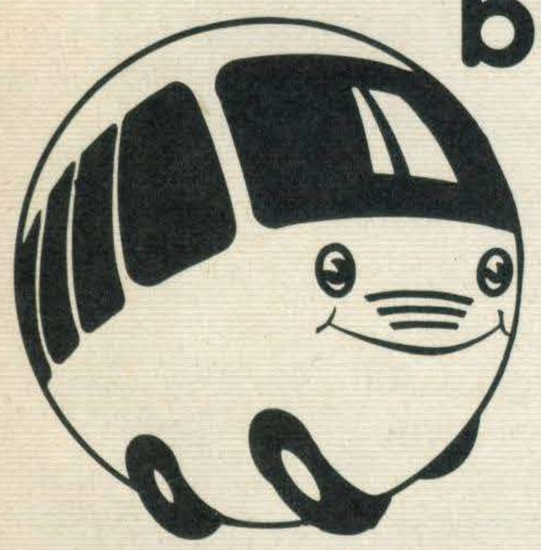

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Does MSX-DOS mean business?

Disc drives need a Disc Operating System to work. Jeremy Vine has been investigating MSX-DOS, the system for MSX computers.

In October 1983 Microsoft announced an 8-bit operating system for MSX machines, MSX-DOS—but first a little background. DOS, if you didn't already know, means 'Disc Operating System'. But what is an operating system? Well it is usually a program, or collection of programs, which organises and manages the hardware of a computer. These functions include controlling the input and output operations carried out by the computer, connections to peripheral devices and the user's own programs.

The physical location of the operating system is not always the same and may consist of one or two parts. This can be a permanent system, which is always present even when the computer has been turned off, and this is held within ROM (Read Only Memory)—the permanent memory of the computer. The second option, which is often an extension to the operating system, can be loaded from disc.

The DOS, for the most part, extends the operating system commands and in particular allows a computer to support and run disc drives. However the DOS does not necessarily have to be loaded from a disc. The pre-requisite interface to allow a computer to connect to a disc drive may consist of the DOS completely contained within ROM. Whatever the method used it is the set of instructions and their effects which concern us.

The DOS, as explained, is the manager of the system. But what precisely does it manage? Taking the MSX computer as our example, we know that it forms the heart of a number of devices. These devices may be VDUs (Visual Display Units), disc drives, a keyboard or printer. In running your own or anyone else's programs the computer needs to load programs into its memory, RAM (Random Access Memory—memory which is lost when the machine is turned off), and then organise and process the information. In a similar way commands are needed to access disc drives and organise the information on the disc.

Compatibility

All these are functions of an operating system. But operating systems are not all compatible and universal. In order to create compatibility between machines, and here we are talking about the more expensive business machines, operating systems such as CP/M and MS-DOS were created, the aim being to allow users to transfer and run software on different manufacturers' machines. Nevertheless you may need to 'tweak' your shop-bought CP/M package to enable it to run on your own micro. The DOS will allow you access to the content of any file, it may allow you to re-name, sort or shuffle the files but you might not be able to run them. Though some standards already exist they haven't guaranteed 'across the board' compatibility.

In order to understand the functions of a DOS let's look at MS-DOS, of which MSX-DOS is a derivative. MS-DOS was written by Microsoft, the originator of the MSX standard, and consists of a number of parts. The system was

designed with the IBM PC in mind and MS-DOS has four main components to enable the system to run on any disc system, be it hard disc or floppy. These components are as follows:

BOOT: This is a program which boots (starts-up) the system by loading MS-DOS from disc.

DOS.COM: The organiser of the disc system.

BIO.COM: Sets the physical drivers for the particular disc being used.

COMMAND.COM: Responsible for interpreting and processing input commands.

