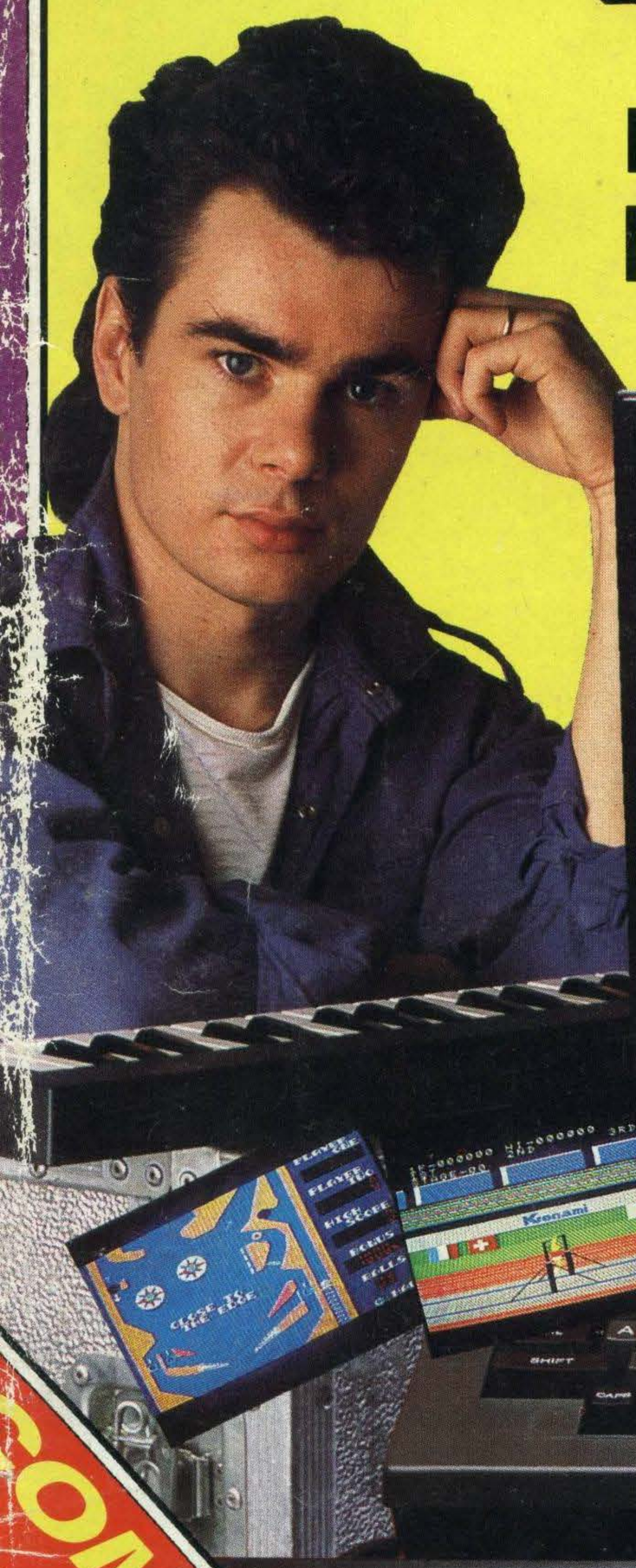
BUMPER FIRST ISSUE

A Haymarket publication December 1984 85p

MSX COMPUTING

MSX MAKING MUSIC!

Nik Kershaw tests Yamaha



LISTINGS

12 pages of type-it yourself programs

REVIEWS

10 pages of software under scrutiny

COMPETITION

£1000 of Activision software to be won!

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.

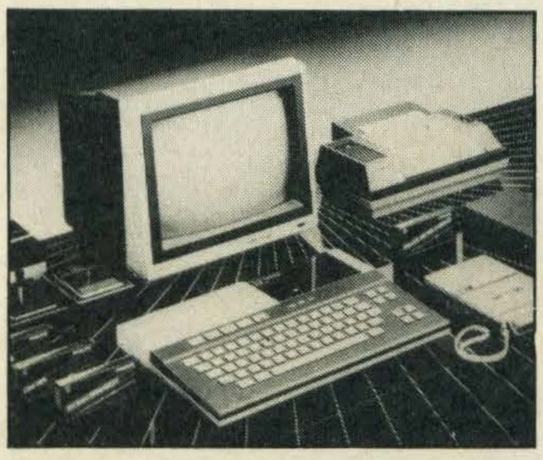
All of which makes MSX the system of the future.

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.

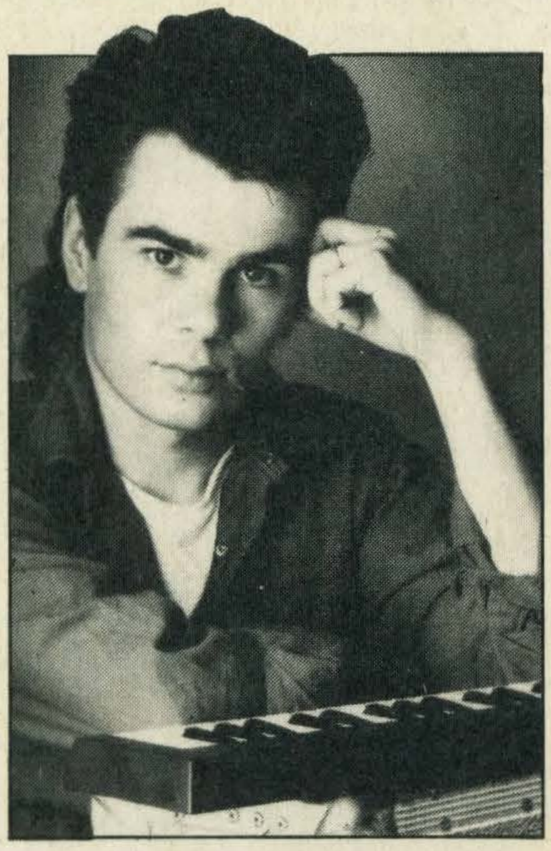
TOSHIBA MSX

MSX COMPUTING

REGULARS



FEATURES



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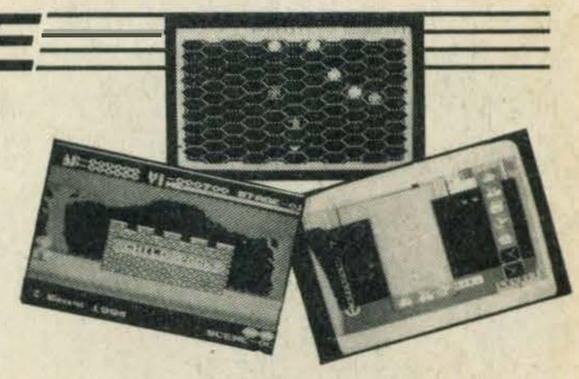

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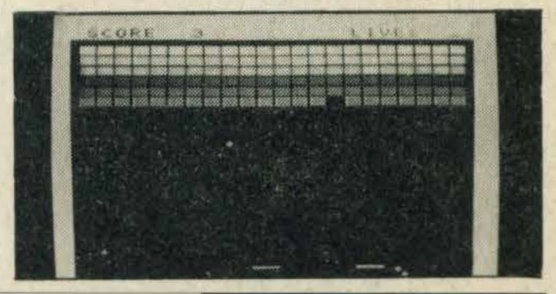

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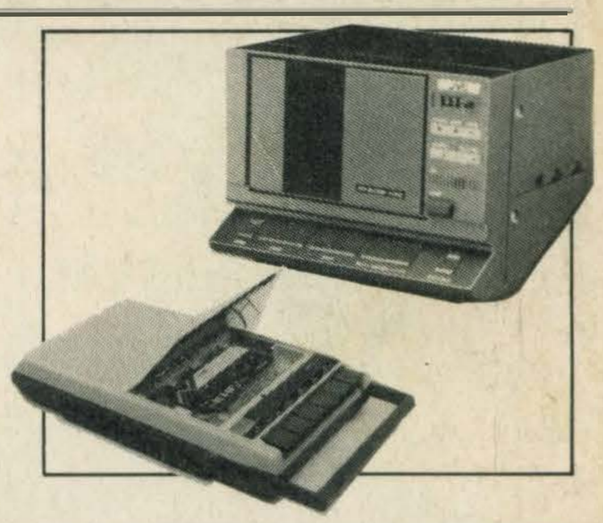

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NEWS

16-bit MSX machines are on the way

A version of Microsoft's MSX standard is on the way for 16-bit computers, machines which are typified by IBM's Personal Computer and ACT's Apricot.

The 16-bit MSX will have advantages over the current 8-bit version, as 16-bit machines are more powerful than their 8-bit counterparts. Communications, such as networks, where a number of computers share information and peripherals, are increasingly popular. But machines have to be fairly powerful to give such features, and it's argued that 8-bit MSX machines are not up to the job.

Availability of software is a strong point for a 16-bit MSX, which Microsoft says will run the MS-DOS operating system. This operating system is already widely used so there's plenty of software around for any future MSX machines using 16-bit chips.

Although the standard is still little more than a twinkle in the eyes of a number of Microsoft's engineers, it will use MSX GW Basic. But whatever 16-bit MSX emerges, Microsoft has promised that it will be upwardly compatible with the current standard. Which means that software running on machines available today will also run on machines built to a 16-bit MSX standard.

The obvious microprocessor to use in a standard 16-bit machine is Zilog's Z8000. The chip is essentially an expanded version of the Zilog Z80 used in today's MSX machines.

Microsoft admits that it is looking at all the main 16-bit microprocessors, including the Z8000, but the two strongest contenders are Intel chips.

One of these is the Intel 8088, used in the IBM Personal Computer, and the other is the 8086. The advantage of using one of these chips is that it makes running MS-DOS, which was written for the 8088, easy.

Unfortunately the 16-bit standard is unlikely to appear before mid-1986. This means that the technology chosen for the standard will be very old hat by then. The 8088 is even now slated as being outdated.

Such thoughts don't affect the designers of the 8-bit MSX, who are using technology that has been around for over four years. One criticism of MSX is that while it defines a standard, it defines a very basic one.

The proponents of MSX claim that there is reason behind this apparent madness. MSX may use old technology, but it is reliable, cheap, readily available and well understood by computer makers. Since this thinking is part of MSX, the 16-bit standard will surely follow.

Toshiba software

Five cassette-based games are the first UK software offerings from MSX computer manufacturer Toshiba.

Transferred from cartridge in Japan, the games cover pretty familiar territory — from *3-D Golf Simulation* and *Pinball Game* to two arcade 'zap-everything-that-moves' games, *Battle Ship Clapton II* and *Polar Star*. The latter incorporates 3-D graphics and is claimed by Toshiba to be a more 'advanced' example of its genre. The final offering is *Pyramid*, a maze-based graphics adventure.

All available now at £7.95 from Boots, Currys and independent dealers.

Kuma extends its range of add-ons

A speech synthesis package and two interface cartridges have been added to Kuma Computers' product range.

The speech synthesis package consists of a cartridge that plugs into the computer and a cassette-based program.

The program is used to create words that are output through the sound channel of your MSX computer.

Machine code generated by the program can be incorporated into other programs and can be used if the cartridge is in place.

The system works with 64 allophones (basic speech units) and costs £69.50.

For £59.50 the parallel interface cartridge is for the hobbyist wanting to connect an MSX computer to more than one parallel-interfaced peripheral.

It uses a TTL 8255 chip and provides either three eight bit ports without handshakes, two eight-bit ports with handshakes and bit set or reset, or one eight bit bi-directional port.

Kuma is making an RS232C interface cartridge for £99.50. This could be used as a printer port, or to interface with RS232 compatible peripherals such as modems.

Kuma also has two books scheduled. *Starting With MSX* is by Tony Marriott and costs £5.95. As the title implies, it is a book for MSX beginners, with the emphasis on explaining the jargon.

Three of the latest additions to Kuma Computers' ever growing range of MSX peripherals; £6 for the book, £70 for the speech add-on and £100 for the RS-232C.

Mystery machine

There are conflicting rumours that the German company Siemens has an MSX computer.

Reports in an American magazine claim that the company has taken out a license to manufacture MSX.

The machine is said to have the same basic specifications as its Japanese counterparts. But at the time of going to press the company's European headquarters in Munich, and its New York office, refused to confirm or deny the existence of any MSX computers.

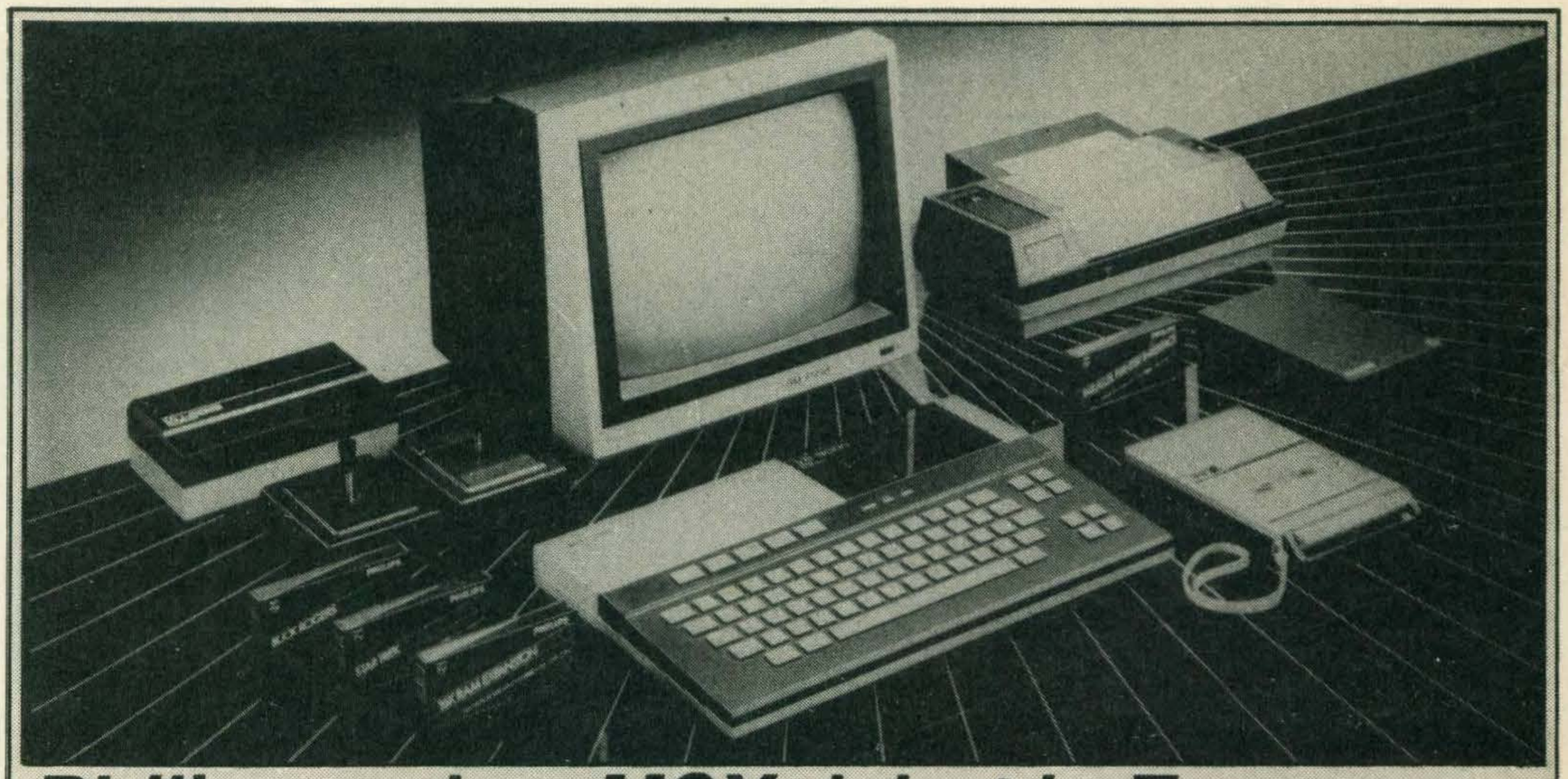
Network announced for MSX

Bill Gates, Microsoft's 28 year old chairman and founder, has revealed that the 16-bit MSX will use the Microsoft Networks software announced at the beginning of November.

This software allows up to 72 computers and peripherals to be connected in a local area network. Hardware has to be added to each computer in the network and one large machine has to be set up as a server. The server is in command of the network and needs a minimum of 196K of RAM.

Microsoft Networks runs on machines which support the MS-DOS operating system, which confirms earlier comments from Microsoft that the 16-bit MSX standard will use this operating system.

Gate's comment on networking for current 8-bit MSX machines is that while manufacturers such as Sony and Mitsubishi may get together to produce something there is no possibility of Microsoft Networks running on these machines.



Philips makes MSX debut in Europe

Phillips has become the first European company to launch an MSX computer.

The VG8000 is a 32K MSX computer with full MSX compatibility. It features two cartridge slots, though a printer interface has been omitted. To use a printer, an accessory printer interface cartridge must be plugged in.

The 72 keys are marked with all graphics characters and are reminiscent of membrane keyboards.

There is a cluster of four cursor keys plus power, caps and code lights. Appearance is certainly a plus point, as our picture shows.

Phillips is launching a range of peripherals with the VG8000 too, including a 40 and 80 column dot matrix printers with full MSX character set capability. Both handle graphics and print at least 35 characters per second.

Other peripherals launched with the computer include a 16K RAM expansion cartridge, upping user memory to 48K, a joystick, data recorder and a 12 inch monochrome monitor.

There are plans for a 64K RAM cartridge, giving 96K of usable memory, and a floppy disc drive. As yet there are no plans to distribute machines in the UK before the beginning of 1985.

However, the VG8000 will go on sale in Italy for 620,000 lire, approximately £270.

A non-MSX £130 computer, the VG5000, will also go on sale — but only in France.

Mitsubishi's budget 32K offering

Mitsubishi is offering a £250 32K MSX computer in addition to its £300 64K machine. Known as the MLF-48 it is intended to give buyers on a budget the chance to start in MSX.

Steve Wankling, sales executive for Mitsubishi, said that 99 per cent of software should run on the 32K model.

The only reason for buying a 64K machine would be if you wanted to use disc drives and run CP/M programs. These need 64K RAM.

Physically, the budget Mitsubishi has a different finish. The casing is silver, compared to the black of the 64K version. Otherwise, apart from fewer RAM chips inside, the two computers are identical.

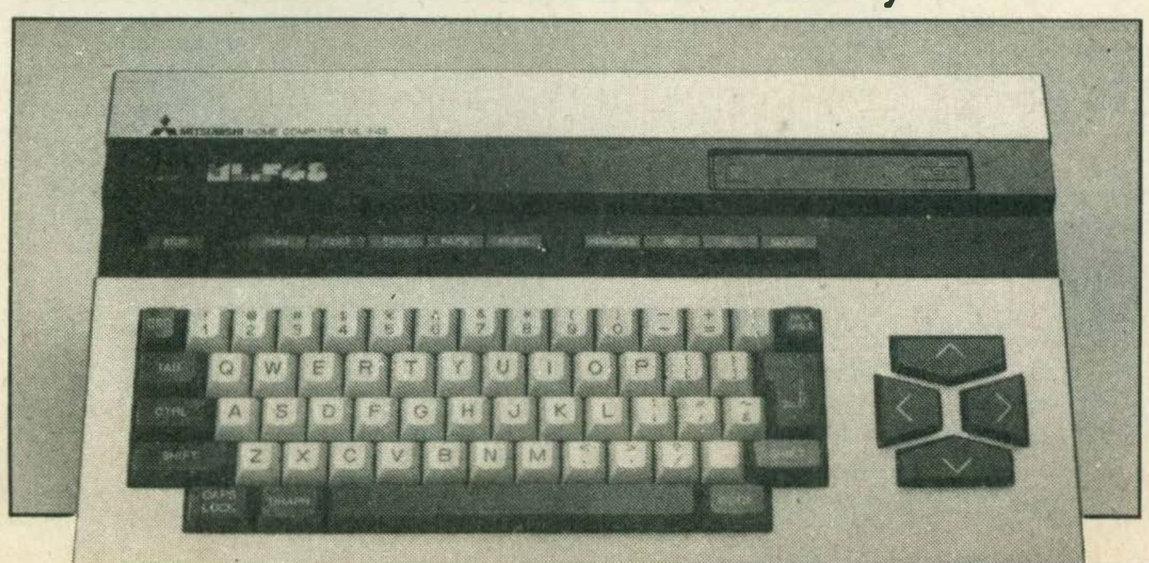
Mitsubishi has a two-pronged marketing strategy. 'As we are newcomers to the computer market, and we believe that there is a market for 32K machines, we have not sunk all our eggs into one basket,' said Wankling.

'We are bringing in approximately equal numbers of both machines and will see which sells the better. We'll then be able to decide which computer to major on.'

When RAM cartridges to expand the memory of MSX computers become available, it will be possible to give the 32K model a full 64K RAM.

In Japan, most manufacturers make a range of computers with memory from 16K to 64K. Mitsubishi is the first to import a non-64K computer, and other companies will no doubt watch its progress with interest.

The £250 Mitsubishi — lower cost for smaller memory



Collins' new title

Working With MSX BASIC is the title of a book due for release in January under the Collins imprint.

Written by prolific author Ian Sinclair, it is intended to be for both the beginner and the experienced MSX owner.

Chapters will deal with the MSX concept, numbers, strings, loops and program structure, graphics, sound, program editing and there will be numerous appendices for reference. The price is expected to be around the £7 mark.

By the way, if you remember Sinclair as a Granada author, note that Granada was bought out by Collins and its books will now be published by Collins.