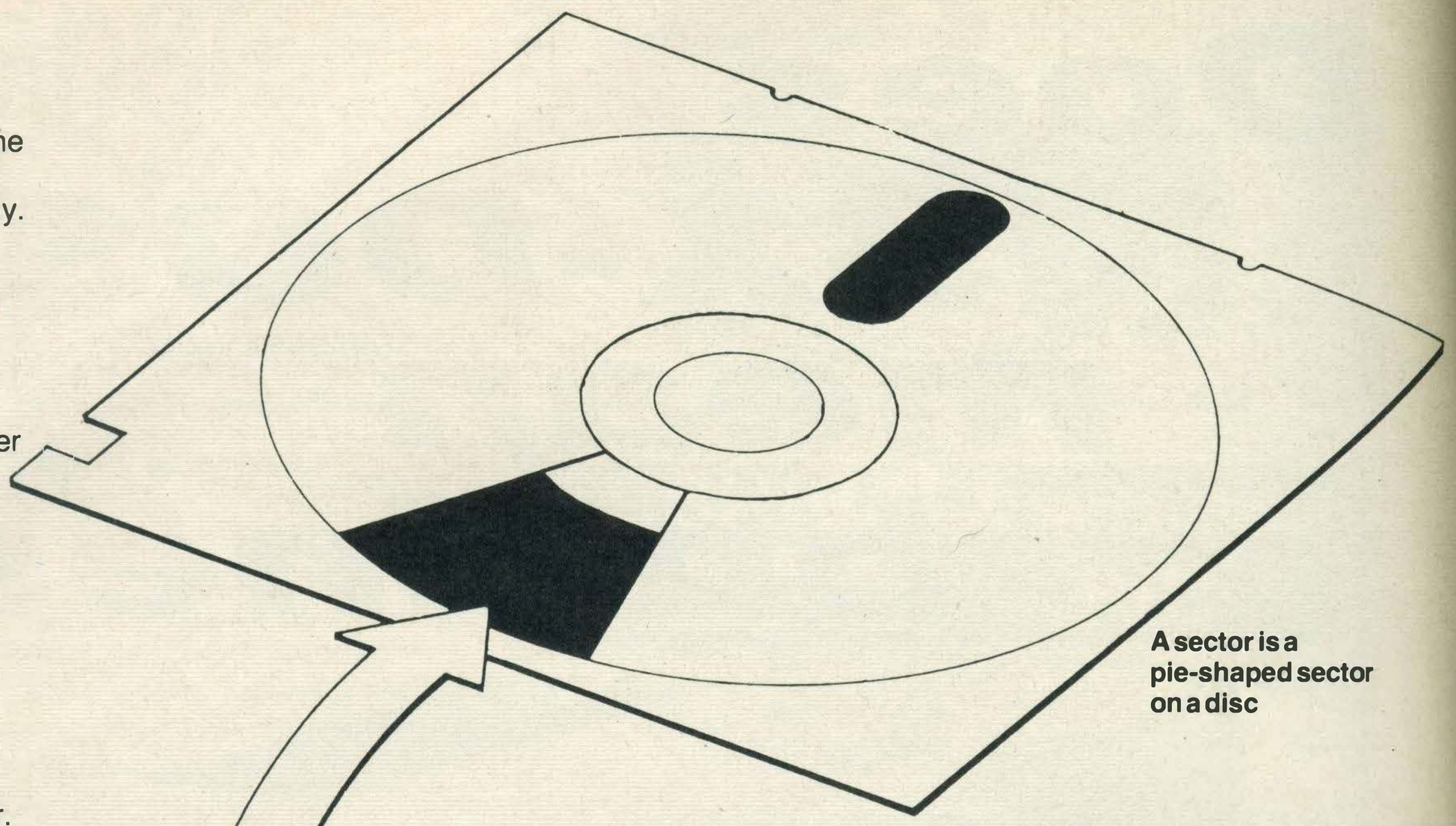
The COMMAND program is responsible for two kinds of commands issued by the user. These are internal commands, commands built into the system for erasing, renaming, displaying, copying files etc and external commands, which are utilities that can be loaded from disc. These are commands that load programs to compare files, enter the date, format discs as well as utilities added by the user.

Disc formats

Files are where programs and data are stored. These files are stored on disc and can be identified by their names which the user gives to them. The DOS is a necessary part in keeping the disc in order so that files may be added or deleted and the data structured so that it can be called up at a later date.

Disc Operating Systems are therefore the management centre of the disc system and computer. But as I've already pointed out running programs that use the same DOS may still not be enough to run on another machine. Why? Well, it is all too often a case of incompatibility between disc formats. The format of a disc refers to the internal structure laid down onto the disc. There are hundreds of different disc formats on the market, and this is where all compatibility ends. All is not lost as the programs can still be run on other machines but each time the program has to be configured to the disc format of the machine on which it is to run.

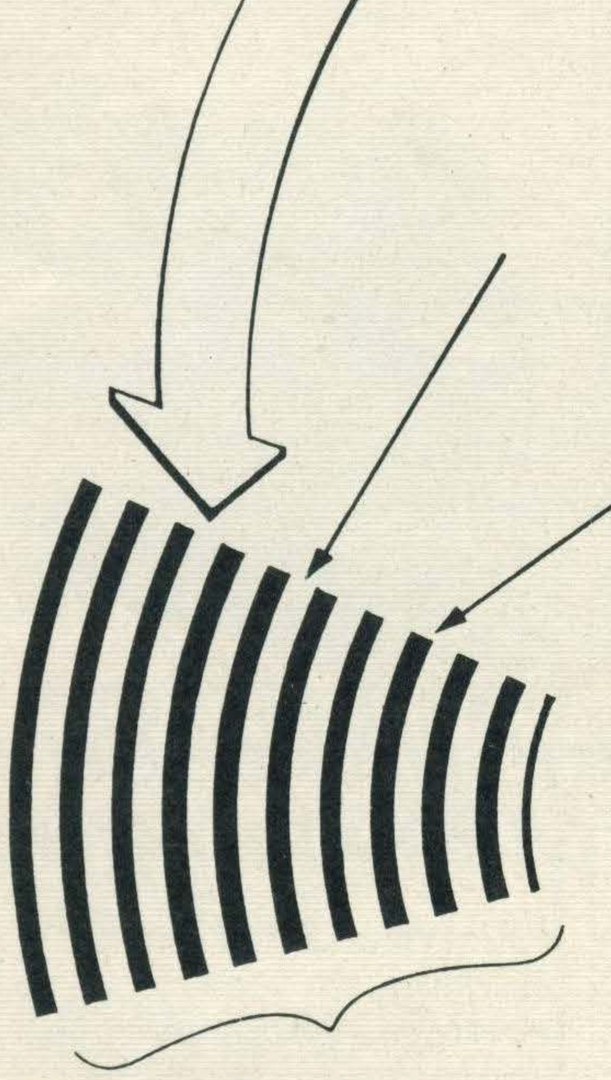
Talking of disc formats demands a brief explanation of