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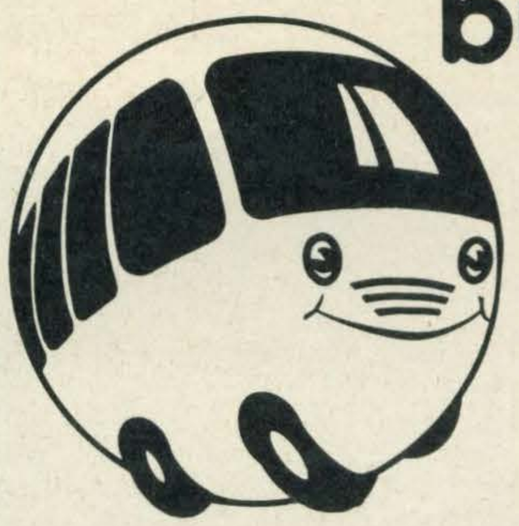

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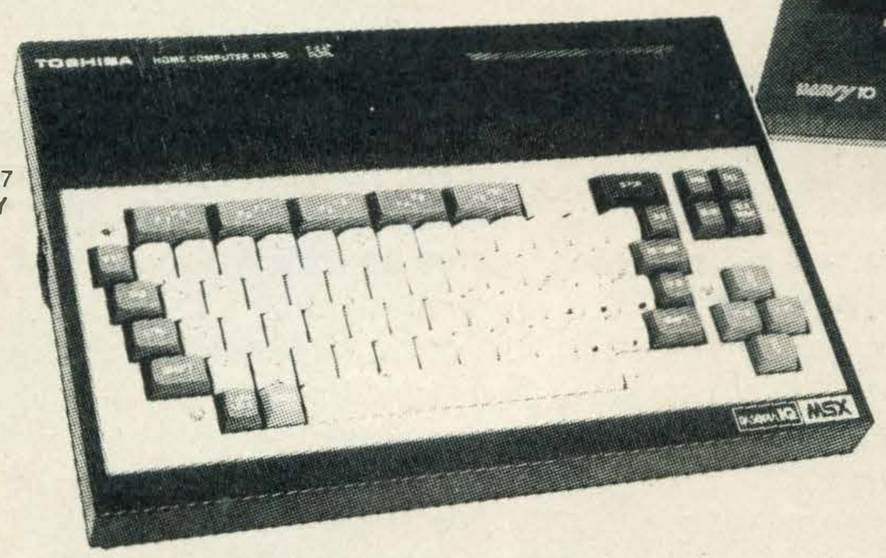

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NEWS UPDATE

Working party continues?

Despite rumours to the contrary, the MSX Working Group claims to be very much alive and active.

'We will have an important role to play for at least the next six months,' said John Locke handling PR for the group.

Rumours started when a weekly consumer magazine published a story implying that the MSX Working Group was about to split up.

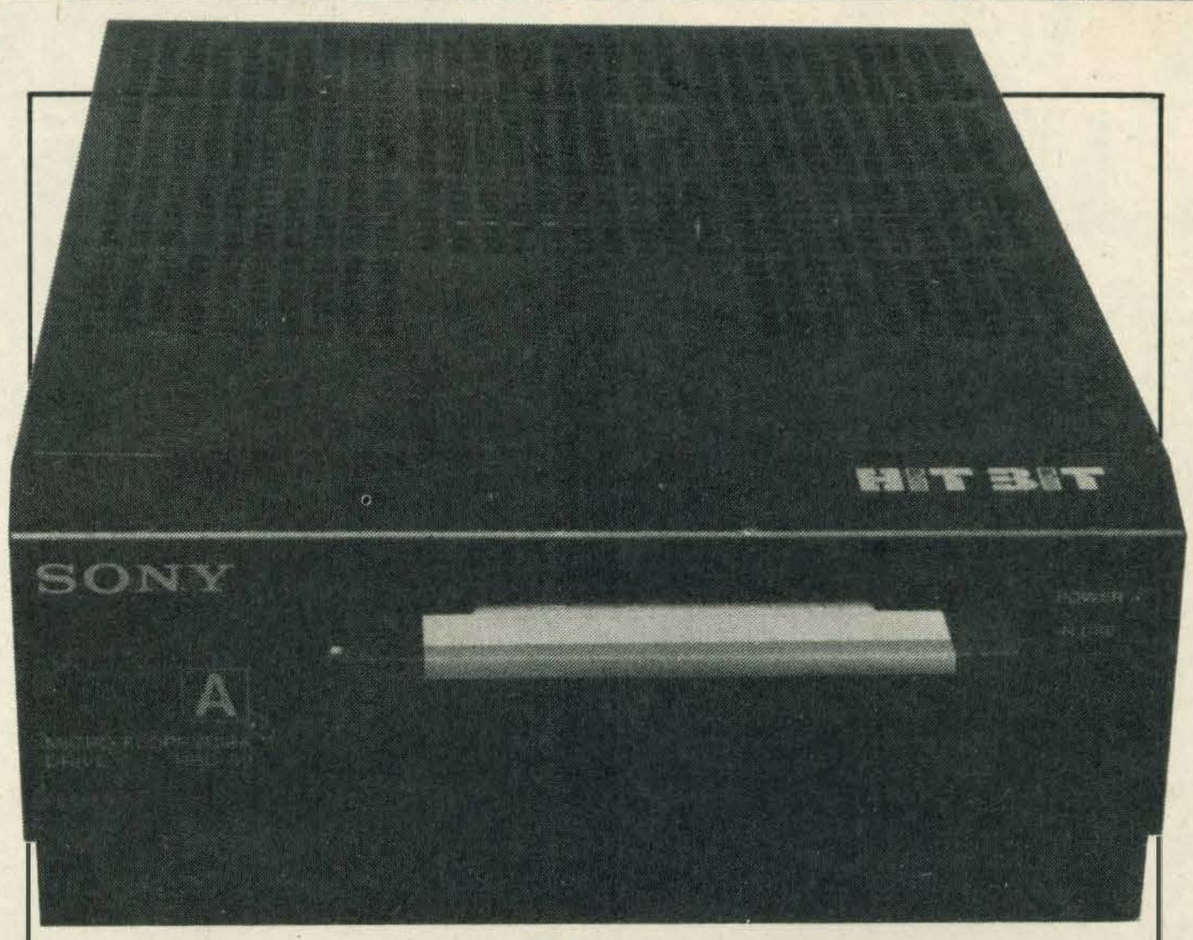
At the time Microsoft, (the inventor of MSX Basic) one of the original members of the group, had just withdrawn.

Craig Exley, Microsoft's spokesman, said that the company had never intended to be in the group after MSX computers started arriving.

'We will be putting a big effort into promoting MSX-DOS, but as for MSX, we've done our work and have withdrawn from the group.'

John Locke is aware of the difficulties of getting members of the group to co-operate.

'The aim is to get MSX known as a generic system, rather than to boost the sales of any particular manufacturer. We expect them to go their own way after a time, so the group is not a long term prospect.'



Sony's disc system gives CP/M facility

Sony has launched a £350 disc drive unit embodying MSX-DOS.

The MSX-DOS operating system is built into the computer end of the cable connecting the computer to the disc drive.

Needless to say the drive will work with any MSX computer, connecting to a cartridge port.

The 3½ inch disc can hold up to 500K of memory when unformatted.

Formatting reduces this capacity to 360K bytes spread over 80 tracks on one side of the disc.

Each track has nine sectors, with 512 bytes per second and average access time is 350msec.

The DOS allows both random and sequential files. And, up to seven buffers can be open at one time.

Commands allow the copying of files, storage of files in ASCII or machine code, auto-starting of a file when the DOS is booted up and directories.

The MSX-DOS system's big advantage is that it allows any CP/M software to be run on MSX micros.

Providing it is formatted on a 3½ inch disc, it can be slotted into the Sony HBD-50 disc drive and run as on any business micro.

Sigma prints two MSX titles

Sigma Press, a publishing house already established in the computer book field, has two titles for MSX enthusiasts lined up in the pipeline.

The first, called *Getting More From MSX And Your Spectravideo*, is a book for the newcomer to MSX computing and should be available shortly.

The author is Brian Boyde-Shaw. His 80 page long volume deals with how to write, edit and debug BASIC programs.

A Programmers Guide To The MSX System is due for release in 1985 and is co-authored by R. Goodley and C.I. Burkinshaw.

Both books will cost £7.95 and are distributed by John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex PO19 1UD.

Adventure from PSS

Sword and Sorcery, a graphics adventure game for MSX, will be available from Personal Software Services in January.

To successfully complete the game, the player has to collect 16 fragments of the Armour of Zob.

The action takes place in over 400 locations and the player has 80 monsters to deal with as well as 128 items to manipulate.

Commands can be chosen from a menu on screen with either a joystick or the keyboard.

Each of the monsters has a basic greed or anger and each will react differently depending on the situation. If the player begs for mercy the dragon may spare him or he may not — it depends how hungry he feels!

Sword and Sorcery costs £9.95 on cassette. More information from PSS on (0203) 81346.

More games cartridges on the scene

Sony is getting involved in the software scene with a range of six cartridge format titles. Five are games, the sixth is a word processor.

The games are to retail for around £18. *Sparkie* is a maze game in which your *Pacman* type character has to put out fires and destroy unfriendly objects, without catching alight.

Juno First is a comsmic zap game — you against hordes of advancing aliens relying on reflexes to survive. Other games are *Battle Cross, Crazy Train* and *Dorodon*. The games were developed by Konami, and display its usual flair for good graphics, action and thrills.

Homewriter is a word processing package developed by Sony to make the most of its PRN C41 colour printer/plotter. It allows you to format a page, from postcard size to A4, with up to eight text areas, or fields. These fields can be written to separately, so you could have one for an address panel, another for a chart and so forth.

MSX graphics characters can be printed too. The program is aimed at people wanting to design documents and costs around £25.

Mike Margolis, Sony's product development manager, commented that 'Software is important to our plans, but we see it more in a supporting role, preferring to major on the hardware.' Sony software is in the shops now.

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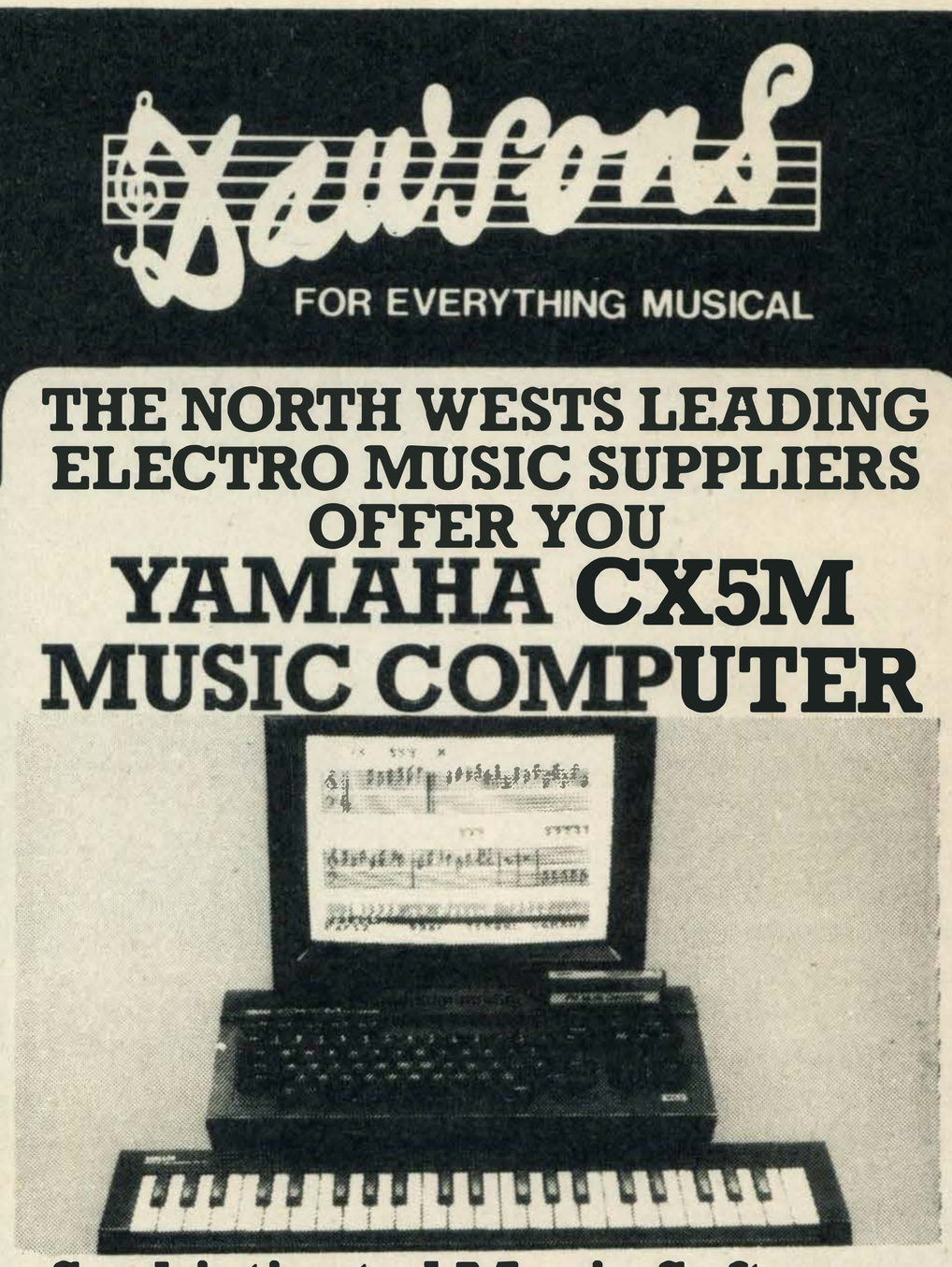

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NEWS UPDATE

MSX ROM emulation board

USA software publishing and hardware company Quest has made its ROM Emulation Board (REB) available in the UK.

Developed by an original member of the MSX development team, the REB is designed to help software houses producing cartridge software, or using advanced development systems to write MSX software.

The REB consists of 32K of CMOS RAM, and RS232 and Centronic interfaces. It plugs into the standard MSX cartridge slot.

The RS232 port can be connected to software development systems, often used by bigger software houses.

One advantage of the REB is that there is no need to blow EPROMS while programmers are developing cartridge software.

Priced at around £1000, the REB should cut down the cost of developing software and considerably reduce the time of development.

Any software houses interested in this product should write to Quest's UK agent, Tom Sato, 376 New Cavendish Street, London W1M 8JR.

Latest titles from Melbourne House

Melbourne House, the software and book publisher is launching into the MSX field with three books.

***The Complete MSX Programmers Reference Guide* is a 600 page tome by Tom Sato. It's claimed as the definitive guide to MSX, and certainly covers a lot of ground in its four sections.**

The first deals with the fundamentals of MSX BASIC, examining each command and function of the MSX computer.

Then there's an advanced programmer's section, with special chapters on making the most of graphics, files, sound and machine code.

The third section is a reference section with keyboard charts and BASIC commands.

Finally there is a lengthy section on the MSX Operating System.

***The MSX Games Book* will cover all areas, from arcade to adventure, from traditional to simulation and more.**

T he third book from Melbourne House, *MSX Exposed* by Joe Pritchard, is a detailed analysis of the components of an MSX computer.

Further details from: Melbourne House Publishing, tel: 01-940 6064.

Yashica's coming

At a recent photographic exhibition in Germany the Japanese Yashica company, a subsidiary of the Kyocera Corporation, had four 64K MSX computers on show for the first time.

Specifications conformed to the MSX standard, with 64K RAM, one cartridge slot, 73 full travel keys, a separate cursor keypad, RF output (RGB on the French version) and a Centronics parallel printer interface. The casing was a metallic pink.

Supplies of the Yashica YC-64 computer are unlikely before Spring 1985.

Konami speaks up

Four cartridges incorporating speech synthesis are currently on trial at Konami.

Keyboard Master teaches the keyboard novice how to type properly using speech. *Spelling Tree* is a spelling game aimed at primary school children. *Tennis* is a sports simulation game and *Magical Tree* involves a boy trying to climb to the top of a tree.

As final tests have not been completed, Konami won't release details of prices and availability.

Toshiba's matrix

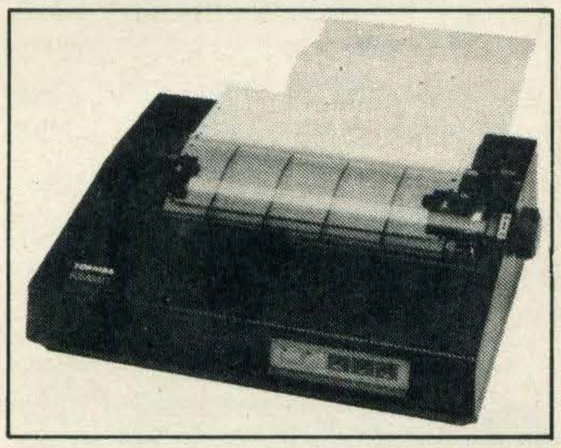
Toshiba is expanding its range of MSX peripherals with an 80 column dot matrix printer capable of printing out 105 characters per second.

The HX-P550 is a fairly conventional 80 column dot matrix printer.

The printer accepts paper up to 10 inches wide, using either friction or tractor feed.

Characters are printed on a 9 × 8 matrix. There are compressed, double width and Elite character sets.

All MSX characters are on tap, something you may not find with non-MSX printers.



The inked ribbon is claimed to have a life of 1,500,000 characters and the printer a life of five million lines of characters. The whole unit measures 738 × 110 × 305mm and should be in the shops, priced at around £350, now.

For information contact: Toshiba (UK) Ltd on (0276) 62222.

Latest book/tape series

By the end of the year, Honeyfold Software, already known for the Dr Watson series of Basic and Assembler courses, hopes to add a range of books and cassettes dealing with MSX BASIC.

Three books are planned for the Micro Watson series — *An Introduction to Basic* and two specialising in MSX graphics and sound.

The book prices haven't been established yet, but cassettes containing programs used in the books will be available from Honeyfold for a nominal fee of about £2.50 — on request.

The Beginners Basic Course for MSX will cost £10.50 and includes chapters on sprite generators, video games and a compose-a-tune program.

A Beginners Assembly Course for MSX is also planned and will cost about £12.50 for a book and a tape.

Games requiring tactical thought as well as arcade skills will be included in a book entitled *Not Just A Games Book.*

Also under development is a BASIC course for children. More details from Honeyfold Software on 01-441 4130.

QUERIES

These are the kind of questions that we expect everyone interested in MSX computing will be asking as the machines start arriving in the shops.

As you can probably guess, we have made them up, but from now on we want to hear from you.

Our team of experts is on hand to solve any programming niggle, hardware hiccup or basic blunder that you may have, so write to The Editor, MSX Computing, Haymarket Publishing Ltd., 38/42 Hampton Road, Teddington, Middlesex TW11 0JE.

Spectravideo's new MSX microcomputer: the SVI728

Q

How exactly does MSX BASIC compare to other BASIC languages? Are there any significant advantages?

A

The point about MSX BASIC is that it is extremely user-friendly. Its graphics and sound facilities are very good due to the inclusion of its own Macro language (a language within a language).

In other words, commands to control activities such as filling in shapes, writing music chords and drawing circles or boxes are inbuilt. With other BASICs, endless PEEKing and POKEing would probably be needed to carry out the same tasks.

Q

It seems to me that MSX machines are taking a step backwards by using outdated technology. Is there any reason for using old ideas instead of new ones?

A

MSX does use fairly old, established technology, but it can be argued that old means proven.

The risks of component shortages and the resulting delay in MSX computer development are much greater if the products are new and only a handful of companies are making the components needed. Software and peripheral manufacturers may take months to gear themselves up to a new technology whereas using chips and processors that have been widely used for a time already will enable them to exploit the MSX technology to the full.

Using the well-established Z80 chip also gives MSX users access to the vast range of CP/M software already in existence.

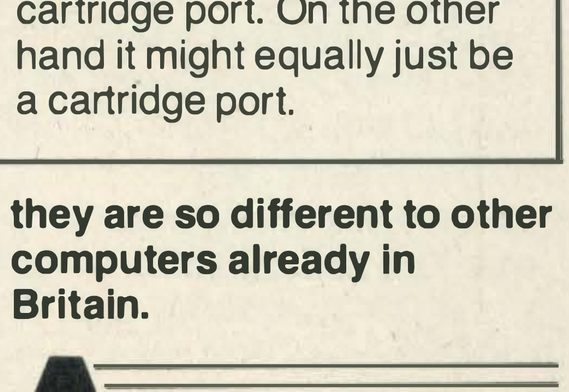
Q

I have heard so much about the MSX computers, but I don't really understand why they are so different to other computers already in Britain.

A

Standardisation is the key word when attempting to explain the difference between MSX computers and the rest of the home computers now available.

The most important feature



of every single machine calling itself an MSX is that each conforms to a set of software and hardware standards. Each machine therefore contains the same chip set (Z80A processor, a Texas Instruments 9918A video display processor and a General Instrument AY-3-8910 sound generator or the equivalent), peripheral connections and ROM cartridge format.

This means that any software or peripheral designed for one machine will work with every other MSX computer too. Computers such as the Commodore 64, ZX Spectrum and the BBC are so different that each one needs a completely different set of hardware and software.

These differences provide problems for consumers, stockists and manufacturers because it is difficult for them to know which computer to buy, stock or design products for. They often find that mistakes are very costly!

Q

If I buy a game for one MSX microcomputer will it be compatible with all the others?

A

Yes. The only problem would be if you bought a version of an MSX micro with less than 64K of memory. For example

32K MSX micros exist in Japan (but don't look likely to take off here). If you did get hold of one of these you may find that a few programs written for 64K micros wouldn't fit into memory.

Q

I have heard so much about the MSX computers, but I don't really understand why

A

Converting both MSX BASIC and machine code to something acceptable to the Spectravideo 318 (and the 328) should be simple enough.

For computer games fans eager to get their hands on all the latest MSX software, patience will be a necessary virtue. Spectravideo claims it might be bringing out an MSX adaptor for both the 318 and 328, but it's not in the UK yet.

The price of the adaptor is expected to be about £80 and the device might have facilities for two joystick ports, a cassette port, two new MSX ROMs and a cartridge port. On the other hand it might equally just be a cartridge port.

Earlier this year I bought a Spectravideo 318, but now that the MSX machines are arriving I am wondering how easy it would be to convert MSX BASIC and machine code programs for my 318.
I have heard that the two machines are very similar and wonder if there is any way to convert the 318 to accept MSX software.

I have heard that Yamaha has added a special sound chip to its CX5M which effectively turns it into a musical synthesiser. Are there additional features on any of the other MSX computers?

Yes, most of the MSX micros have some features unique to themselves. Extra keys, a varied and interesting colour scheme, extra light pen port, built-in software and reset controls are just some of the minor ways in which the MSX micros vary.

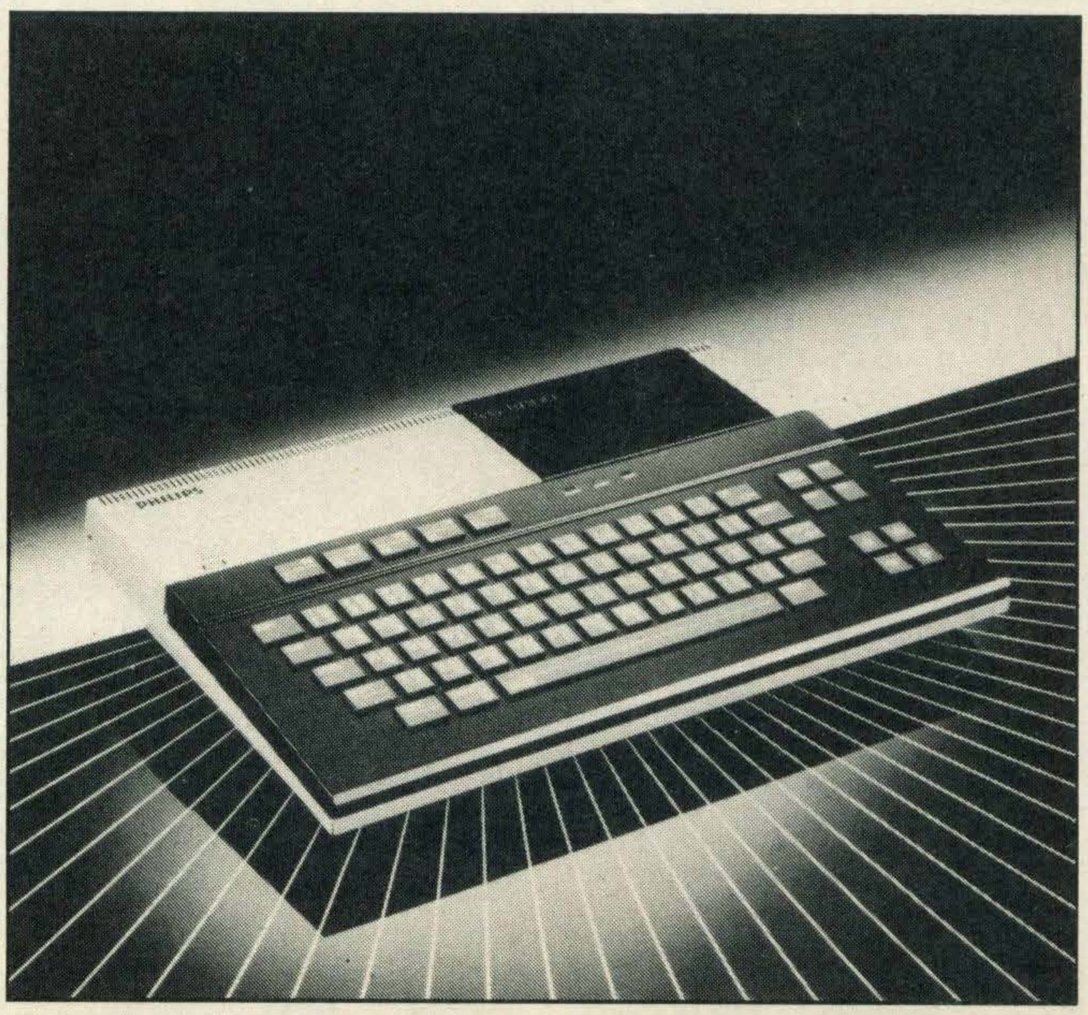
More specifically the Pioneer PX-V7, due here next spring, has a P-BASIC video dedicated language and the Sony HB-75 includes a start-up menu and a data cartridge memo pad. As the machines become more popular we are bound to see more and more special features.

I have heard that MSX machines will run the CP/M operating system. What exactly does CP/M mean and what advantages does it have?

CP/M stands for Control Program for Micros and is one of the most popular disc operating systems in use.

Operating systems are the 'office secretaries' of the disc world. They work out where to store data on the disc, inform the user what is on the disc and will copy information from one disc to another.

CP/M is just about essential for anyone using a Z80 based microcomputer who wants to run business software or store large amounts of data. MSX users will have to invest in an 80 column card, though, to upgrade MSX's standard 40 column display to the 80 columns required by CP/M.



I have noticed that most MSX computers are made by Japanese companies such as Sony, Hitachi, Mitsubishi and Sanyo. Is it an exclusively Japanese standard or can any company manufacture MSX machines — and if so how does it get permission to do so?

MSX machines can be manufactured by anyone who applies for a special licence from Microsoft and builds a computer strictly according to the MSX specifications.

At present there are 21 companies with MSX licences, and they include such non-Japanese companies as Spectravideo from Hong Kong, Goldstar from Korea, Samsung from Korea and the Dutch company, Philips.
pay a fixed initial licensing fee plus an additional sum to cover prepaid royalties on the first 100,000 computers sold.

Is it true that the Einstein computer from Tatung (UK) uses the same chip as the MSX machines? Does Tatung have any plans to apply for the MSX licence and will the Einstein run MSX software?

Tatung developed the Einstein home computer two years ago and it is almost identical to the MSX machines. However, as the two machines are not exactly alike and the Einstein has a superior specification — it costs in the region of £500 — it is unlikely that Tatung will be applying to Microsoft for a licence to build MSX microcomputers.

Tatung's Einstein has a built-in floppy disc drive — and costs £500

By May next year an MSX cartridge adaptor should be available for the Einstein at a price around £20, enabling MSX cartridge based software to be played.

As both ZX Spectrum and MSX computers have the same Z80A processor, can I convert Spectrum programs for use on the MSX?

Spectrum conversions for the MSX will involve a lot of re-writing and even more trouble! MSX BASIC is more extensive than Spectrum BASIC and the graphics in particular would need a lot of attention to convert up to MSX standard.

The average programmer will find it almost impossible to make conversions without doing a complete re-write. So, basically, the answer is no.

I have noticed a SELECT key on my MSX micro, but it doesn't seem to do anything when I press it. Does it have a function?

It certainly does, although just pressing it will not result in any immediate reaction. If the machine is programmed correctly, a completely new range of functions can be created. By pressing the SELECT key together with another key, the programmer can generate a few more controls to use in programs.

Although I have heard and read about the new MSX computers, I am not really sure what MSX stands for.

MSX is a hardware and software standard for home computers, developed by a US company called Microsoft, one of the largest suppliers of software in the world. (Hence MicroSoft eXtended BASIC.)

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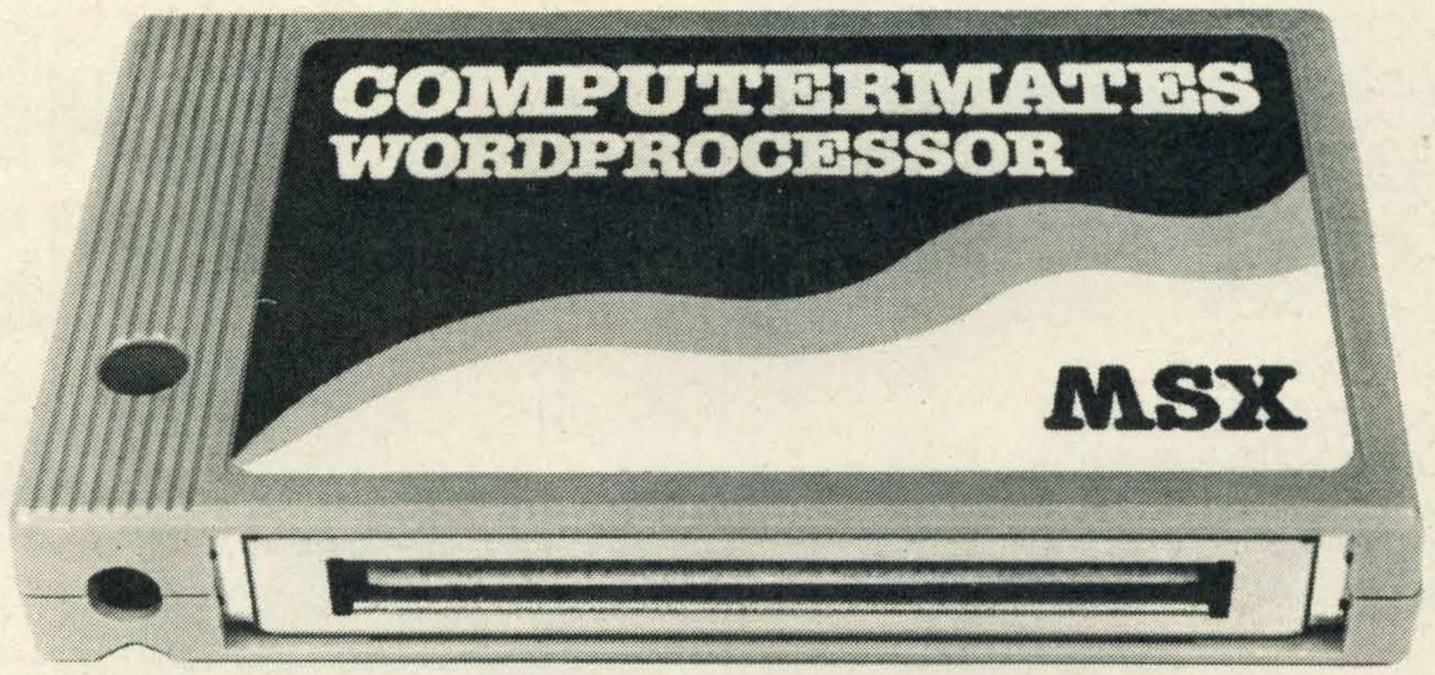

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Sophisticated Music Software YRM101 FM Music Composer

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YRM102 FM Voicing Program

This program gives you precise control over the CX5M digital FM voice generator to edit and alter the pre-programmed voices or create totally new voices of your own. The FM voice generator employs 4 operators, each with a sophisticated envelope generator, and a choice of 8 algorithms (different configurations of operators with different modulator-to-carrier relationships). The YRM102 FM Voice Program lets you precisely set all parameters relating to the operators and algorithms, as well as extras like amplitude and pitch modulation, LFO waveform, keyboard scaling, transpose, etc. With a little practice you should be easily able to program just about any voice you can imagine. Save your original voices on any standard cassette recorder, and build up an original voice library. Voices you create can be used in arrangements created with the FM Music Composer program.

YRM103 DX7 Voicing Program

DX7 owner's, here is the key to easy DX7 voice programming. This program displays all DX7 voice parameters right on the video monitor, and lets you program from the CX5M computer keyboard. The data is transferred to the DX7 via the built-in MIDI interface. Voice parameters are displayed in easy-to-understand graph form. For example, when programming envelope generator parameters you can actually see what the programmed envelope curve looks like, rather than having to think entirely in terms of numbers. The DX7 voicing program makes programming the DX7 so easy, that even if you're not interested in the CX5M's other capabilities, it's worth having one just to program your DX.

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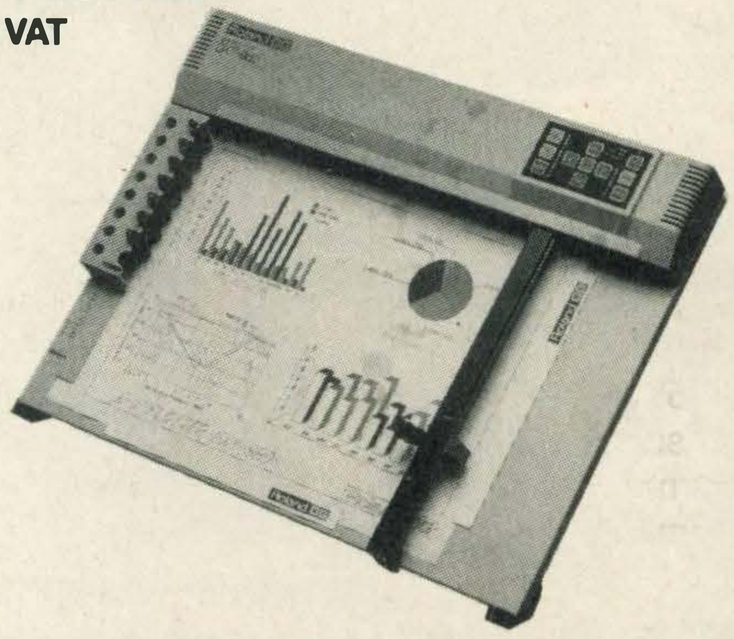

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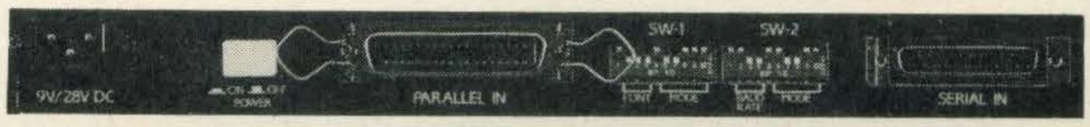

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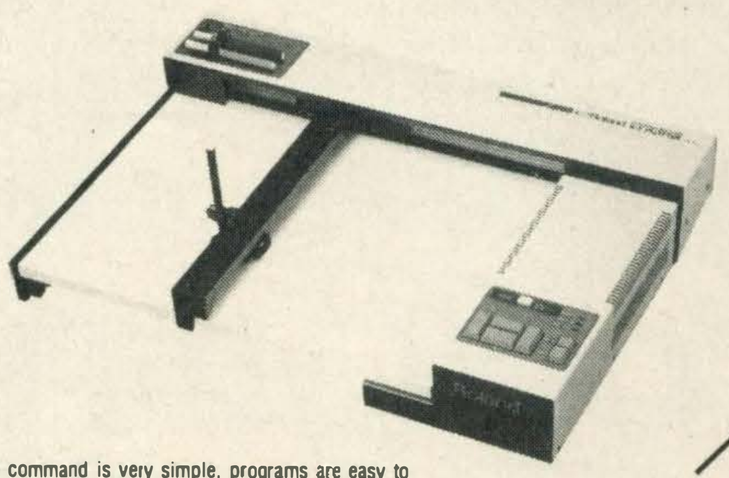

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The DXY-100R, the first of its kind, is offered at an extremely reasonable price. This revolutionary plotter is characterised by full high-performance plotting and tabulating capacity. Quiet operation is an absolute requirement for a practical plotter. The DXY-100R successfully reduces mechanical noise to a minimum. It is suitable for use either at home or in the small-scale office. Effective plotting and tabulating size is up to 360 × 260mm. Since each step equals 0.1mm, calculation during programming is simple.

● **Mul iple intelligent functions**
Fourteen control commands are included in the DXY-100R. The DXY-100R also provides eight vector commands for plotting and tabulating as well as drafting continuous lines, dotted lines and coordinates; five character commands to select English capital or small letters, numerals, various other symbols, and to set their size and slant. There is also a built-in mode command. Since each command is very simple, programs are easy to master, even with BASIC. In addition, the DXY-100R includes a self-test function to quickly check performance and operation.

● **Optional ROM for expanded in elligen functions**
The DXY-100R has an added intelligent function for graphing, including circular arcs, curves, hatchings, etc. with the optional ROM #1 (XY-0R1). This allows simple programming to generate more sophisticated tabulating. Moreover, with the DXY-100R, it is possible to tabulate original characters such as trade marks and symbols simply by writing them into the PROM (2716).

● **Compatible wi h virtually any personal computer**
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Getting into the picture

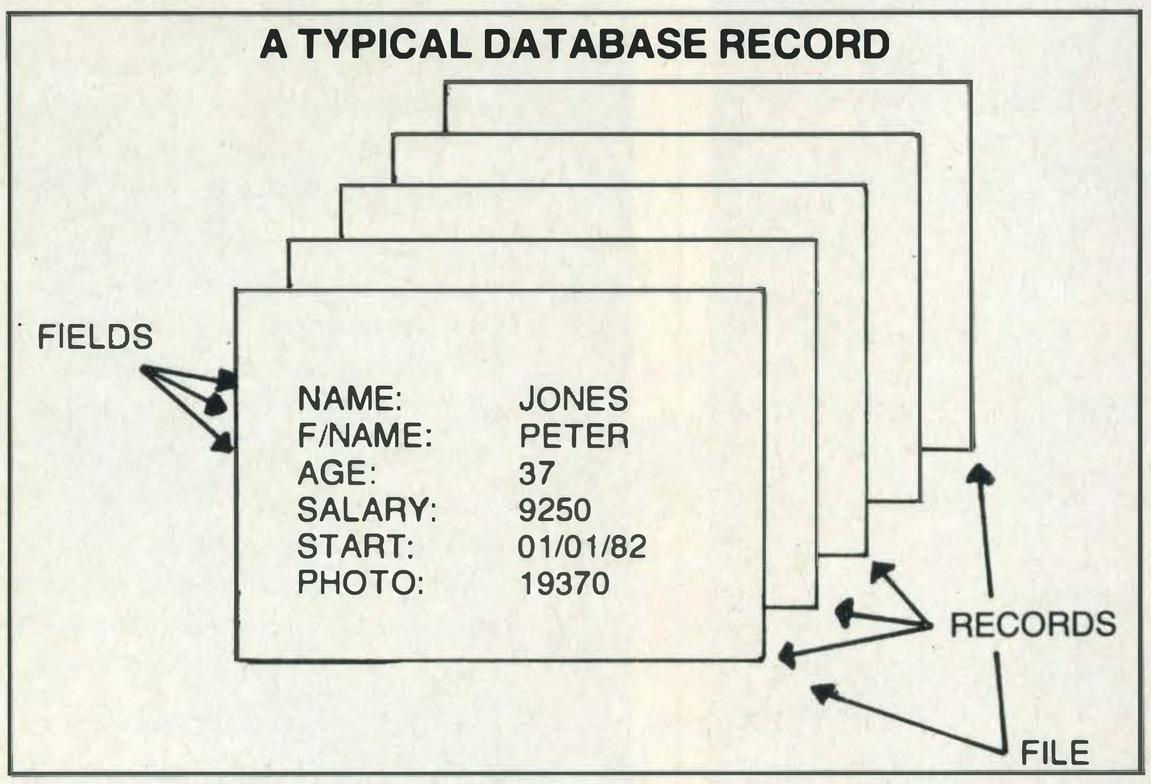
Action, adventure and information with interactive video

Laser video disc players cost around £1,000 or more while MSX computers sell for around a third of that. In view of this massive discrepancy in price, it might be thought they would make unlikely bed-fellows. Yet in Japan the Pioneer company is actively promoting an MSX computer/laser video disc combination for the home entertainment market.

A video disc player is essentially a digital device, and as such lends itself to computer control. But before we can understand just how powerful a computer/disc player combination can be, it is first necessary to know something of the theory of video disc players.

Before jumping into the deep end of laser disc technicalities, though, here are a few of the applications:

- Computer adventure games with real video (movie) sequences instead of the usual computer graphics.
- Vast data banks of photographs with instant computerised access to any picture.
- Interactive educational and training 'film' where the computer checks the student's progress to date.
- Inventories and catalogues under computer control.
- Medical and scientific 'expert systems'.



The records in a database system are like cards in a card index. Each has an identical set of fields holding different information

A television signal is essentially analogue in form — the voltage level of the signal is continuously variable — but video discs record the information using a special type of digital encoding. An ordinary TV set displays 287½ horizontal lines of video 'information' at a time on the screen, and 25 of these 'fields' are presented every second.

The television signal has to contain luminance information (the brightness of the dot on the screen at any moment) and chrominance information (the balance of the three primary colours).

Taking all this into account, it is obvious that even a single frame of a TV signal contains a huge amount of data, all of which has to be converted into a digital form. And yet the data recording density of laser video discs is so high that one side of one disc can contain a whole hour of television quality video.

The video information is stored on the disc in the form of small 'pits' burned by a laser beam into a metallised film deposited on the surface of a plastic disc. The tiny pits form a track that spirals out from the centre of the disc to the outside.

When the video disc is played, another laser is focused on the disc surface and its reflection is picked up by a small array of light sensitive diodes. Highly sophisticated optics and servo-mechanisms are needed in order to keep the spot of laser light accurately focused on the right track.

Laser disc fomatting is where the complications set in, but knowing about the differences between the two laser disc formats is essential if you want to understand computerised video disc control. There are two types of laser video disc: CLV (constant linear velocity) and CAV (constant angular velocity). CLV packs in twice as much video as the CAV

format (an hour per side, as against half and hour for CAV) but so-called 'trick' control is not possible. Trick control means still frames, slow forward, slow reverse and so on.

In a CLV disc, the speed of the disc rotation changes as it is played so that the amount of track passing under the laser beam is kept reasonably constant (hence constant *linear* velocity).

Constant angular velocity discs, which can be operated in trick mode — rotate at a constant speed and have exactly two fields of video recorded per revolution. This wastes a lot of space towards the outer parts of the disc, but because the movement of the optical assembly is kept to a minimum, flicking between adjacent tracks is comparatively simple.

As far as the computer user is concerned, then, the only disc format of interest is the CAV type.

Each video frame contains 16 reserved horizontal lines that hold information about that frame.

Picture number

Of most significance to the computer user is the picture number. Each frame has a unique picture number that allows that frame, and no other, to be selected automatically. Provided that the number of each frame is known, it is a simple matter to have a computer send the appropriate frame number to the disc player to select any single frame on the disc. When you consider that a single disc contains over 50,000 TV frames, the massive potential of the system becomes apparent.

Several of the MSX machines being marketed in Japan have a built-in capability know as video-superimpose. This means that they can mix the output of the computer with a conventional video signal.

This is not quite as simple as it might sound as the output from the computer has to be held in precise synchronisation with the video signal for the 'mix' to work. Once that technical difficulty has been surmounted, however, all sorts of clever effects become possible, including the superimposition of computer generated characters and graphics over the video picture.

When a video disc is linked to a computer in this way, it can be thought of as an extension of a database. A database is essentially like a card index. The whole 'box of cards' is referred to as the data file and each 'card' it holds is called a record. Each record contains areas known as fields (not to be confused with video fields). The principle is shown in the illustration, which shows a record from a file on company personnel; the last field in each record is a reference to a photograph.

The video disc player could be the heart of a computerised home information, business and entertainment system

Not surprisingly, in view of the popular appeal of computer games, the first laser disc software off the starting block in Japan has been mainly of the arcade and adventure game variety.

With a Pioneer PX-7 MSX computer coupled to a Pioneer LD-7000 video player, neither yet available over here, games fans can choose from *Astron Belt* (arcade style action), *Murder, Anyone?* (adventure/mystery), *Many Roads to Murder* (adventure/mystery) and *Strike Mission* (arcade style action). *Astron Belt* and *Strike Mission* are special-purpose games discs, and the price includes the computer software. They sell for the equivalent of about £30 each. *Many Roads to Murder* and *Murder, Anyone?* are computer programs on ROM cartridge for use with the video discs of the same name.

Although fully interactive video disc software is still under development, MSX owners in Japan have plenty of goodies to choose from. Sanyo offers a *Graphics Expander* that allows colour graphics to be displayed in 512 colours with a screen resolution of 512 × 204 dots.

The superimpose facility allows extremely fine computer generated graphics to be superimposed over conventional video pictures for dramatic effects which were previously impossible for the home user.