A sector is a pie-shaped sector on a disc

'There are hundreds of different disc formats on the market, and this is where all compatibility ends'

the organisation of a disc and the memory of a system. Laid down magnetically on the disc is a series of tracks, either 40 or 80, with each track split into a number of sectors. A typical disc may be made up with 40 tracks of 16 sectors to a track. This information is held at 512 bytes per sector in double density form. The first track of a

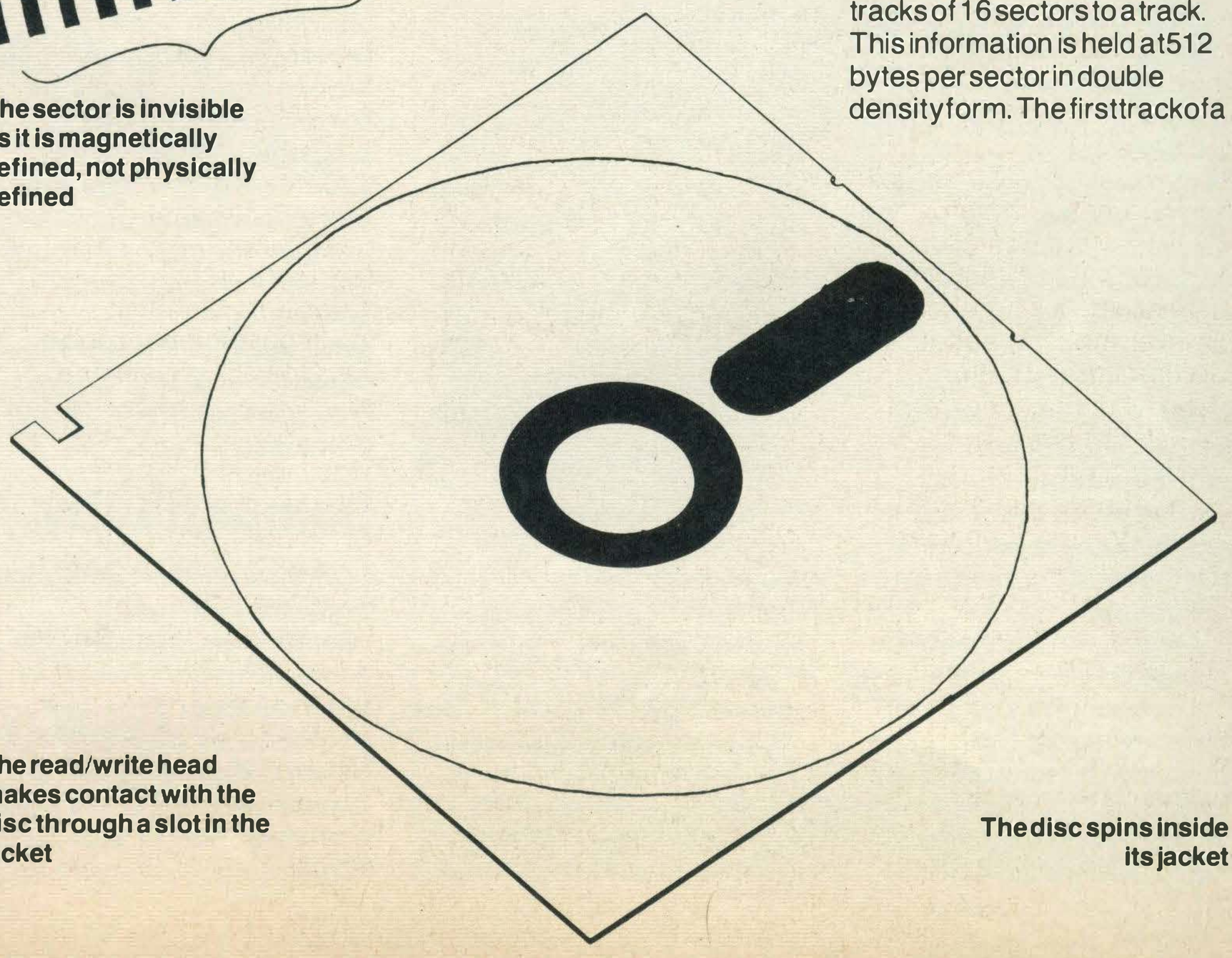


Track gap

One track-sector

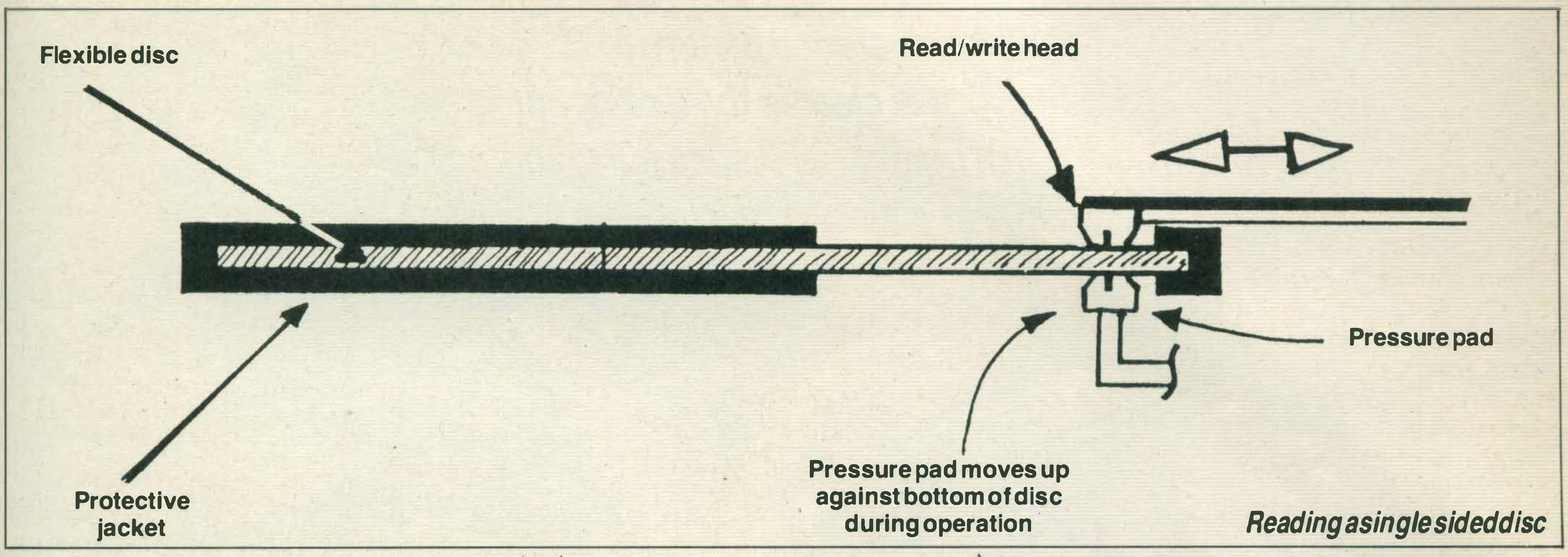
Discs may be divided into one to 32 different sectors

The sector is invisible as it is magnetically defined, not physically defined

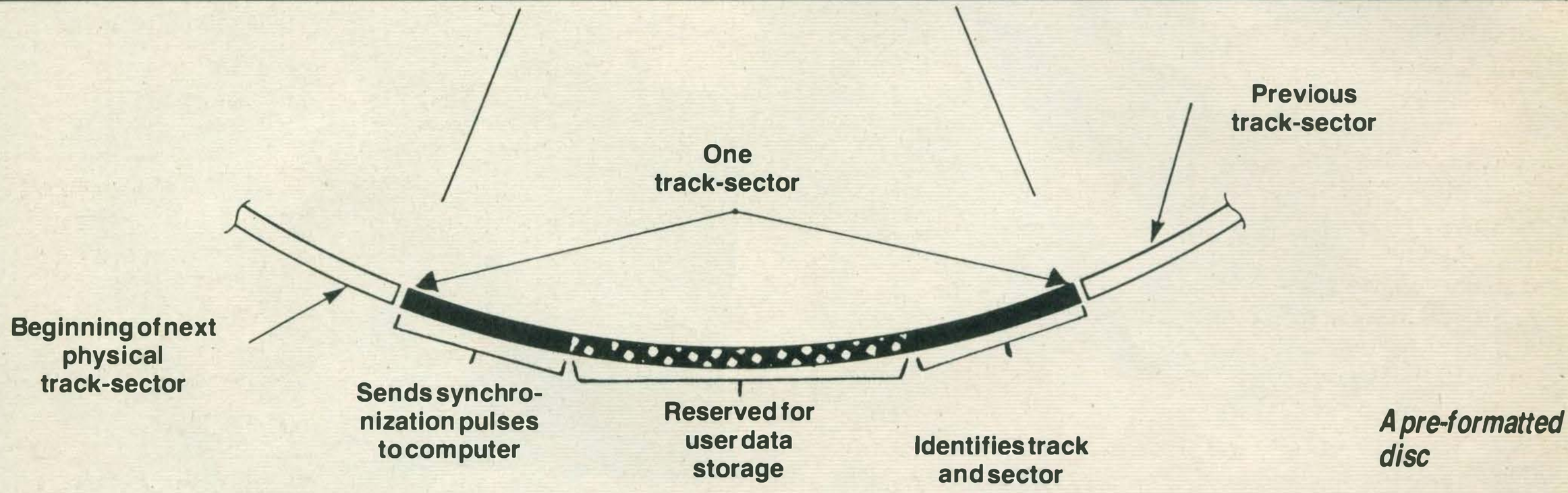


The read/write head makes contact with the disc through a slot in the jacket

The disc spins inside its jacket



Reading a single sided disc

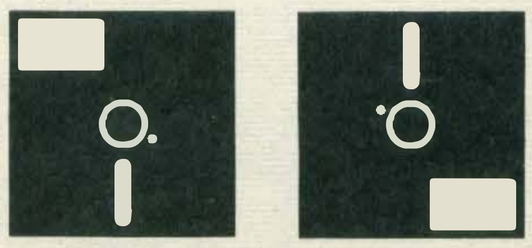


A pre-formatted disc

disc (0) contains all the information about what is held on the disc and is the referencing point for the system. Track 1 sector 1 holds the boot record and the next two sectors contain the File allocation table. The file allocation table tells the DOS whether a sector is in use or not; if it is a pointer is set up to point to the next relevant sector. Sectors 4 to 7 of track 0 contain the directory, which is an index of files on disc and contains the information to locate blocks of information held on the disc. However, the user need not concern himself with this information. This is the role of the DOS and its job is to organise the physical information and the user can then worry about the logical data.

What I have just described is the format of a disc on the IBM computer. This format is different according to the DOS used—and CP/M organises its disc in another format. The commands used by disc operating systems are often different though they do have similar names. For instance, deleting or removing a file from disc requires the user to type a command such as **DELETE** or **ERASE**. Remembering the command for the system you are using isn't so bad, as it is usually something that conveys the action you are about to take.

One final structure that the DOS commands can give the



'The planning behind MSX-DOS, in common with MSX, is that all MSX machines will be able to run a standard DOS, based on the MS-DOS disc format'

user is the directory structure. A directory can be split into a 'tree-like' structure where a 'trunk-like' master directory exists with branching sub-directories. The purpose of this is to allow a more organised system especially where vast quantities of data are being handled. The DOS yet again provides the commands to create a directory tree structure, transfer data between directories and access the different sub-directories.

Having given all this background information on Disc Operating Systems and MS-DOS, where does MSX-DOS come in? Well, to add to all the MSX standards comes the standard DOS for MSX machines. Or is it a standard? Information on MSX-DOS is thin on the ground and what we can tell you is what can be gathered from the MSX companies and Microsoft, though they aren't showing all their hands just at the moment.

The planning behind MSX-DOS, in common with MSX, is that all MSX machines will be able to run a standard DOS, based on the MS-DOS disc format and which will allow the exchange of information between 8 and 16-bit systems, therefore making MSX computers upwards-compatible with micros using the MS-DOS and XENIX operating systems. This would allow all Microsoft languages to be available, for example.

Going through the user guide for MSX-DOS gives the impression of it being identical to MS-DOS. Getting started, entering the date and using the drives is similar to MS-DOS and the user will have the same standards such as drives A and B. However, don't think that you will be getting an MS-DOS system.

It would be nice to think that the disc drives being used by the various manufacturers would be compatible but from what we can gather no agreement has been reached between them as to the drive to

be used. It had been assumed that the Sony 3½ inch drives would be the standard but this has not been to the liking of other manufacturers such as Hitachi who has vested interests in its own disc drives, which are, of course, a different size.

'Pulling together a picture of MSX-DOS is difficult. What is clear is the lack of agreement on a number of issues surrounding the appearance of disc systems for MSX machines'

Sony's 3½ inch disc drive

With the sizes of disc drives varying between 3½ and 8 inches it seems that the makers of the machines will go their own way. This is borne out by Spectravideo who will be releasing 5¼ inch floppy disc drives while Sony, of course, is using its 3½ inch drives. Indeed Microsoft has said there is no stipulated standard as to the size of drive. This is understandable in the light of having a system that will support different disc drives, but because of the nature of MSX machines it seems a pity that the consumer is not going to be able to purchase a machine with the full knowledge that if a disc system is purchased at a later date, he would be able to transfer his discs easily among MSX computers. The answer to this problem lies with the manufacturers and we will have to wait and see what they decide.