A very interesting hardware/software combination comes from HAL Research. This consists of a trackball input device called the CAT (Computer Aided Trackball) plus a cassette based software package called *Eddy* — an animation editor. The CAT/*Eddy* combination sells for a very reasonable £50.

Pioneer has a Video Art Tablet, the PX-TB7 (£90) that allows automated video fades and wipes to be effected at the touch of a stylus.

A similar software package from JVC is called *Joygraph.* It allows graphics to be added to and superimposed on ordinary video signals. JVC also has a video editor on ROM cartridge called *Video Edpal.* This sells for £26 and permits, through a screen menu of options, 11 different wipe modes between video and computer output.

The potential of computer-interactive laser video discs is only just beginning to be realised. The ability to select any frame from over 50,000 on a single disc in a matter of moments creates possibilities for educational and database applications hitherto beyond the capabilities of anything affordable by the home user.

Adventure games: The screens of text and rather crude graphics of present adventure games are replaced with video quality pictures and movie sequences through which the player can move at will. As you move through the cave or dungeon, the scene moves and changes before your eyes.

Instant access

Databases: With over 50,000 frames available on a single video disc, large 'instant access' archives become possible. Think how useful such a system would be to art dealers and universities if one disc could contain photographs of virtually every significant work of art.

Expert systems: Expert systems are an extension of the database concept. The chief difference is that the software is 'intelligent' and can make 'educated guesses' from various possibilities. Expert systems are elaborate pieces of computer software that literally replace experts.

When an expert system comes up with a diagnosis or recommendation, a laser video disc linked to the computer could simultaneously display a high quality picture. By taking advantage of the low cost of an MSX computer and laser disc player combination, high quality medical diagnosis, oil and mineral exploration and other disciplines requiring expensive expertise will become available to the less affluent developing countries.

As a reader of this magazine, you either own, or are thinking of buying an MSX computer. Although these are brand new products as far as the British market is concerned, they are already well established in Japan. Because of the complete software compatibility between all MSX micros it is a safe bet that anything that comes on the market in Japan will be available here soon.

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The CX5ME is an MSX computer, as such it can accept other manufacturers software including games, business and teaching programmes. We will be stocking a good selection of all available software.

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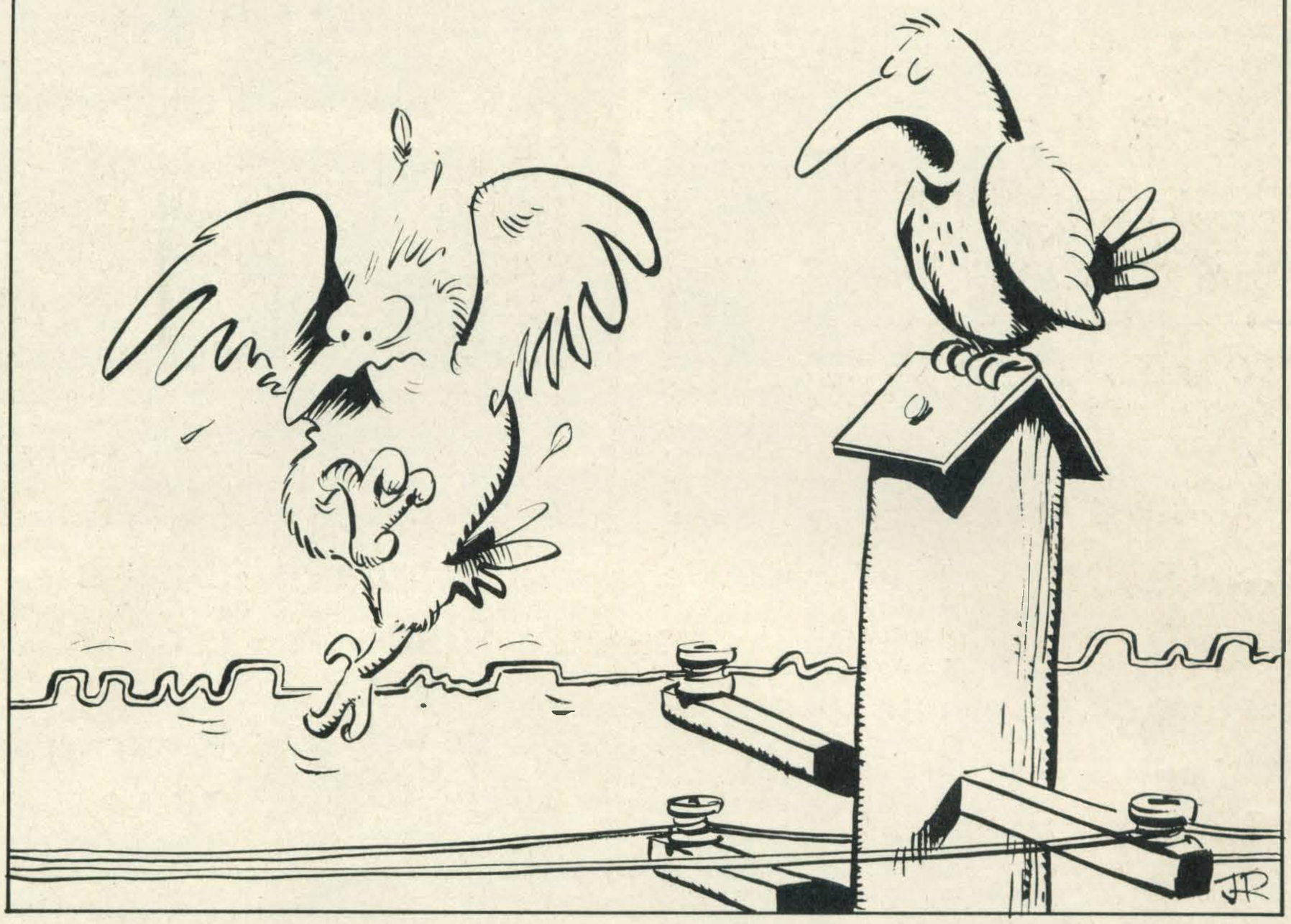


Logging on

Reach out to other micro owners with a new comms package

Don't worry, you're not alone. Even if you're the only computer enthusiast on your block, there are thousands throughout the country just like you. But how do you get in touch with them?

The best way is to plug your micro into the telephone system. Then, not only do you have contact with others of the same inclinations, but you also have access to a wealth of information and entertainment.

There are many systems which allow you to do this, but probably the most popular is Prestel. This is a viewdata system, which means that it is based around pages of information, each of which is numbered. You can also call up a page directly, or view an interconnected series of pages.

Prestel contains hundreds of thousands of pages, with information on everything from the weather to stock market prices. There are games and news sections, travel information (travel agents are some of the biggest users) and news sections.

The Kuma package can't handle Prestel graphics. For instance, the left-hand greetings card is supposed to show a light bulb

You can send messages and greetings cards electronically. And there are also sections devoted to computing, such as Micronet 800 and Viewfax — although the Microcomputing area which covers all these is a closed user group and requires additional membership.

Apart from Prestel there are numerous other viewdata systems, many of them run by local government authorities and private businesses. Although some require membership, others are free, or have free sections.

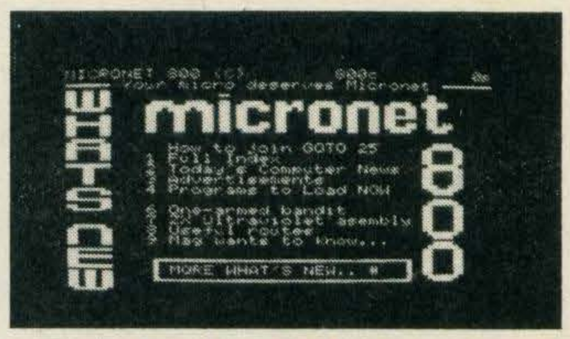
The other main system is Telecom Gold, which is essentially an electronic messaging system. This has a special area devoted to MSX micro owners called MSX-NET, where you will find information of particular interest to you, programs to download and pages of advice.

Two products from Kuma open up this fascinating world to the MSX micro owner. An RS232C card gives your machine the necessary serial interface.

Kuma's *Communications with Viewdata* program lets you use the RS232C board with ease. The only other things you need are a telephone and a suitable modem. Kuma supplied a Prism 1000 modem for use with this review. This is the model the company is recommending to its customers.

The Kuma package is mainly intended for use with

NETWORKS



Sample pages from Prestel and Micronet — note the page numbers. The Op in the top right hand corner indicates that the pages are free. Some other pages have to be paid for, though

Prestel and Telecom Gold, and Viewdata systems. Although baud rates can be changed from the normal user level, other protocols like word lengths and parity can't without delving into and modifying the code.

With the card plugged into both the cartridge port and the modem we were ready to load the software. This is supplied on tape. A BASIC program is loaded first. When you run it you're asked if you want to initialise the program. This is done by loading two machine code files (the program takes care of this for you) and has to be done each time you load the program. However, if you end the program and then decide to re-run it straight away, it's not necessary to re-initialise.

The software isn't protected. Indeed, Kuma actively encourages you to make back-up copies and includes detailed instructions on how to do this — an approach closer to professional business software houses than the piracy-paranoid games producers.

Loading doesn't take particularly long. But it's long enough if all you want to do is run a quick check to see if any messages are waiting in your mailbox, or if you just want a brief look at the weather report. Spending five minutes to set up the system just to spend five seconds on it does remove a little of its 'glamour'.

According to our information, the final design of the RS232C card will include an empty chip socket. It is possible that all the relevant software could be blown into an EPROM for instant use. The ROM could even contain personalised information, such as telephone numbers, IDs and passwords for your favourite systems, for use with an autodialling modem. Mind you, to our knowledge nothing of that sort is actually planned — it's simply a possibility.

As soon as the program's ready you are presented with the main menu. This gives the most important options such as: logging on; logging off; returning to Prestel (if you've called up the menu while on-line); saving, viewing and printing frames; a software downloader for when MSX programs become available; a mailbox message preparation system; and an option to alter the parameters.

If you choose this last option, you're presented with another menu. From this you can change the transmit and receive baud rates, screen colours, cursor character, tab settings and function key settings.

With everything ready we rang Prestel and logged onto Kipling. The first disappointment encountered was the graphics. The Prestel graphics may not give David Hockney many sleepless nights, but they are quite colourful and attractive.

Unfortunately, the Kuma software can't handle teletext graphics. When I asked Tim Moore, managing director of Kuma why this is so, he told me: 'The VDP video chip isn't fast enough to do the graphics — 300 baud might be OK, but not at 1200. However, we may eventually overcome this problem. We've learned a lot more about the VDP chip, especially undocumented modes. But at the moment, teletext graphics are not possible.'

This doesn't mean that you lose all the graphics. You do lose colour, special symbols and many of the lines. But very simple block graphics, such as those used for many of the greetings card designs, are retained, albeit in monochrome.

At least you can set the text and background colours to suit your taste. This is done via the parameters menu. The program asks you to enter the numbers for the colours you want. It's as well to have a manual handy if you don't know the numbers off by heart, as you can easily end up with instant-migraine colour combinations. I guessed the first time and wound up with invisible writing!

That apart, the package worked very well. One feature I particularly liked was the redefining of certain keys to help speed up operations.

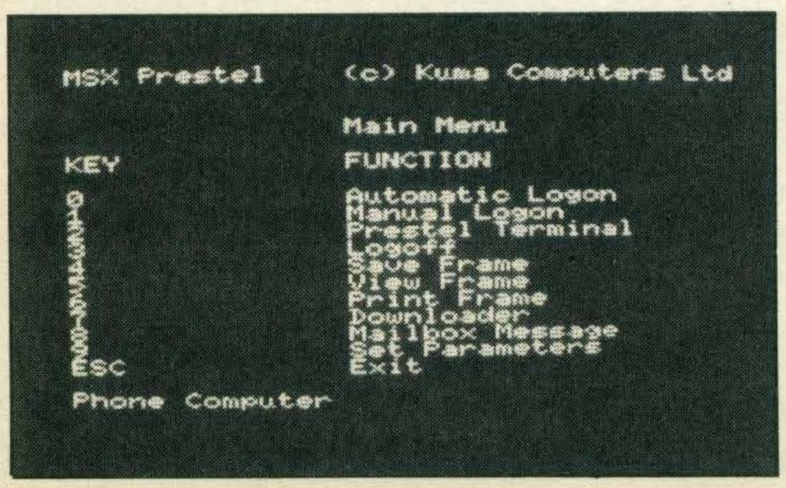
The backspace key sends the code for the asterisk (or 'star'), and the RETURN key gives the hash symbol. These are used a great deal. For example, to call up a particular page, you enter a star, the page number and then a hash. If you had to do this with the normal star and hash keys it would involve a lot of shifting.

All ten function keys are also redefined — in this case with popular page numbers. For example, single keystrokes can give you the pages for Prestel, Viewfax, Microcomputing, Homelink and Mailbox main menus.

Pressing the escape key at any time returns you to the Kuma program's main menu, enabling you to do things like save or print pages and then return to Prestel.

It's good to see this sort of package appearing so early. Owners of other microcomputer systems had to wait a long time before they could go on-line. It's a shame about the graphics but, after all, it's the information you really want, not the pictures.

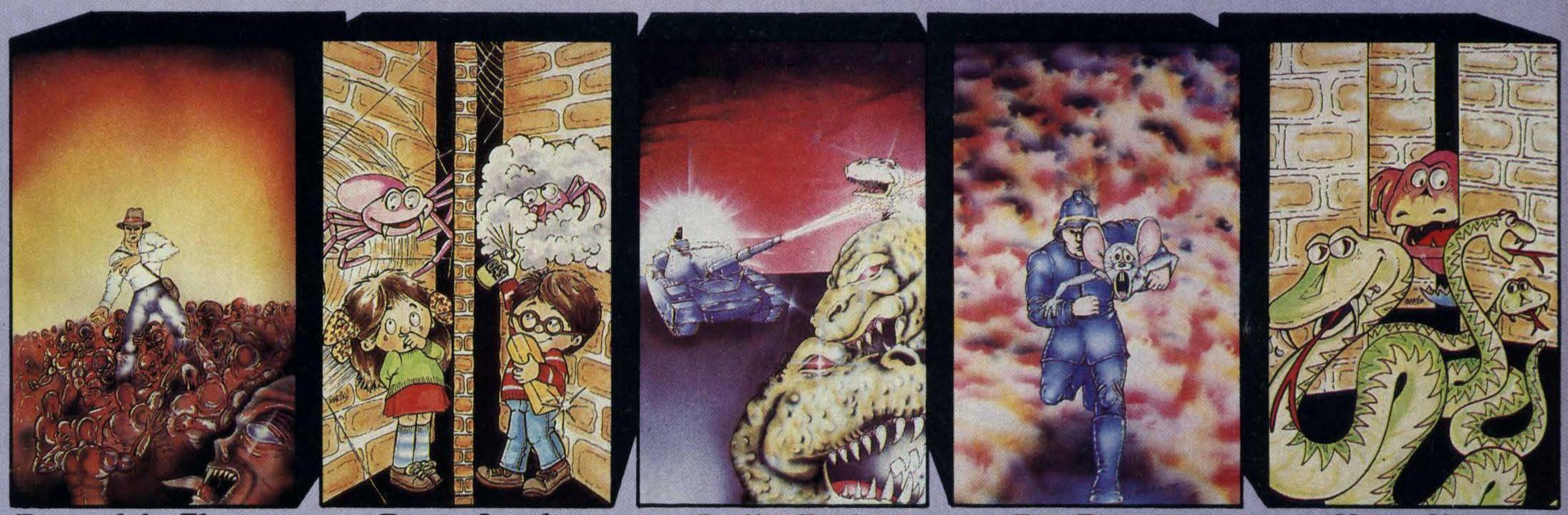
A serial port and a modem will let you connect to any computer



This screen shot shows the main menu from the Kuma communications software package

the only choice

Kuma



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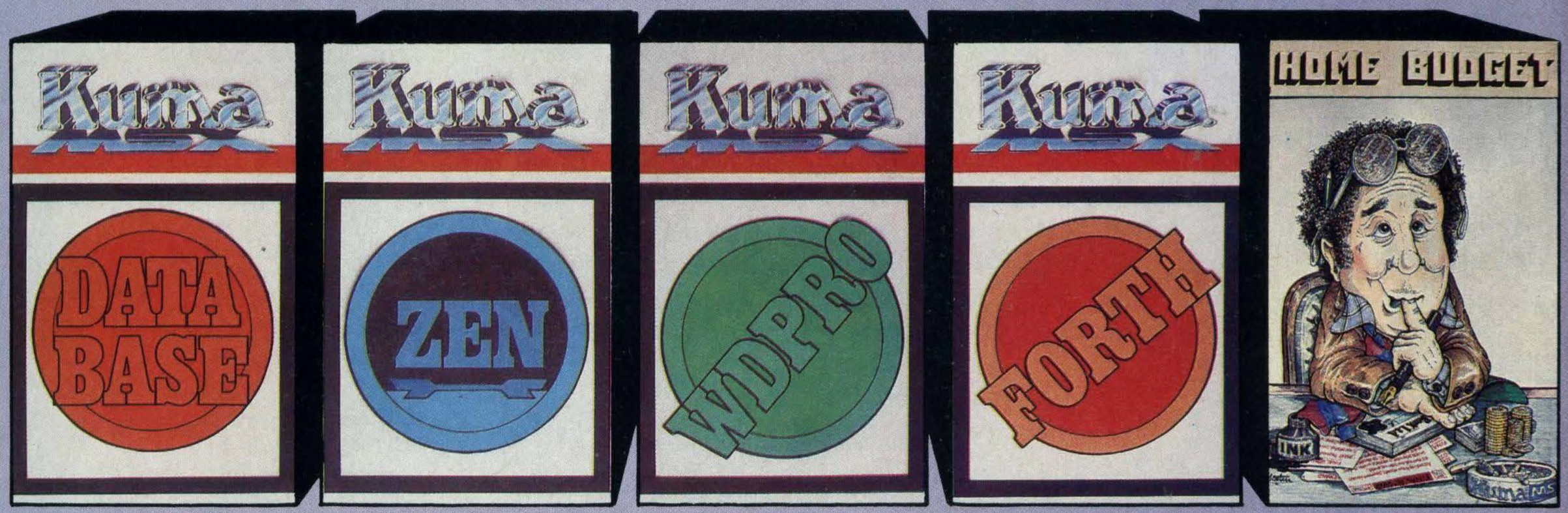

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GRAPHICS

Here's two ways to commit your digitised doodles to paper — and in colour, too!

Colo char

Colour is something we humans take for granted. We would probably turn our noses up at a computer that didn't deliver a colour image to our television sets. But, when it comes to printers, we quite cheerfully accept a black and white world.

That situation is slowly changing as new technology is developed and applied. MSX users will certainly benefit from this.

For the vast majority of purposes, a conventional black and white printer is more than adequate. You get fast printing speeds, high quality printing and the equipment need not cost an arm and a leg. For documents such as letters, program listings and so forth, colour is not essential.

However, if you had the ability to use colour, just imagine what a difference it could make. You'd be able to highlight sections of text in colour or print comments in a different tone. Tables could have rules in red. Presentation could be so much better.

You might also be able to dump a screen in colour. Create a chart or a picture with a program, press a button and what you see on the screen will appear on paper, in colour. The possibilities are interesting.

At present there are two main ways of printing in colour. They are exemplified by the two machines here.

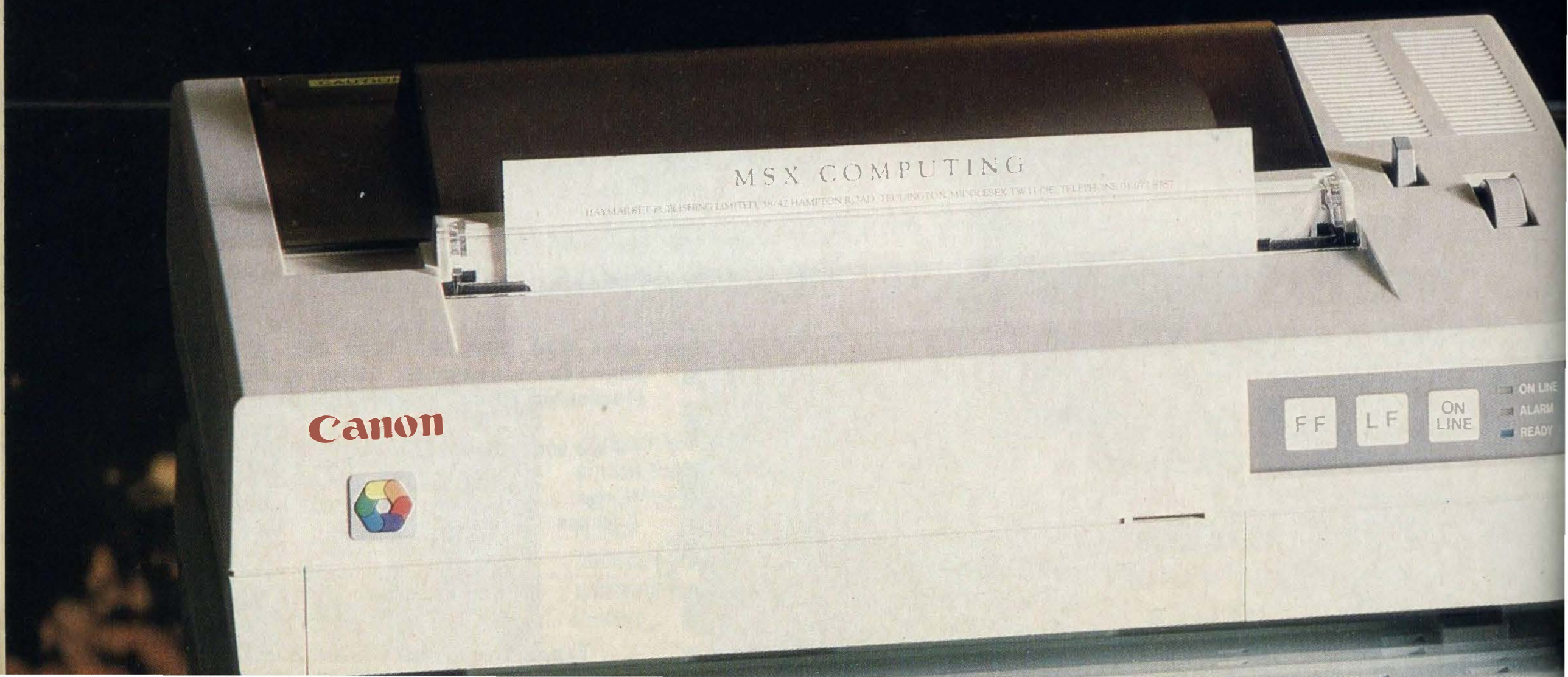
At around £250, the Toshiba HX-P570 is described as a printer/plotter. It uses four small pens of different colours to actually draw characters or lines. The Canon PJ1080A costs twice as much but has seven colours and works on the ink jet principle. Comparing the two printers is as much a duel between technologies as between printer makers.