What other features will MSX-DOS have? The user guide reveals the following as the Disc Basic Commands:

ELOAD	**KILL**	**PRINT#**
ESAVE	**LINE**	**USING**
CLOSE	**INPUT#**	**PUT**
COPY	**LOAD**	**RUN**
DSKO	**LSET**	**SAVE**
FIELD	**RSET**	**SYSTEM**
FILES	**MERGE**	
FORMAT	**NAME**	
GET	**OPEN**	
INPUT #	**PRINT #**	

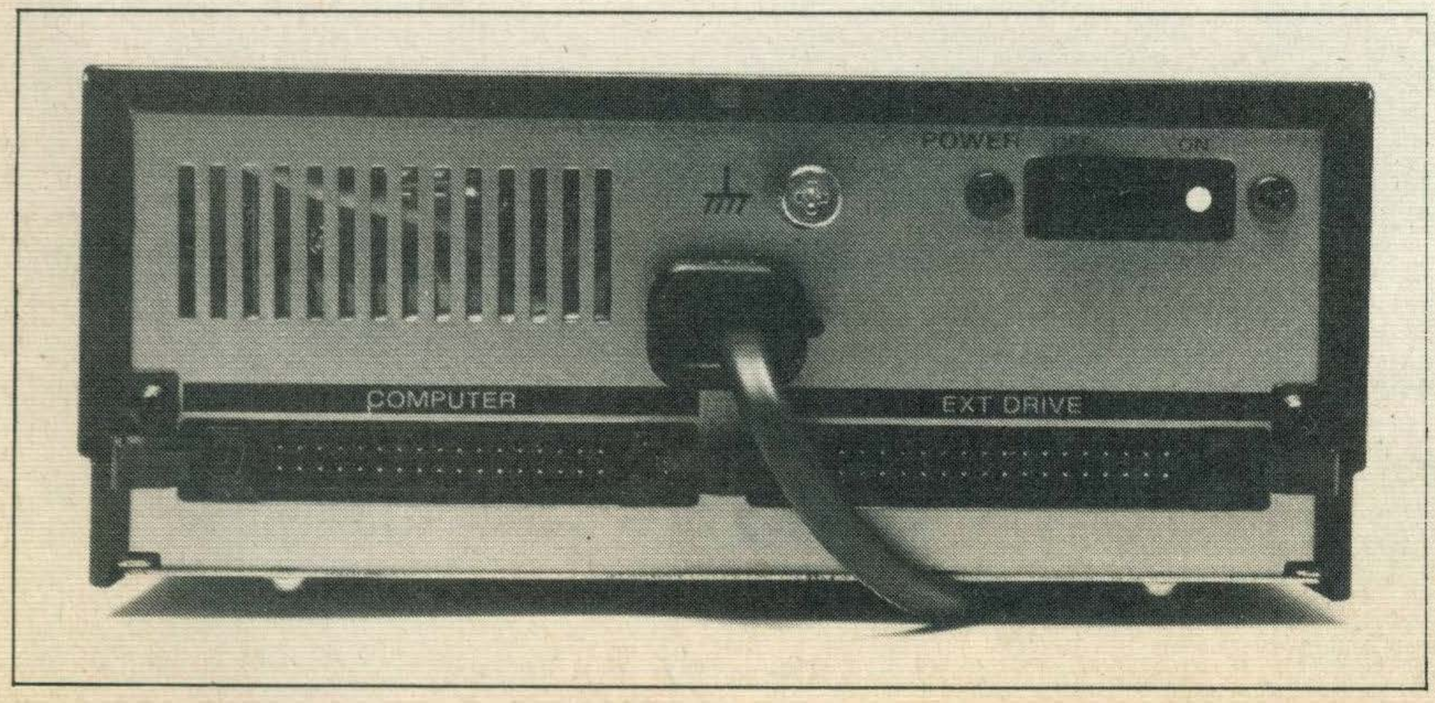
These commands are very much what can be expected and at least suggest that part of the system is agreed. There is also documented material for Independent Software Vendors giving guidelines as to the ways software should be written. With the amount of documentation usually made available technical details will no doubt become available and enable the more experienced to modify and change MSX-DOS.

Details on how the system will be provided are also vague and yet again would appear to be up to the individual manufacturer concerned. For instance, the Spectravideo micro will have a built-in disc controller card connected directly to the CPU unit and will support MSX-DOS and CP/M. However, when asked about MS-DOS the only reply was that this was so far untried.