The Toshiba printer/plotter mechanism is essentially very simple. A miniature ballpoint pen is lowered onto the paper. It can move from side to side across the width of the paper. The paper itself can move backwards and forwards. Combine these types of movements and it is possible to draw any shape. The pen is raised to end a line, and the pen holder can be rotated to another colour.

The pen system has several advantages. It costs less to make as there are less parts. That's why the Toshiba printer/plotter costs less than most other printers, colour or monotone. Live graphics are easy to generate under software control. Quality is high too, as you are using ball point pens. All in all, if you want to generate line drawings, a printer such as the Toshiba is an excellent proposition.

The Canon has a much more complicated mechanism. The printer head consists of a row of four nozzles, dispensing black, cyan, magenta and yellow ink drops.

Each nozzle is only one



urful acters

tenth of a millimetre in diameter, with a hole of 0.065mm. Around each nozzle is a collar. When a small voltage is applied to this collar, it contracts, squeezing the nozzle and causing a drop of ink to be squirted out. Combining different inks gives the range of seven colours.

A standard character is printed on a matrix of five by seven dots, each dot being about one third of a millimetre in diameter. Even so, characters are printed at the rate of 37 every second.

Speed is not the only advantage. As each dot can be printed separately, you can, in theory, 'dump' a screen to paper. Every pixel on the screen will be reproduced as a dot.

The Canon also lets you print out blocks of colour, for charts, enlarged, underlined or bold characters, making it a supremely versatile instrument.

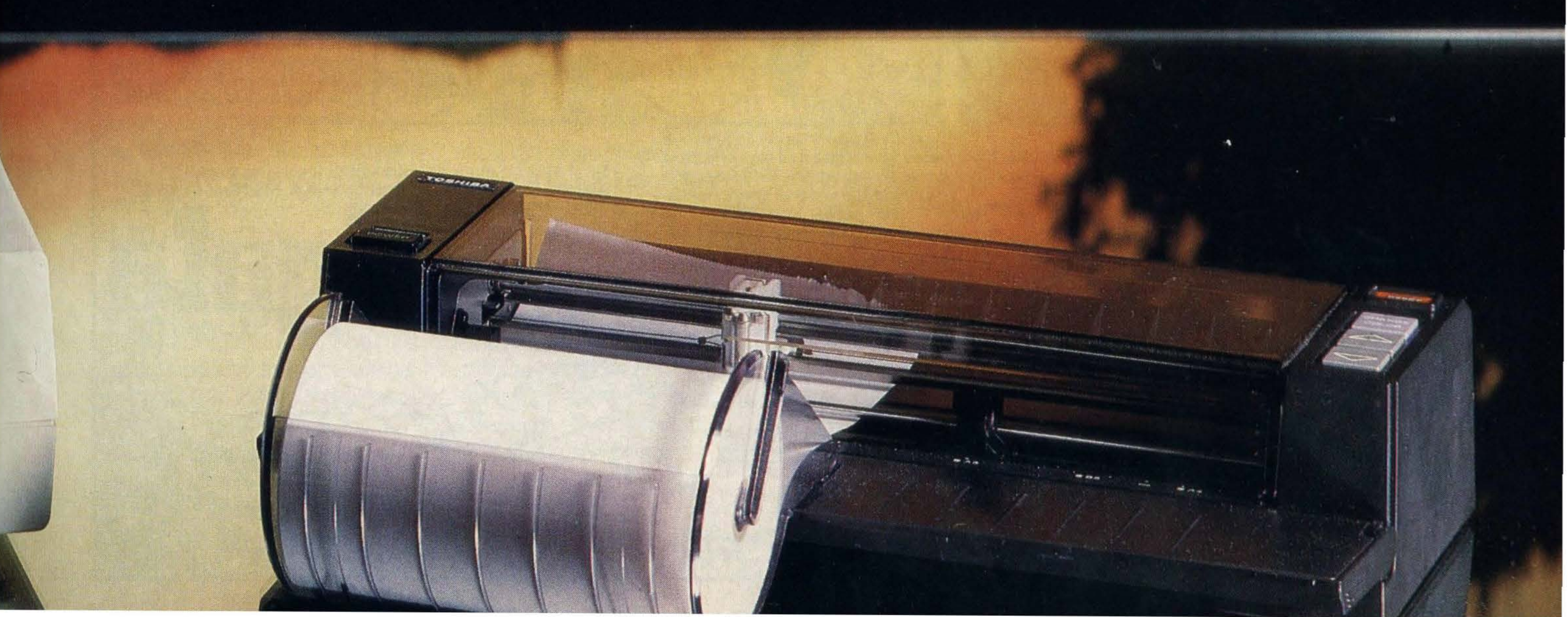
Side by side, the two printers are strikingly different. The Toshiba's matt black finish is embellished with bright buttons and a smoky perspex cover. Panels at the front and back fold down so it can be loaded with paper. At its most compact, the device measures just 303 × 65 × 108mm, so it takes up very little room on a desk. It is a very tidy piece of hardware.

The beige Canon printer looks far more conventional. It has a footprint of 400 × 296mm, membrane type buttons on the front, a fold up perspex flap on the top and a very high standard of finish. Only a wheel of colour logo on the front shows that it is a colour printer.

Both printers are mains powered. The Toshiba needs an external transformer (which is supplied), while the Canon has a detachable power cable.

Changing ink or pens on both printers is a doddle. With the Toshiba, a plastic retaining clip over the exhausted pen is slid forward and flipped up. The pen is pulled out and replaced. Pens come in sets of four — red, blue, black and green — costing around £3. It is not possible to buy separate pens of one colour, so you may end up with a surplus of little used pens. Still, the cost is comparatively low.

Canon's ink comes in two cartridges — one has 25cc of black ink, the other has 20cc of each of the three colours. Flip down a panel next to the control switches and cartridges can be



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quickly swapped. Cartridge costs are around £6 for black and £10 for colour. You will get up to four million characters out of each cartridge, so replacement will be an infrequent event.

Both printers have a Centronics parallel printer interface. The Toshiba comes with a one metre printer cable; you'll need to buy one for the Canon.

Single sheets of A4 paper will quite happily go through both printers. They will also take rolls of continuous stationery, so you don't have to keep changing sheets.

Text is likely to be the most used printer mode so let's look at each in turn, starting with the Toshiba printer/plotter.

When it is switched on, the pen mechanism does a quick dance as each pen's ball is started moving.

Besides the power button and power on light, the Toshiba has few controls. A red reset button repositions the print head to the left of the carriage. A blue button switches to the next pen — the order is black, red, green, blue, black and so on. Grey buttons move paper forwards or backwards. There is also an array of four dip switches on the back, to set slightly different character sets.

To see the complete set of characters, press the change colour and paper forward buttons together. You'll see the printer draw out all the MSX characters.

The Toshiba prints out text at the rate of 12 characters per second — not particularly fast. As it is printing, the paper moves backwards and forwards rapidly, the pen holder moves left and right or up and down and the letters are literally drawn out. At the end of each line the printer head goes back to the left and starts another line.

The Canon prints out at the much faster rate of 37 characters per second in a bidirectional manner. The noise made by this process is a rapid buzz that is moderately loud but tolerable.

Both printers will print up to 80 characters across an A4 sheet of paper. In the text mode, the Toshiba has the advantage of having all the MSX characters present, so if you are using musical symbols, for instance, you will be able to print them. It also prints true descenders on letters such as g and j.

The Canon offers a choice of eight characters sets, selected by dip switches on the back of the machine. It also has a switch that sets a bold printing mode — the speed is halved but quality is improved.

By using special control codes in a program, the Canon can be made to do a great deal more in the text mode too. There is one code that sets an enlarged printing mode, with characters printed across double the width in a ten by seven dot matrix.

Another code lets you change the colour of the foreground or background to red, green, yellow, magenta, cyan, blue or black. You can set an automatic underlining facility, or set up a system of both horizontal and vertical tabs to print out charts or tables. In the text mode, character sets apart, the pricier Canon printer is a much more versatile, faster instrument.

When print quality was compared the general preference appeared to be for the drawn ink characters of the Toshiba. If you want better quality, you'll have to look at a daisywheel printer.

When it comes to graphics, differencs are even more marked. To examine the Toshiba's abilities, we made use of a piece of software Toshiba supply with the printer/plotter. Called T-Graph, it is a simple data program that produces graphs or charts of entered data.

You can choose to present data as a line graph, horizontal or vertical bar graph or a pie chart. You can choose to have black or coloured cross hatching too. The graph can then be dumped to either a dot matrix printer or a printer plotter. Data can be saved and loaded to or from tape after a session. As a simple data processing program, it is user friendly, rather simple and not the sort of thing you'd pay good money for. As a promotional aid, it works quite well.

You can see the printout of a pie chart it gave. It took under a minute to complete and is more than good enough for reports, statistical uses and suchlike. The speed is quoted as 285 steps per second.

You pays your money and you takes your choice — the Toshiba is better value but the Canon is more versatile

To draw pictures of your own creation, it is back to BASIC commands. There is no software to dump the contents of a screen yet, but it will not be too difficult to write.

The graphics of the printer/plotter are best for line images, but of course restricted to the four colours. Geometrical patterns of great beauty and complexity can be created quite easily, but solid blobs of colour can't be done. Toshiba calls its unit a plotter — that's an apt description.

With seven colours and the ability to print up to 640 dots per line, the Canon is much more versatile. It has two colour printing modes. What it lacks is an MSX graphics chip, so reproducing what appears on screen is not possible without writing special software.

There are two graphic modes. The first prints in colour units one pixel deep by eight pixels across. You set the number of characters across to be printed and the colour. This is the mode to produce blocks of colour and it isn't too difficult to get the hang of it.

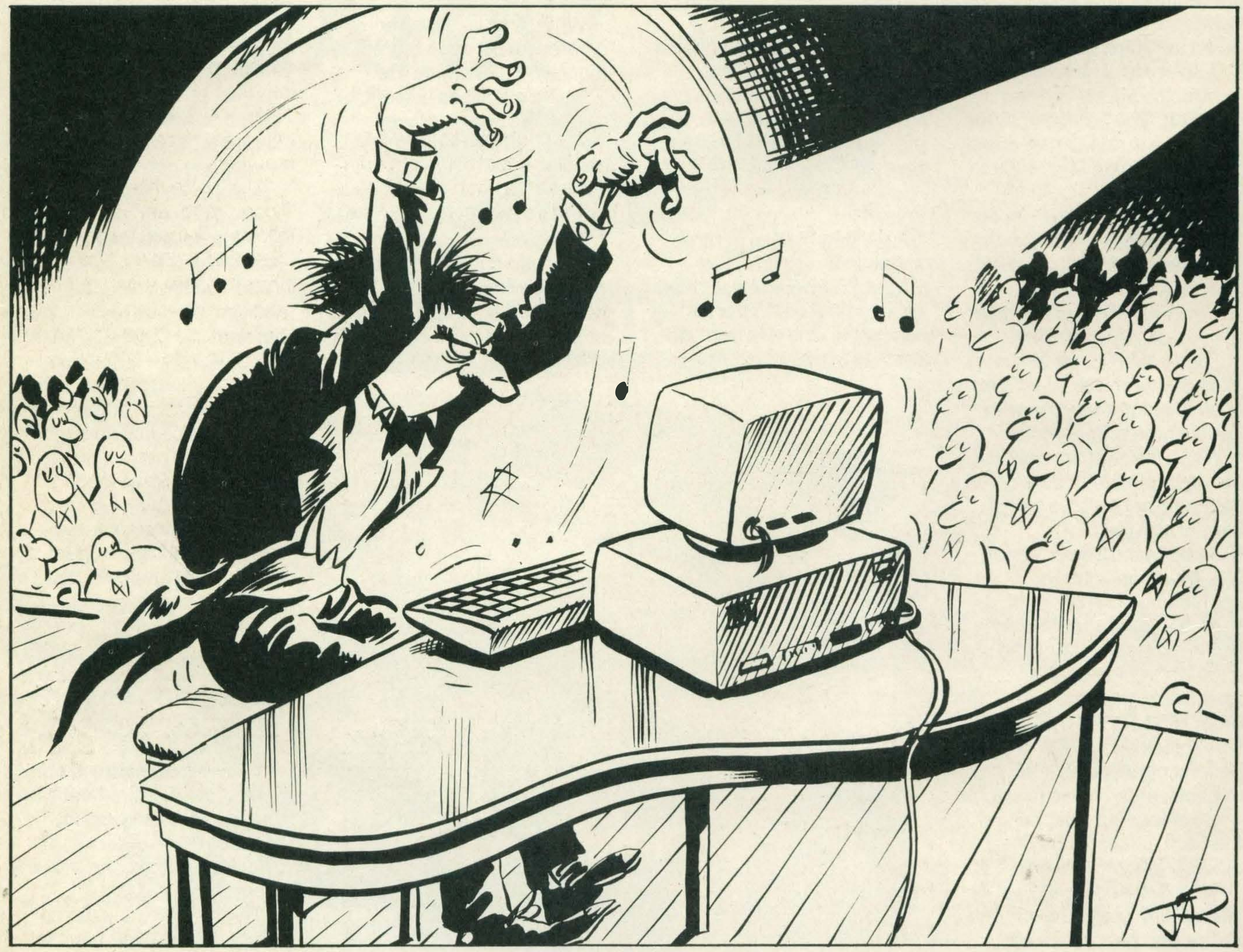
The second mode is able to control the colour of each pixel and is very complicated. To produce three fairly simple coloured characters, a 30 line program is needed.

To fill an eight by ten dot character cell, you have to supply a hexadecimal code for each of the three inks, for each eight dot character, ten times over. Up to 80 characters, or 640 dots, can be printed per line. Though a sophisticated mechanism, getting the Canon to print what you want will take time and patience.

These two printers aren't really in direct competition. The Toshiba HX-P570 is better value for money as it is half the price of the Canon and includes both a printer cable and a piece of software. For text printing, it gives better quality results and is ideal for line graphics.

The Canon is more versatile in both text and graphics modes. It has more colours, is faster and can produce excellent colour images — if you take the trouble to learn how it works.

Tune in to BASIC



Hit the right note with MSX BASIC's music facilities. Isabella Muriel shows you how

Anybody with a musical flair is well served by the MSX specification. That is because of the Music Macro Language, a versatile sub-language contained within MSX BASIC. If you can already read sheet music, you will find it easy enough to transcribe music using the MML, and here Isabella Muriel shows you how.

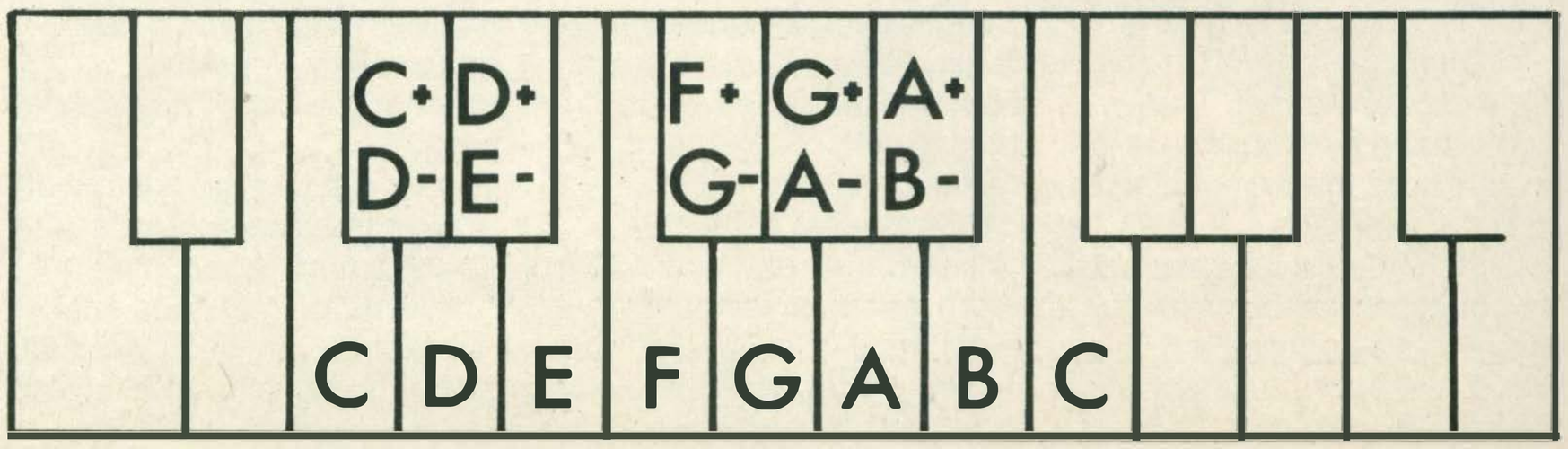
All the notes on the piano are available in the MML; to play each note you use the commands C, D, E, F, G, A and B. The black notes on the piano — the sharp and flat notes — are accessed by following the note command by a + or – sign respectively. But you can only play the notes which are available on the piano, so E+, for example, would be an invalid command. Figure 1 demonstrates this point.

As you can see from the diagram, each of the piano's black notes can be played using two different commands, for example C+ and D– will both give you the same sound.

The MML can only be used together with the BASIC keyword PLAY. This keyword is then followed by the string containing the MML commands. In standard music notation the scale of C major, starting at middle C on the piano, is shown in figure 2. The program line needed to play this scale is:

PLAY"C D E F G A B"

Figure 1. Sharp and flat notes are denoted by plus or minus signs when transcribing music



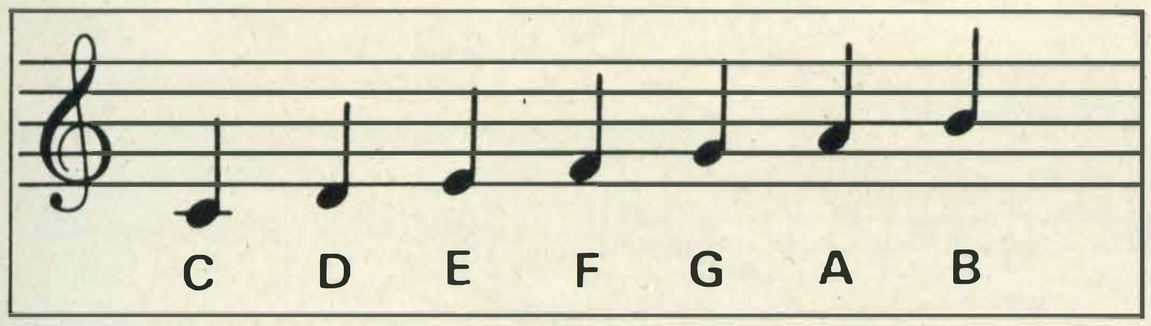


Figure 2. The scale of C major without an O command

The simple note commands on their own, as in the above example, always play the notes in this octave. To play higher or lower notes, you must change the octave by using the O command. The number following this command must be between 1 and 8 — O1 is the lowest octave available, O8 the highest; the default octave is O4. An octave always starts on C and ends on B, as is shown in figure 3.

At this point, let's try to play the scale of E major over one octave. Figure 4 shows how it appears in music notation. The equivalent program line is:

10 PLAY"O4 E F+ G A B C+ O5 D+ E"

The O4 command at the beginning of the string might seem totally unnecessary at first as this is the default octave, but if this was left out you would find that on running the program line again all the notes would be played in the fifth octave. This is because once the MML commands have been set, they remain at their set values, even when the program has finished. Do be careful to use the letter O for this command, and not the number 0.

So far all of the notes have been of the same length, which doesn't exactly make for interesting music. To change the length of a note, the L Command is used. This means that you can play quavers, minims etc, as shown below.

Ln	NOTE	LENGTH
L1	Semibreve	----------
L2	Minim	--------
L4	Crotchet	----
L8	Quaver	--
L16	Semiquaver	-

Other values of L are also included — for example L9 could be used to form triplets, three notes of this duration would be equal in length to a crotchet. The shortest note duration is L64.

So far we have only been playing crotchets, as L4 is the default value. If you put an L8 command at the beginning of the string in the last program line, all the notes would be played as quavers.

Alternatively, to change the duration of just a single note, all you need to do is follow the note by a number between 1 and 64 which sets the length in the same way as in the L command.

Rests are represented in the MML by the R command. This again must be followed by a number between 1 and 64.

The shortest rest, R64, is useful in separating two notes of the same pitch when one is played immediately after the other.

If you want to play a dotted note or rest — that is a note or rest whose duration is increased by half of its original length — simply follow the note or rest by a full stop. For example:

PLAY" C R64 C. R64 C.."

If you typed in this line you would hear the note middle C played three times, each time for slightly longer duration.

There are two ways in which the music you have written can be speeded up. You either replace all the notes by ones of shorter duration (i.e. replace all the crotchets with quavers) or more simply change the tempo.

The tempo determines how many crotchets are played by the computer in a minute.

You will probably have noticed that so far we have only used the default tempo, T120, which means that it takes one minute to play 120 crotchets.

To change this you use the T command, and the number following T must be between 32 and 255. So instead of changing the crotchets to quavers, you could more simply get the same effect by changing the tempo to T240 by inserting this command at the start of the first PLAY statement.

Believe it or not, you now know enough MML commands to start transcribing music. Obviously, though, you will need a sheet of music in front of you!