The specifications of the Spectravideo system will be a double sided double density disc, a single drive with a total of 500K on an unformatted disc. This refers to both sides of the disc and the storage capacity once formatted is 326K. The discs will be 40 track with 17 sectors per track and 256 bytes per sector. Remember that the difference between that figure and the one mentioned earlier in relation to the IBM machine is the difference between an 8 and 16-bit system.

Other points that aren't clarified are what will be, if any, the limit of number of files permitted on a disc. No other information is being released by Microsoft and so pulling together a picture of MSX-DOS is difficult. What is clear is the lack of agreement on a number of issues surrounding the appearance of disc systems for MSX machines.

So, at the end of the day, what do we have? MSX-DOS is well on its way but its exact make-up is questionable and although the DOS will be standard across machines, as MS-DOS is in the 16-bit market, other factors such as drive units would seem to be very much a decision by the individual manufacturer. This is to be regretted. Hopefully, however, the DOS will live up to the name of its more illustrious forerunner, MS-DOS, and provide a good standard for disc systems and the MSX range.



Sony's single disc drive can link up with a second to form a dual drive system

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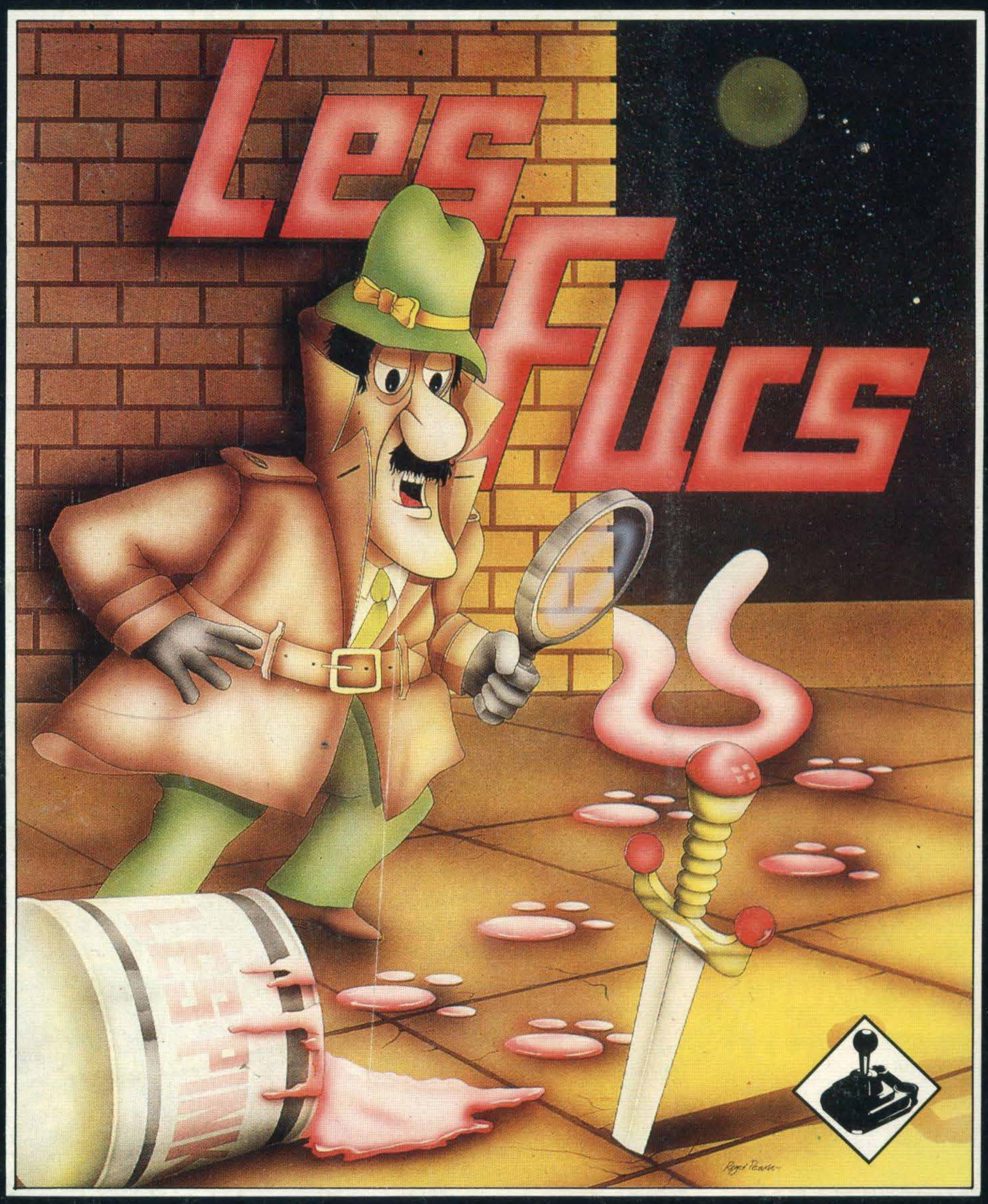