First make a note of the key of the piece of music you want

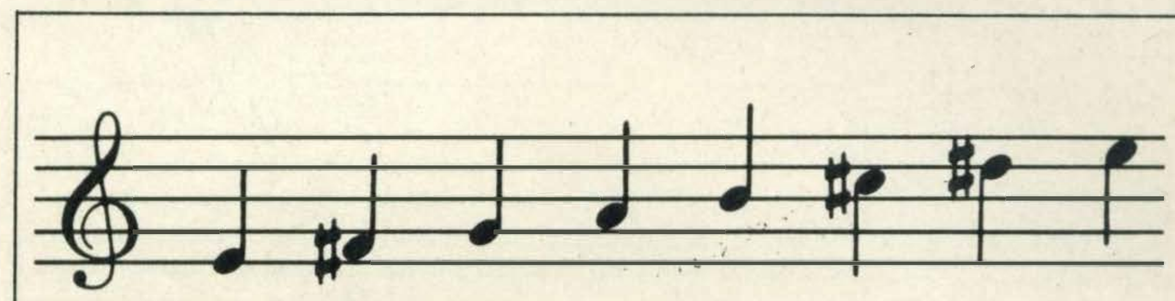


Figure 4. You cannot pre-set the music's key so all sharp and flat notes must be shown as such on the stave

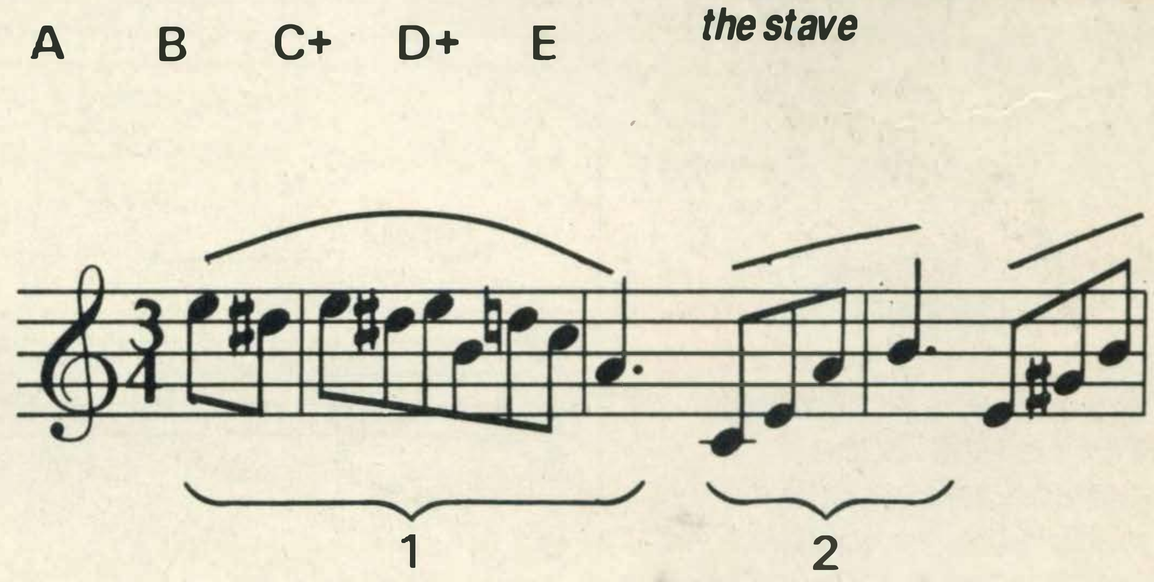
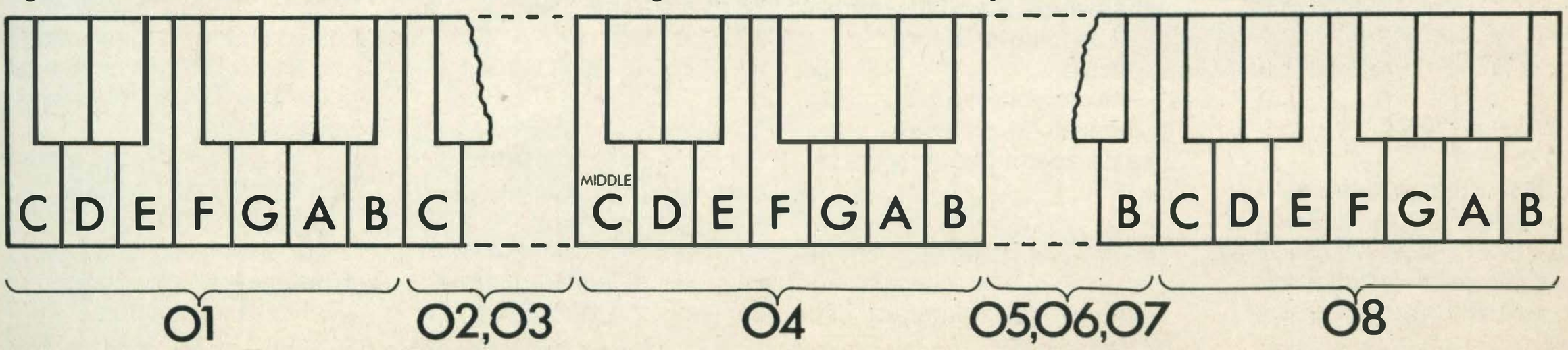


Figure 5. The musically literate among you will recognise this short piece of music. (Clue: the composer was German)

Figure 3. 01 is the lowest octave available and 08 is the highest. In MML, an octave always starts on a C note and ends on a B



to transcribe. It's probably a good idea at this point to stick to music in C major, as you won't then have to remember all the sharps and flats which occur when using the other keys.

There is unfortunately no way of setting the key of a tune at the start of a program. That unfortunately means you must set each note individually to sharp or flat as necessary as you go along.

Next have a good look at the music to see if any groups of notes are repeated — if they are it will help considerably to place these notes into string variables.

Finally, if possible, use one PLAY statement for each phrase of music, a practice which you will soon find aids the debugging process considerably!

Have a look at figure 5 which displays a few bars of Beethoven. The first two phrases are repeated as marked, and so will be put into the string variables A$ and B$:

A$="O5 L8 E D+ E D+ E O4 B O5 D C O4 A4."

Another simple command within the MML is the V command which, surprisingly enough, sets the volume. The number following V must be between 0 and 15. V0 is very soft or pianissimo, V15 is very loud or fortissimo; the default value is V8.

To play the final 'A' as a dotted crotchet, this note is followed by the number 4 and then the dot; all the other notes are played as quavers to the end of phrase.

The next phrase is played using B$, where:

B$="C E A B4."

The first three notes in this phrase are still played as quavers, as the L command has not been reset.

The third phrase is:

"E G+ B O5 C4."

Now the beginning is repeated, with the addition of just one note. We wish to play a string which includes this note and the string variable A$. To put a string variable within a PLAY string, the X command must be used:

"O4 E XA$;"

The X command must always come before a string variable name, and the name must be followed by a semicolon.

The next phrase is identical to the second, so we can just use B$ again. The last phrase is:

"E O5 C O4 B A2"

The complete program looks like this:

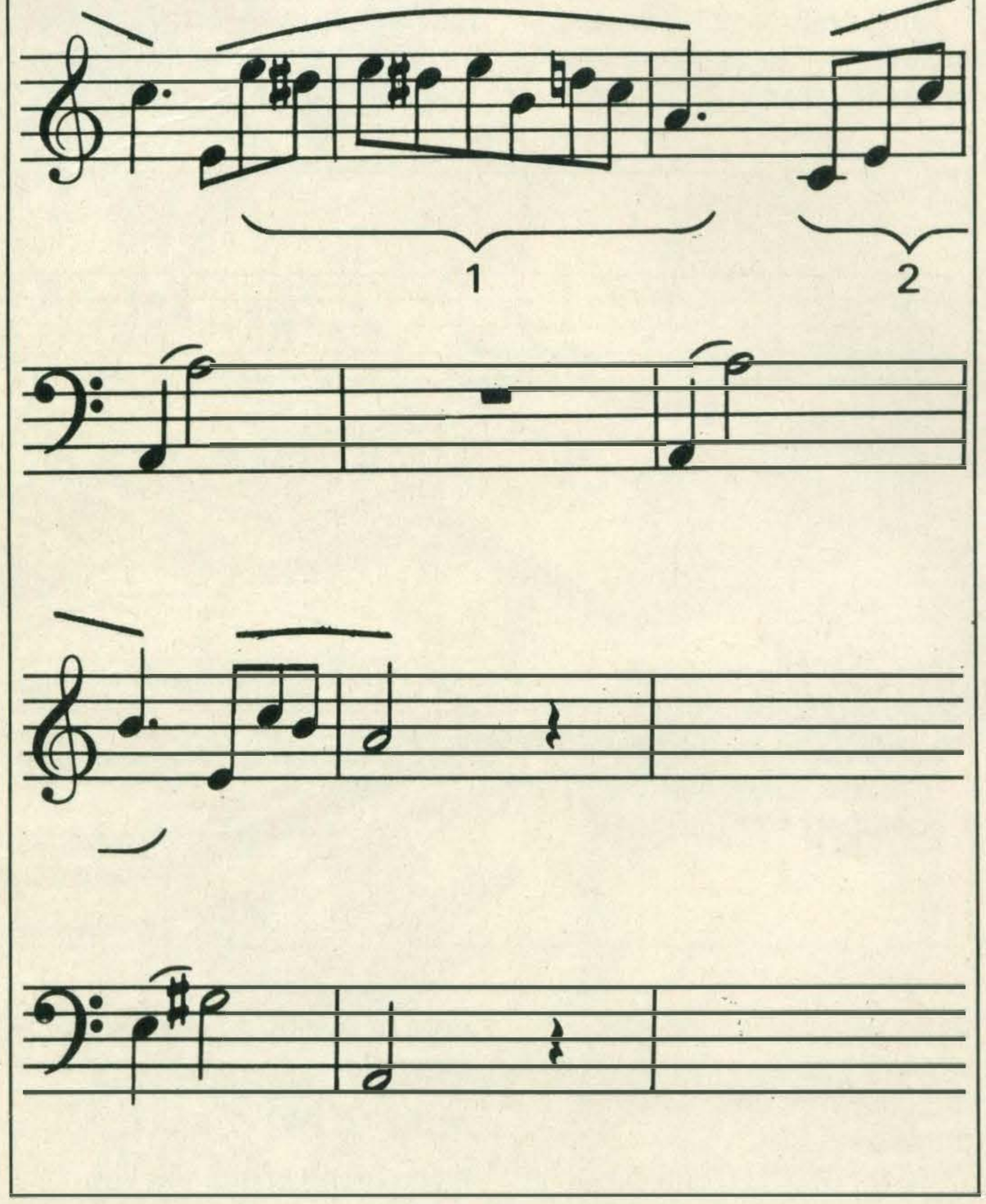


Figure 6. Transcribing music with more than one melody line is easy with MSX microcomputers' three voice facility

```
10 REM FUR ELISE
20 A$="O5 L8 E D+ E D+ E
   O4 B O5 D C A4."
30 B$="C E A B4."
40 PLAY A$
50 PLAY B$
60 PLAY"E G+ O5 B C4."
70 PLAY"O4 E XA$;"
80 PLAY B$
90 PLAY "E O5 C O4 B A2"
```

You may like to try playing the tune at different tempos and volumes. Instead of altering the program each time, you could use numeric variables for either of these, and input the tempo and volume each time you run the program.

Numeric variables must always be preceded by the '=' sign and followed by a ';'.

The melody program looks like this:

```
10 REM FUR ELISE
20 A$="O5 L8 E D+ E D+ E
   O4 B O5 D C A4."
30 B$="C E A B4."
40 INPUT "TEMPO";TEMPO
50 INPUT "VOLUME";
VOLUME
60 PLAY "T=TEMPO;V=
   VOLUME;XA$;"
70 PLAY B$
80 PLAY"E G+ O5 B C4."
90 PLAY"O4 E XA$;"
100 PLAY B$
110 PLAY "E O5 C O4 B A2"
```

Your MSX microcomputer is capable of producing three notes simultaneously, so as well as playing the melody it can also provide an accompaniment and a bass as well.

To do this the PLAY command is extended to include up to three strings, each string representing a separate voice. These strings are PLAYed simultaneously. The format of the PLAY command, using 3 voices, is:

PLAY "voice 1","voice 2","voice 3"

Notice that the strings in the PLAY statement are separated by commas. The tempo, volume etc, must be set individually for each string. Don't forget, though, that a program line cannot exceed more than 255 characters — you could get in a real mess.

It's a good idea to keep the PLAY statements fairly short when using more than one voice, otherwise the voices tend to get slightly out of synchronisation by the end of the statement.

This is because it is quite likely that the voices will contain different numbers of octave changes, for example, and each of these commands takes a very small, but finite, execution time.

These small lengths of time do add up and eventually become noticeable.

For the full version of *Fur Elise*, have a look at figure 6. Now have a go at transcribing it. Good luck!

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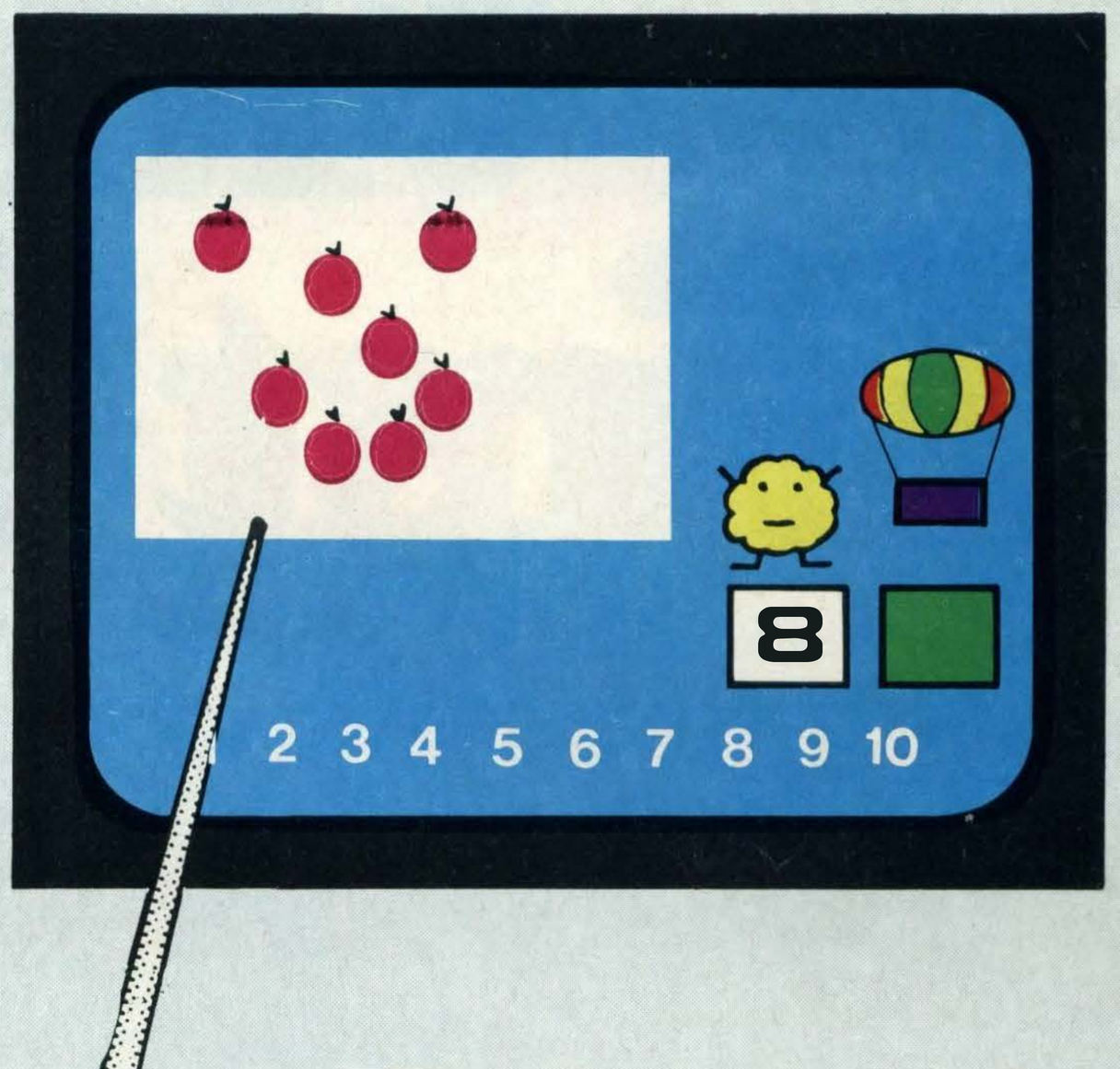

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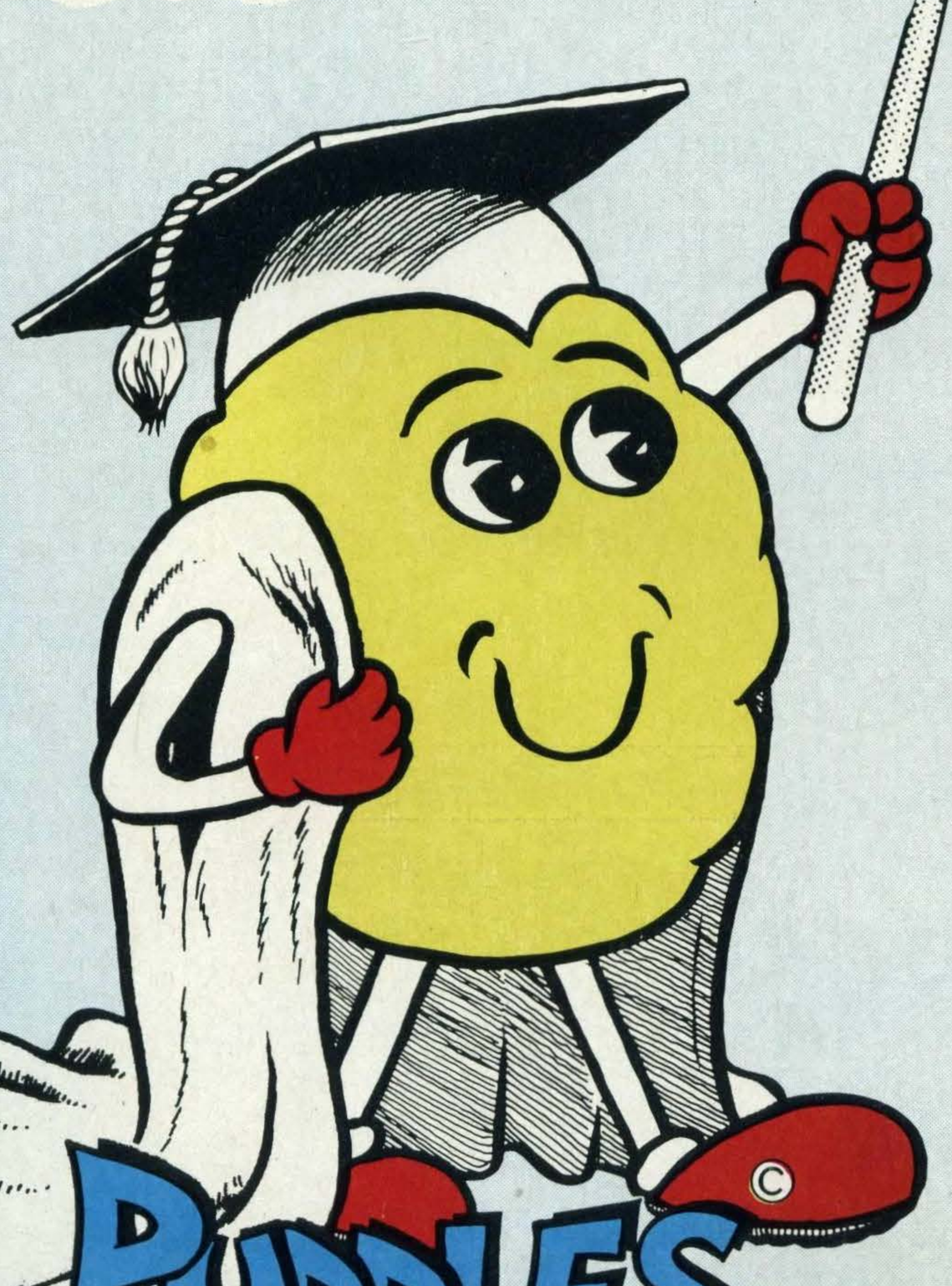

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QUICK ON THE DRAW

Tom Sato delves deeper into the secrets of MSX BASIC's graphics language

MSX's Graphics Macro Language resembles another language called LOGO, which is sometimes known as Turtle Graphics because it basically simulates the motion of a pen on paper.

The Graphics Macro language is relatively easy to use because each command is represented by a single character and each describes what the imaginary pen should do on the screen.

The language is written in the form of a string and the DRAW command must be followed by that string like this:

DRAW <string>

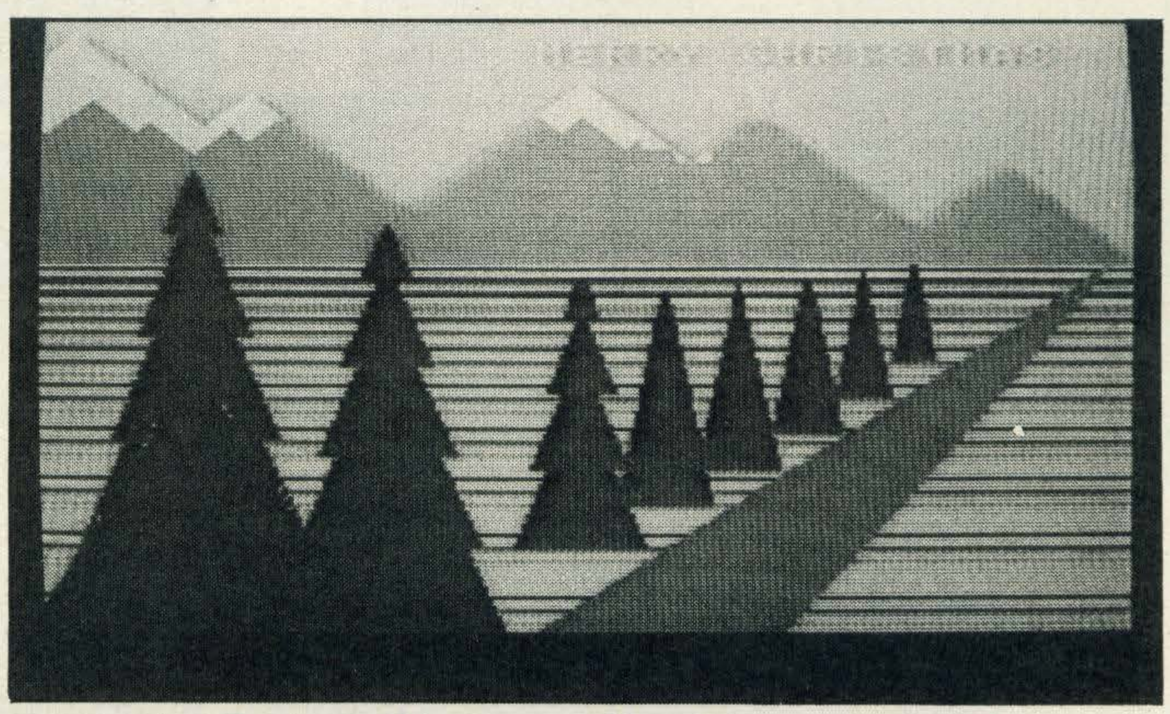
To DRAW a line in one of the four directions (up, down, right or left) the following graphics macro commands are used:

U DRAWs Up
D DRAWs Down
L DRAWs Left
R DRAWs Right

(See figure 1)

After each graphics macro command, you must specify the length of the line in units of pixels. One pixel is one dot on the high resolution graphics screen.

Using the next four commands (E,F,G,H) you can begin to draw diagonal lines on the screen.



You can easily create this seasonal landscape on your TV or monitor with the short program listed overleaf on page 40

E DRAWs diagonally up and right
F DRAWs diagonally down and right
G DRAWs diagonally down and left
H DRAWs diagonally up and left

(See figure 2)

The line length specifies the number of pixels moved in the x and y directions.

This simple program draws a hexagon:

```
PROGRAM 1
  10 REM hexagon
  20 SCREEN 2
  30 PSET(120,90)
  40 DRAW "E20F20D30
     G20H20U30"
  50 GOTO 50
```

The PSET command in line 30 places the graphics cursor at the middle of the screen so that when it comes to line 40, the computer executes the Macro commands in sequential order.

(See figure 6)

To DRAW a line to a specific co-ordinate position on the screen, the M Command is used. M stands for move, and this command must be followed by the x and y co-ordinate position to which you want to draw the line. It will draw from the last point referred to by the graphics cursor to the position given.

There are two ways of specifying co-ordinates in the M command — one absolute and another relative.

```
M30,50
```

will draw a line from the last co-ordinates referred to by the graphics cursor to co-ordinate (30,50). On the other hand, if the co-ordinates have either a + or − prefix, then the co-ordinates are relative. For example:

```
PSET (100,100):DRAW
"M+10,+10"
```

will draw a line from the co-ordinate (100,100) to (110,110).

Another useful Graphics Macro command is the Blank (B) command which is used in combination with all the above graphics commands such as U, E, and M, etc and causes

Figure 1. The GML simulates the motion of pen on paper

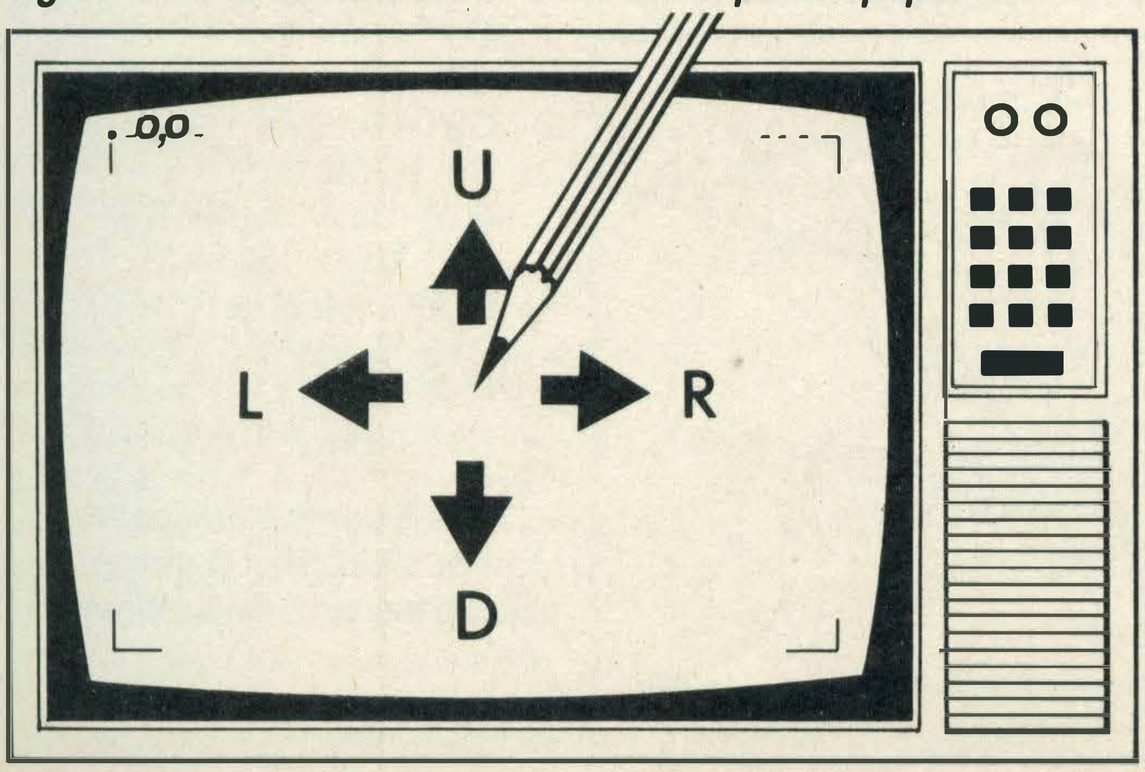
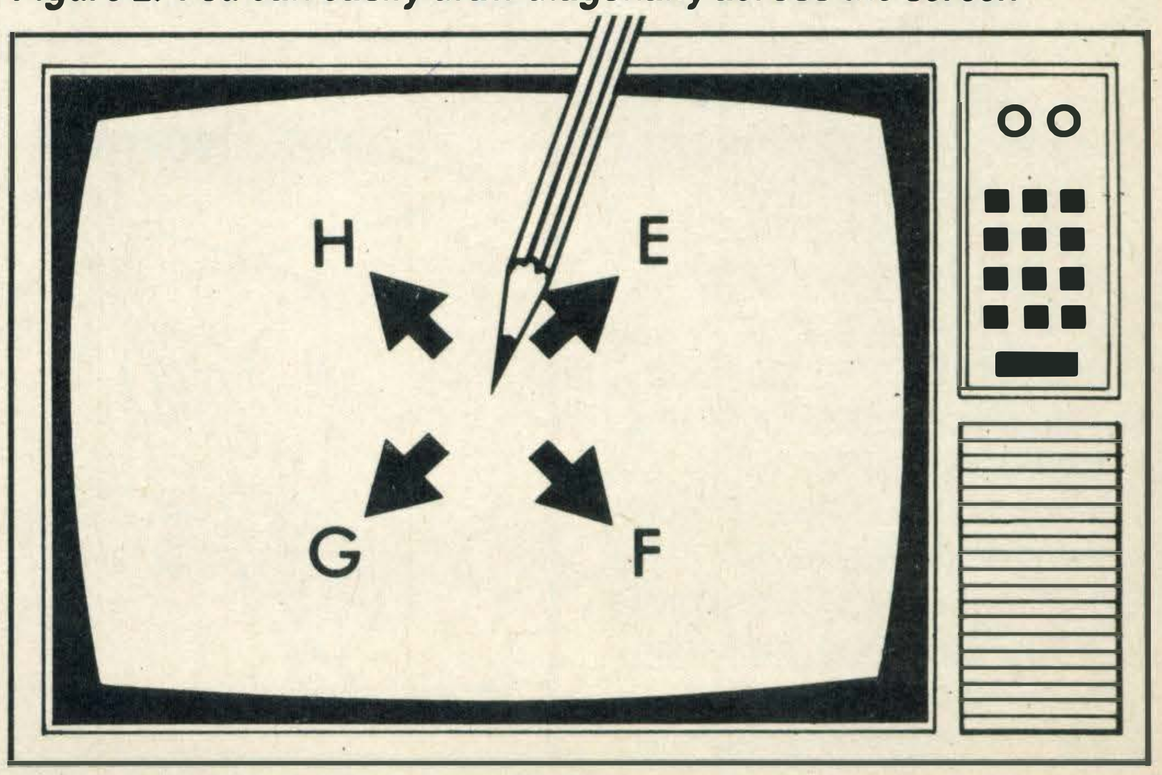


Figure 2. You can easily draw diagonally across the screen



the graphics cursor to move without DRAWing. The B command proves very handy in moving the graphics cursor within the Graphics Macro Language instead of using the PSET statement. For example to move the cursor to the centre of the screen use the following graphics macro:

```
BM123,96
```

(See figure 4)
or, if you want to move right 10 pixels without drawing use the relative form:

```
BR10
```

The string after the DRAW command does not have to be in quotation marks; it can be a string variable or even a string expression. For example, Program 1 can be improved to draw a series of hexagons:

PROGRAM 2

```
10 REM series of
   hexagons
20 SCREEN 2
30 DRAW "BM120,90"
40 A$="E20F20D30G20
   H20U30"
50 FOR B=1 TO 5
60 DRAW "BR10"+A$
70 NEXT B
80 GOTO 80
```

(See figure 5)
Every time the DRAW statement in line 60 is executed within the FOR/TO/NEXT loop between line 50 to 70, the whole hexagon moves to the right by 10 pixels due to the "BR10" macro, which literally means 'Blank move to Right by 10 pixels'.

There is another way of expressing "BR10"+A$ by incorporating the string variable A$ in the Graphics Macro string using the X command. This indicates to the computer that there is a string of GML within that string. So line 60 in program 2 can be changed to:

```
60 DRAW "BR10XA$;"
```

Note that the string variable should be preceded by X and followed by a semicolon.

If you want to move back to where you started after DRAWing a line, use the prefix N. If you wanted to draw to the right by 50 pixels and then place the graphics cursor back where you started off, then your graphics macro would be:

```
NR50
```

It soon becomes clear that the MSX Graphics Macro Language is fairly comprehensive. It gives you a high degree of freedom to move the 'pen' on the screen. If by accident you try to draw outside the screen, the MSX micro will see that and draw up to the edge without showing a syntax error.

However, that is not all GML can do. For instance, you can change the colour of your 'pen'. This is achieved using the C command and it changes the current foreground colour according to the colour code given after the C command. Once C has been set, the current foreground colour will stay this colour until reset by either another C or COLOR statement. Here is a list of all the colours you can use.

C0	Transparent
C1	Black
C2	Medium green
C3	Light green
C4	Dark blue
C5	Light blue
C6	Dark red
C7	Cyan
C8	Medium red
C9	Light red
C10	Dark yellow
C11	Light yellow
C12	Dark green
C13	Magenta
C14	Grey
C15	White

The S command changes the Scale of your drawing. The Scale factor (SF) is defined as:-

```
SF = n/4
```

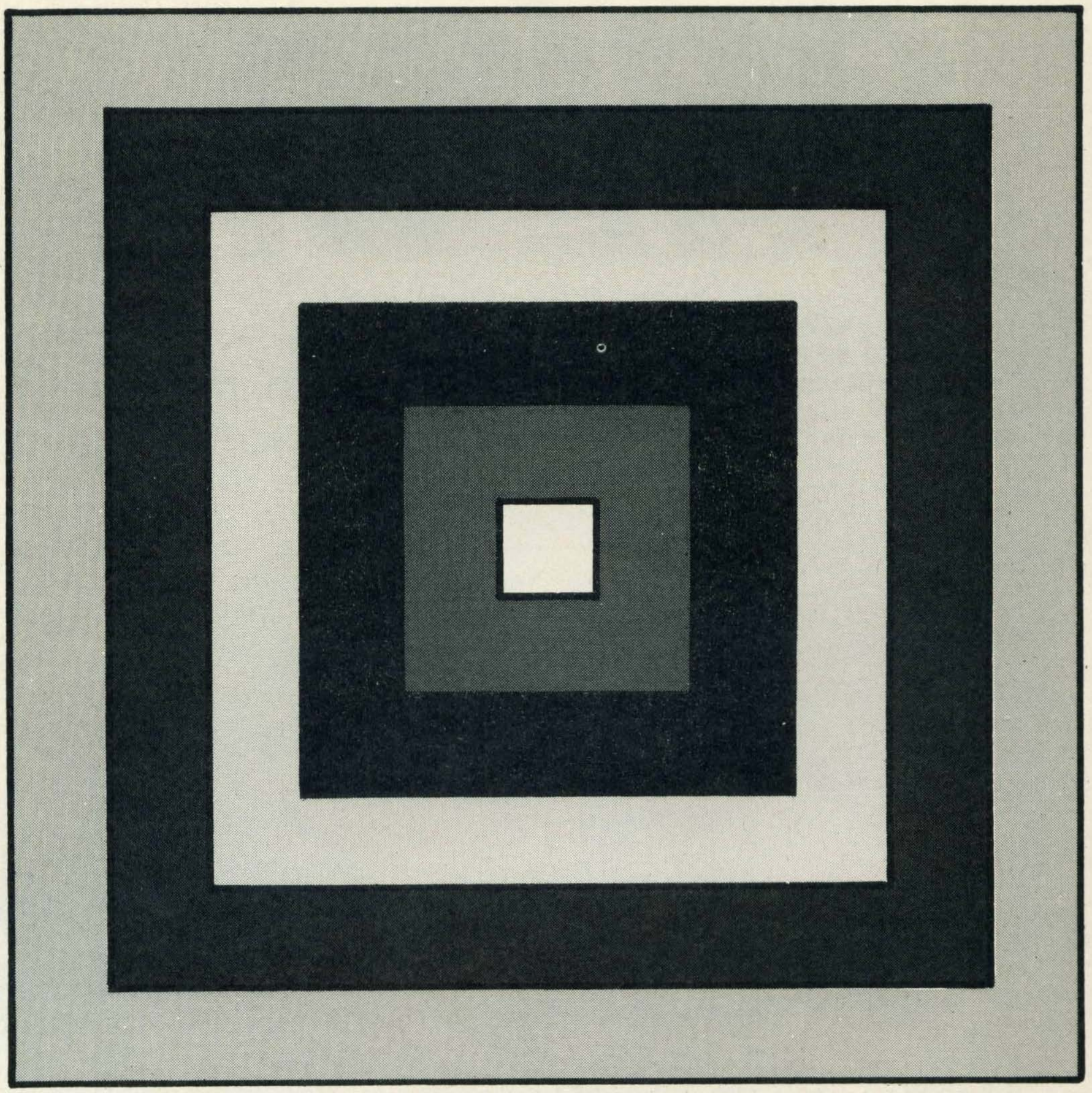
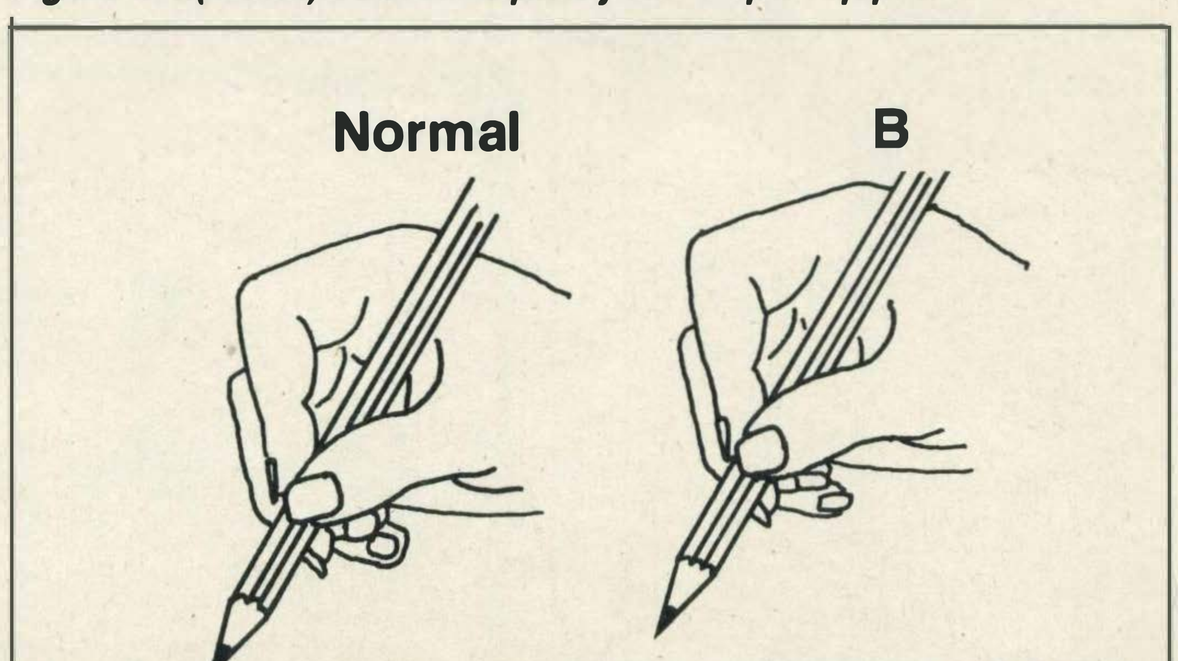


Figure 3. You can easily produce concentric squares of different colours with the GML

Figure 4. B(Blank) command puts you into pen up position



Therefore S1 will result in a scale factor of a ¼, and S4 the normal size. To draw something twice as big, S should be S8.

So far, all the Graphics Macro commands have used constants to give length and colour, etc. However, you can include numeric variables within a DRAW string. The variables must be preceded by the '=' (equal) sign, then followed by a semicolon so the computer can distinguish between Graphics Macro and numeric variables. The following is a simple example:

DRAW "U-VERTICAL:"

which means DRAW up according to the numeric variable VERTICAL.
The next program uses the Colour and Scale commands with numeric variables to produce concentric squares of different colours.

PROGRAM 3

```
10 REM concentric
   coloured squares
20 SCREEN 2
30 DRAW "BM120,95"
40 A$="R10D10L10U10"
50 FOR Q=1 TO 15
60 SIZE=Q*8
70 DRAW "S4BH10C=Q;
      S=SIZE;XA$;"
80 NEXT Q
90 GOTO 90
```

(See figure 3)

Once you have defined your shape, you can alter not only the colour and scale of the shape but also its orientation on the screen by using the Angle Command, A. This command rotates the axis of the screen in an anti-clockwise direction through 0, 90 180 or 270 degrees using A0, A1, A2 and A3 respectively.

The rotated axis in turn affects the orientation of the direction commands U, D, L, R, F, E, G and H. Once A is executed, all the following direction commands in the program will be rotated by the set angle until the computer is told otherwise. It is very important to remember to reset the axis to normal orientation (A0) before the program finishes otherwise it will remain at that angle even after the end of the program.