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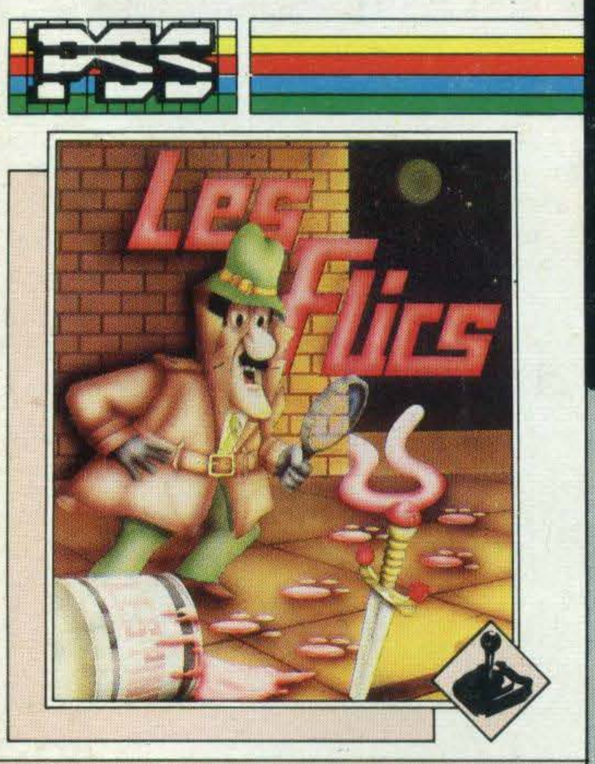
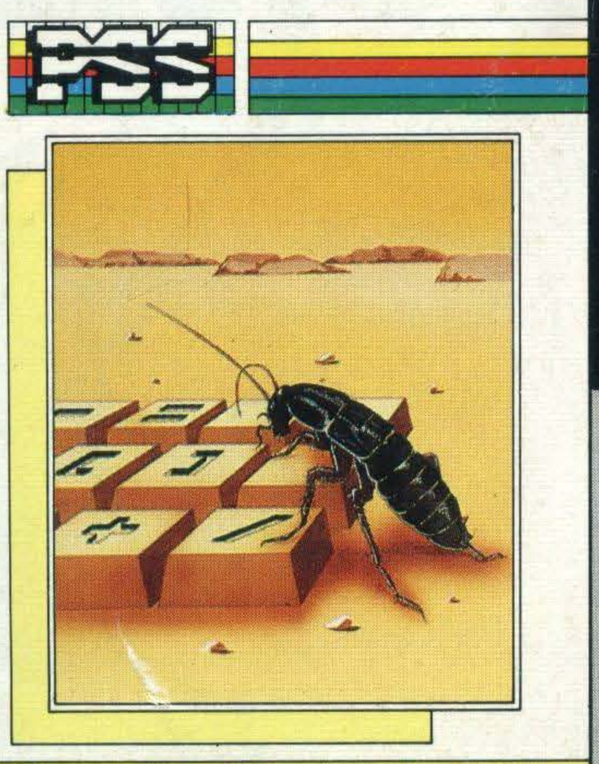


ARCADE ACTION FOR MSX

LES FLICS

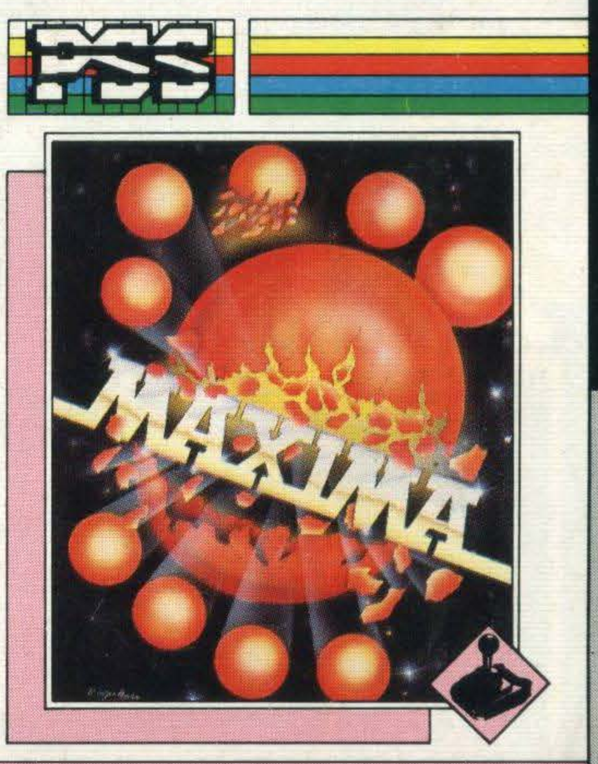
MSX 7·95



Assembler/Monitor for MSX

CHAMP

MSX 12·95



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MAXIMA

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TIME BANDITS

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