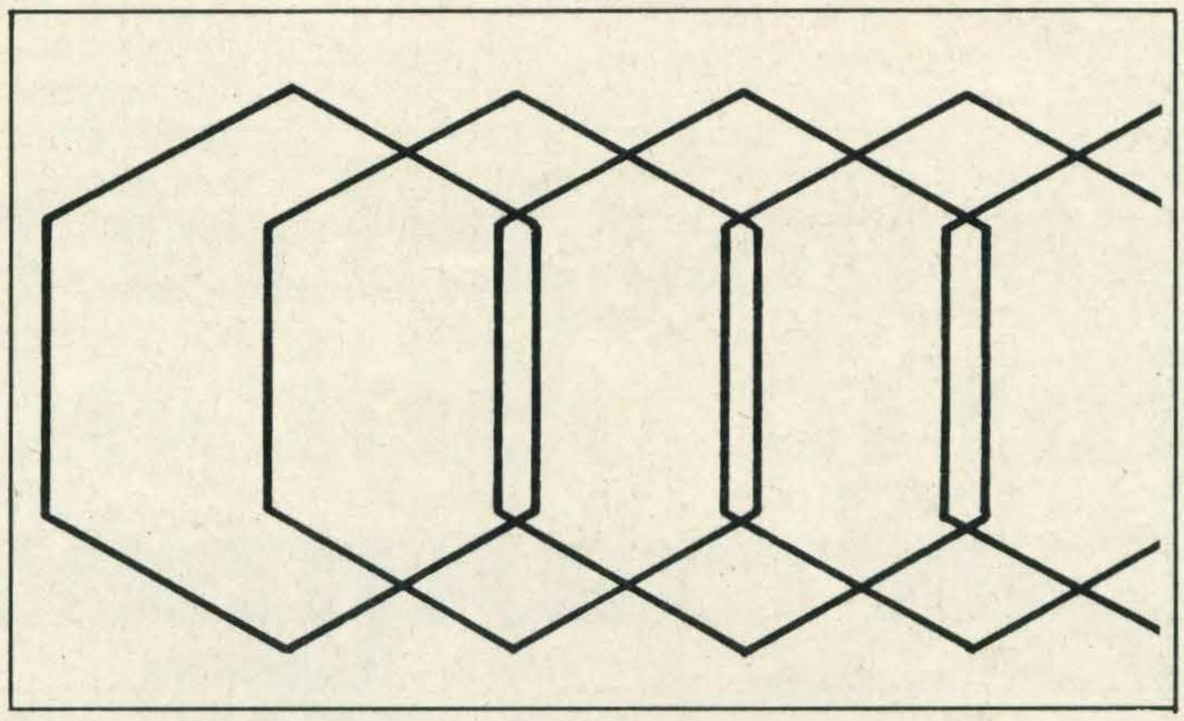


Figure 5. Movement between each hexagon is a simple matter

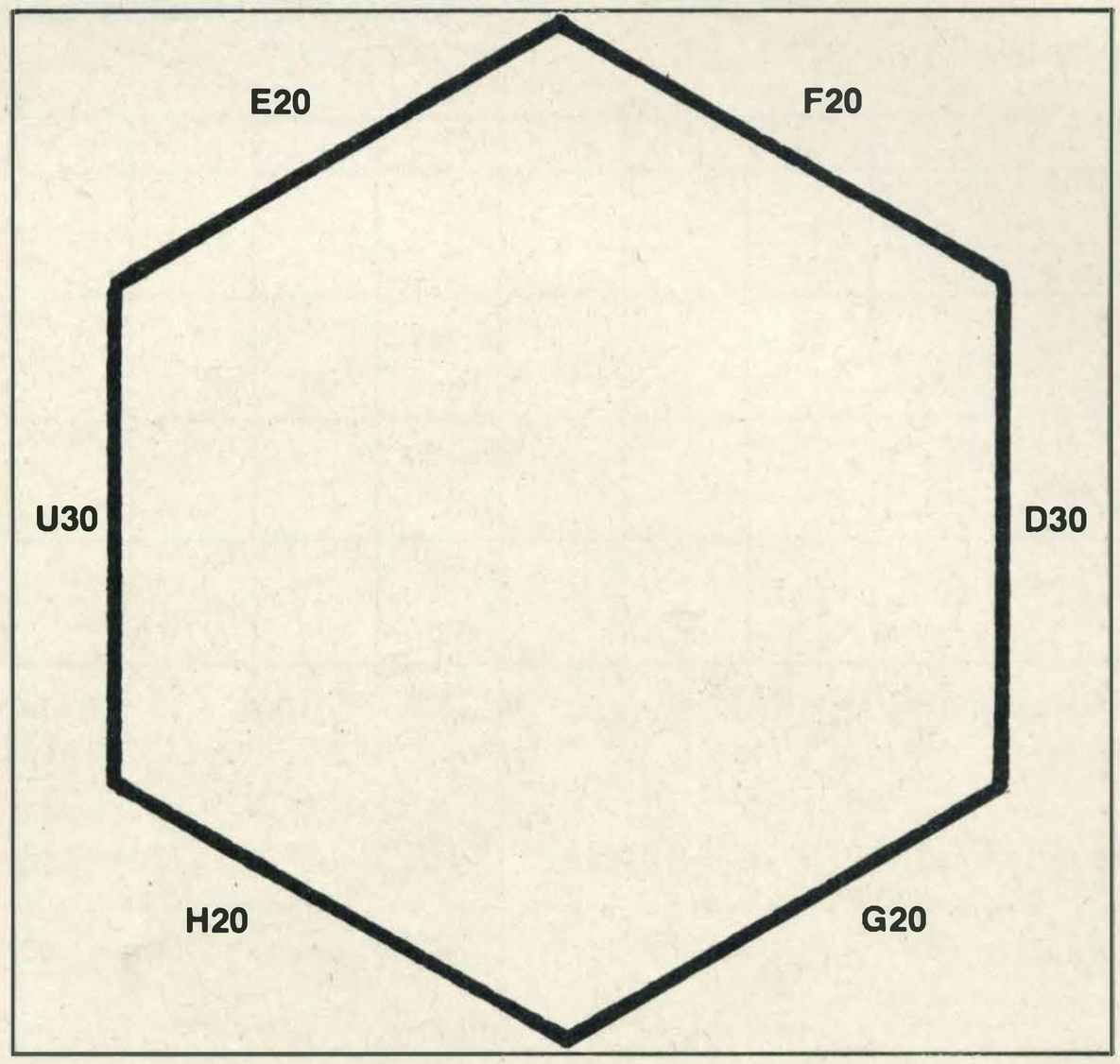
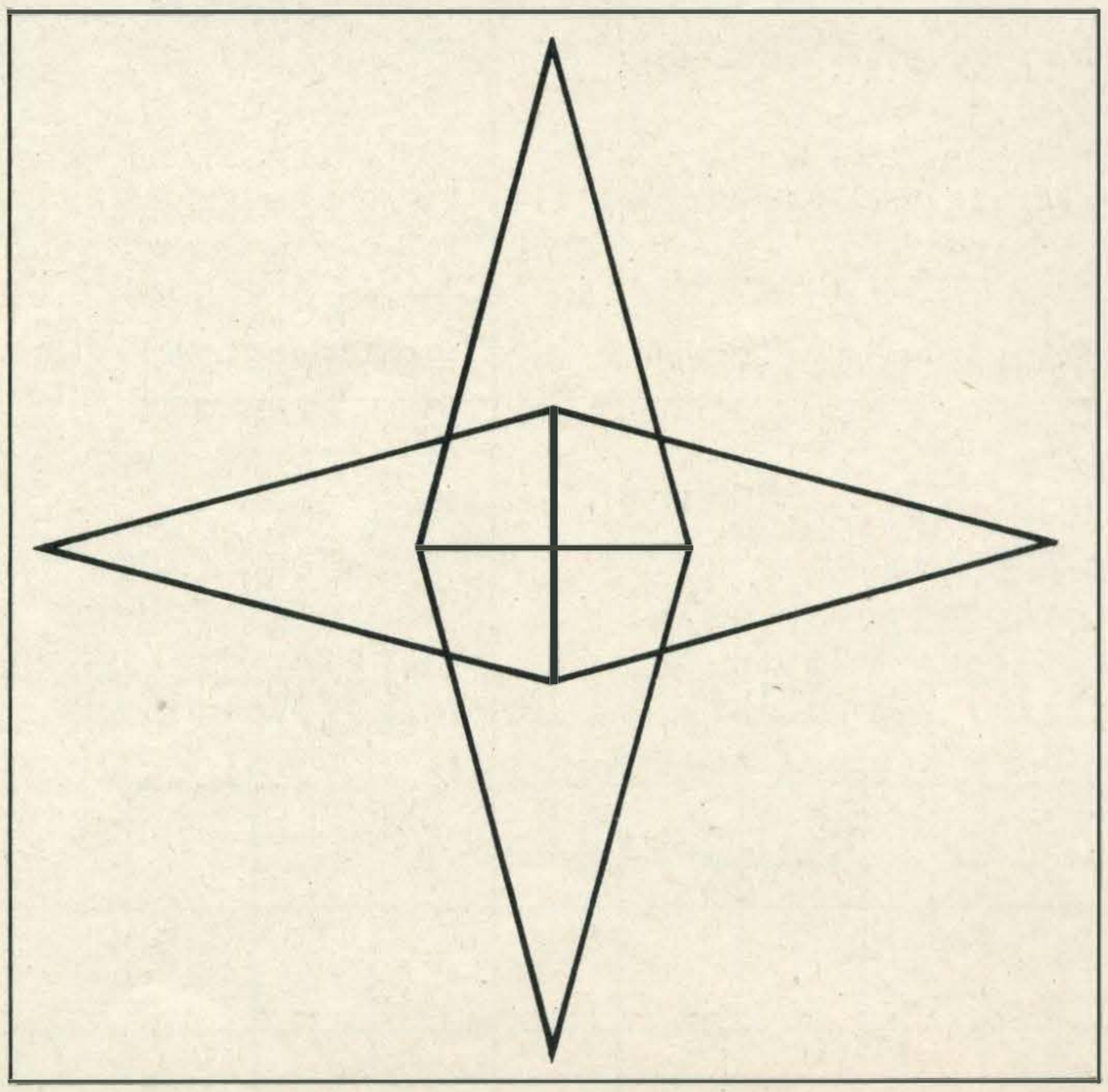


Figure 6 (above). You can achieve this kind of shape without resorting to the use of 'loops'

Figure 7. A simple triangle can be rotated to give a star shape



The following demonstrates that a simple triangle (i.e. A$) can be rotated to give a star shape:

PROGRAM 4

```
10 REM star program
20 SCREEN 2
30 DRAW "BM100,100"
40 A$="L10M+10,-50,
      M+10, +50L10"
50 FOR I=0 TO 3
60 DRAW "A=I;XA$;"
70 NEXT I
80 DRAW "A0"
90 GOTO 90
```

(See figure 7)

Now you can improve the star shape considerably by drawing a whole series of them concentrically in different sizes using the S command. It should look like this:

PROGRAM 5

```
10 REM improved star
      program
20 SCREEN 2
30 DRAW "BM100,100"
40 A$="L10M+10,-50,
      M+10, +50L10"
50 FOR S=1 TO 8
60 FOR I=0 TO 3
70 DRAW "A=I;XA$;"
80 NEXT I,S
90 DRAW "A0S4"
100 GOTO 100
```

SOME USEFUL HINTS ON THE GML

1. **Always plan what you want to draw on a piece of paper before you proceed.**
2. **Make sure you don't repeat the same GML twice by using a string variable to store a shape, then using that variable to represent that shape.**
3. **Scale (S), Angle (A), Move (M), Blank (B) and X commands are best used to draw sophisticated shapes with the minimum of programming effort.**
4. **S, A and C commands remain the same after the program has been executed, so remember to put them back to the default value before you exit the program.**

Graphics Macro Language commands

U<n>	:	draws up
D<n>	:	draws down
L<n>	:	draws left
R<n>	:	draws right
E<n>	:	draws diagonally up and right
F<n>	:	draws diagonally down and right
G<n>	:	draws diagonally down and left
H<n>	:	draws diagonally up and left
M<x>,<y>	:	draws to co-ordinates x,y. You may draw relative from the last point by using the + or − prefixes to the x and y co-ordinates.
B	:	Moves without drawing.
N	:	Draws but returns cursor to the starting point.

Angle Command A

A<n> : where <n> can be 0,1,2, or 3.

A0	:	by 0 degrees.
A1	:	rotates anti clockwise 90 degrees.
A2	:	rotates anti clockwise 180 degrees.
A3	:	rotates anti clockwise 270 degrees.
C<n>	:	sets the colour when drawing.

Scale Command S prefix

S <n> : where <n> can be an integer between 0 to 255.
<scale factor> = <n>/4
Therefore, S1 draws 1/4th of length specified by U, D, L, R, etc.
S4 and S0 are the same and results in no scaling.

How to use substrings

X<string-var>;
means execute what's inside the string variable.

How to use numerical variables within GML

=<num-var>;

```
10 REM CHRISTMAS CARD PROGRAM
20 REM BY T. SATO
30 COLOR ,15,1
40 LIST "C12BM=X;,=Y;S=S;M-1,+6R2M6"
50 SCREEN 2
60 REM MOUNTAINS
70 LINE (0,80)-(255,80),7
80 PAINT (10,10),7
90 DRAW "S4C14BM0,80R255H30G20H35
   G15H25G40H30H5G10H30G20"
100 PAINT (10,70),14
110 DRAW "C15BM155,50H10G5H10G5H
    5E10F15"
120 PAINT STEP(-2,0),15
130 DRAW"BM0,40R10E10F10E3F10E8F
    4E7H7G10H30G20"
140 PAINT (10,30),15
150 LINE (0,81)-(255,81),15
160 REM FIELDS
170 FOR I=1 TO 10
180 Y=81+I^2
190 LINE (0,Y)-(255,Y),6
200 LINE (0,Y+4)-(255,Y+4),3
210 LINE (0,Y+8)-(255,Y+8),7
220 NEXT I
230 DRAW "C11BM250,80NM120,192NM
    176,192"
240 PAINT (141,190),11
250 A$="C12BM=X;,=Y;S=S;M-1,+3R2M
    -1,-3"
260 FOR J=1 TO 3
270 X=43*J
280 FOR I=7-J TO 1 STEP -1
290 Y=I*12+25+J*16
300 S=I*(30-J*5)
310 DRAW A$
320 PAINT STEP(0,2),12
330 NEXT I,J
340 REM TREES 2
350 A$="C12BM=X;,=Y;S=S;M-1,+6R2M6"
360 FOR I= 1 TO 5
370 X=129+(20-I)*I
380 Y=91-I*2:S=49-I*6
390 DRAW A$
400 PAINT STEP(0,5),12
410 NEXT
420 OPEN "GRP:" AS #1
430 DRAW "BM120,12"
440 PRINT#1,"MERRY CHRISTMAS"
450 IF STRIG(0) THEN END ELSE 450
```

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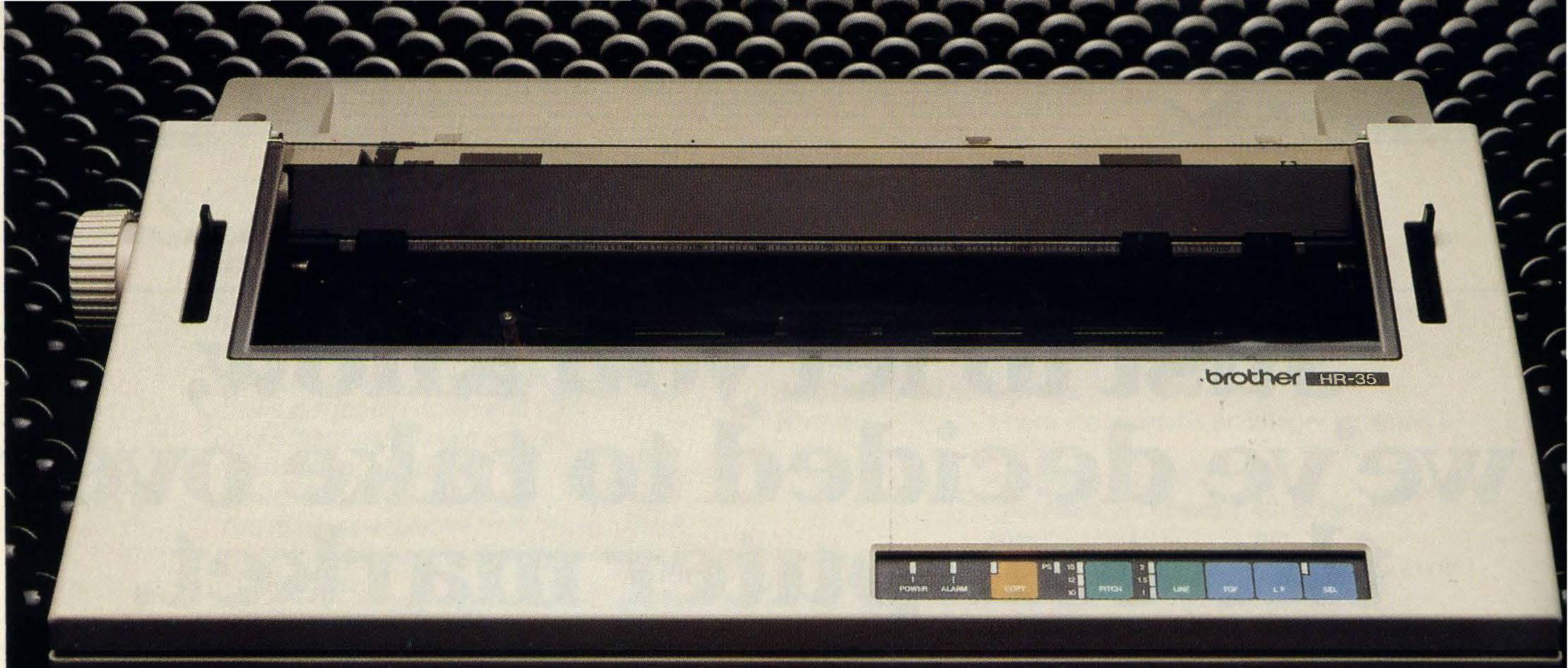

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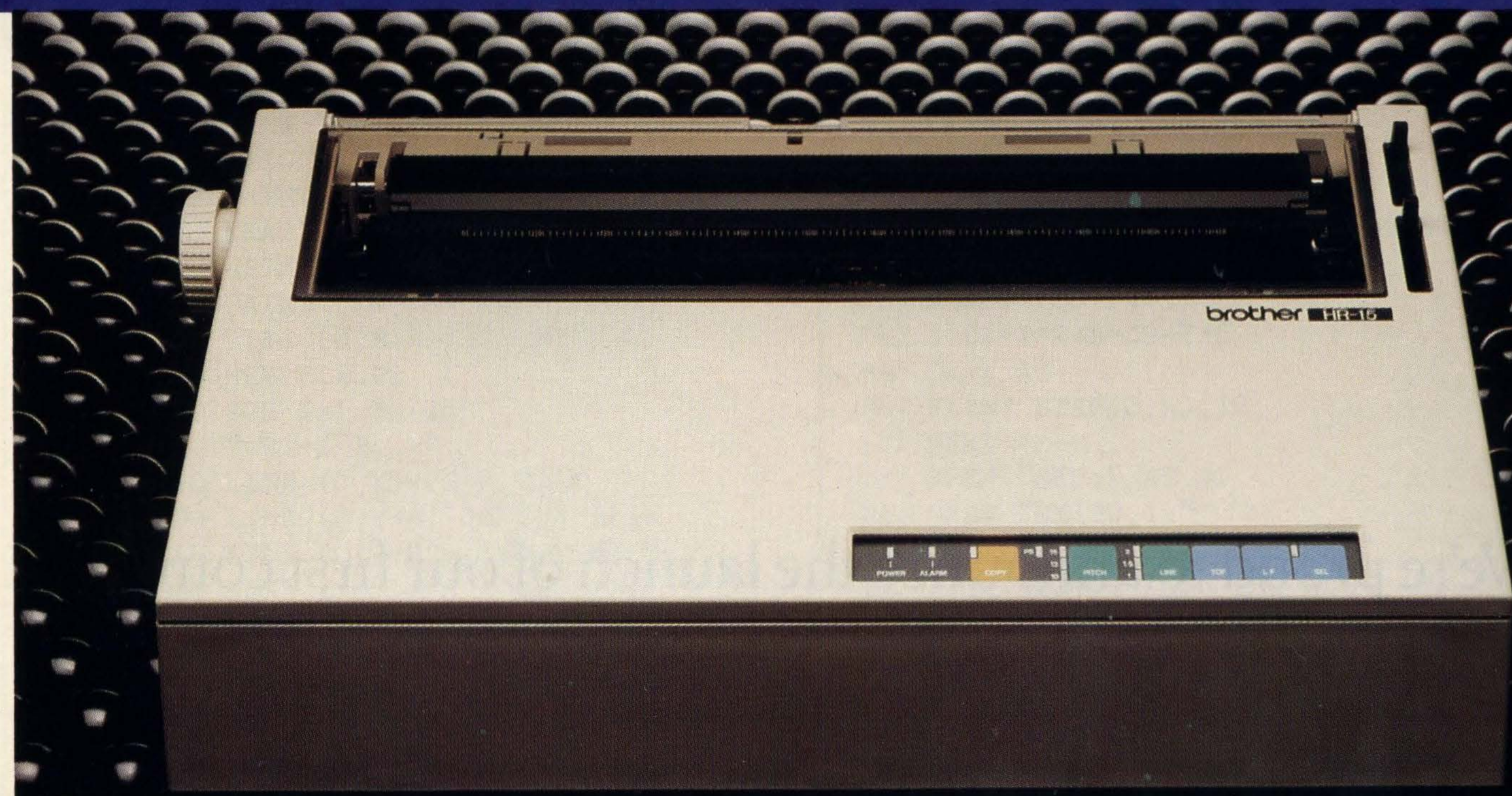
Which printe
compute



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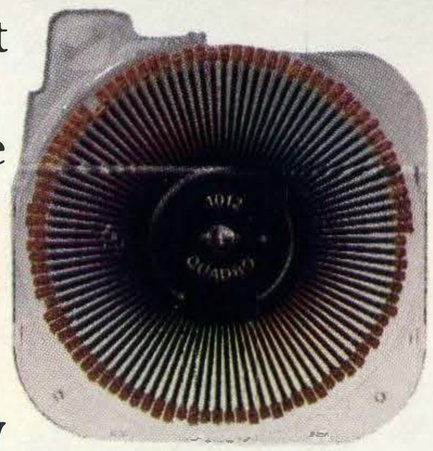
r would your choose?



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THE NEW CONVERTS

Buying a new computer system is often a nerve-wracking business. Will it work as advertised? And even if it does, will it attract the all-important support it needs from software suppliers?

One of the most reassuring things about the MSX movement is the unusually large number of software titles which are coming on to the market. Here at *MSX Computing*, we're all suffering from joystick finger and VDU glare as a result of the hours we are putting in at the keyboard to review the latest releases.

Wondering what games are in store? Simon Craven reveals all

Where are all these programs coming from, though? Many, of course, originate from the Japanese market where MSX has been established for some time. But a surprising number of British rivals have already sprung up, most of which are conversions of programs which have already been released on well-known micros like the Sinclair Spectrum.

This feverish activity is most unusual for a computer which has been properly available for a mere matter of weeks, especially when technologically more glamorous systems such as the Sinclair QL are suffering from a severe shortage of third-party software.

If you have tried converting programs yourself from one machine to another, you will know that it is a gruelling task, and one which rarely repays the time and effort put into the conversion. The main exceptions to this rule are pure machine code programs which do not rely heavily on graphics and sound, and pure Basic programs which also stay clear of excessive video and audio I/O.

Evidently MSX has something out of the ordinary going for it. For a start, it uses the well-known Zilog Z-80 central processor, the same as the Sinclair Spectrum. It also has excellent potential for sound and graphics, so you are unlikely to find an effect in (say) a Spectrum program which the MSX micro is unable to match or surpass. Its Basic is also very comprehensive, including commands which are the

equivalent of those on most other machines, with more besides.

You might expect that the first wave of British MSX software would be full of ex-Spectrum machine code programs which mainly use text rather than graphics — and you would be right.

Hisoft's David Link explained how his company has been able to produce an MSX version of its best selling *Devpac* machine code development package (reviewed in last month's *MSX Computing*). All Hisoft's programs are initially developed using a Z-80 based CP/M-80 system, similar to the generation of business micro which ruled the roost before the IBM PC and its numerous imitators arrived on the scene.

The superior development tools possible on the CP/M system speed the production of a core of code which can then be tailored to the peculiarities of various home computers.

Having this common core of Z-80 machine code left over from development of the Spectrum product made it possible to come up with an MSX derivative (MSX machines use the same Z-80 processor of course) in just a couple of months — much less time than a complete new program would require.

Helpful ROM

David Link reckons the MSX specification is very easy to work with, compared to some of the less thoroughly developed and documented machines on the market. The MSX ROM is particularly helpful, with very well defined entry points to access various BIOS (Basic Input Output System) functions. An especially neat feature is the provision of a ROM-based editing facility.

Most of the MSX computers seen in this country are equipped with the full 64K RAM, but the specification does not demand this much memory for a system to qualify for the MSX tag. David would have preferred to see this area tightened up. 'With the cost of memory now fairly low, it's a pity that software houses won't be able to rely on all users having the full 64K. Obviously it cuts down on what you can do.'

With a bit of luck, though, 64K will become a *de facto* standard, just as the 48K Sinclair Spectrum outsold the cheaper 16K model to such a degree that the less capable unit was dropped. Long-time micro pundits will also remember the BBC Micro Model A which suffered a similar lack of interest.

Tasman Software, creator of the *Tasword* word processor which many Spectrum users regard as the best available on that machine, has also decided

that the MSX market holds a great deal of promise. Once again, it has ported the program from a development system, customising the I/O module to cope with the MSX keyboard, display and printer interface.

Robin Thompson of Tasman is confident that MSX users won't go short of software. 'There is bound to be a big surge of interest in Z-80 programming. For a long time the Spectrum has been the star for games software, but with the Commodore 64 gaining ground a lot of people were starting to transfer on to the 6502 derivatives, with an eye on the American market. Suddenly, though, there are two new highly commercial Z-80 systems to work on — MSX and the Amstrad.'

There's a big incentive for software developers to commit themselves to MSX. Perhaps the biggest problem facing the personal computer industry is its lack of standardisation. That everyone really likes the idea of standards can be seen from the bandwagon effect which surrounds any computer which grabs a big enough market share to be thought of as a kind of standard by itself.

Tim Moore of Kuma puts it succinctly. 'Being different is basically a marketing ploy, but being the same is good for actually getting things done. If you are an engineer or a programmer you aren't going to develop some wonderful product for one machine and then discover it has to be completely different for another. With MSX you can put everything you've got into a product, make it as good as you can, confident in the knowledge that you're addressing a big enough audience to make it economically viable.'

Tim is especially enthusiastic about MSX's potential as a games system. 'The MSX VDP chip is something special. Very few computers use it, and in many ways it's more complex than the Z-80 CPU! Any entertainment or educational program with a high video content can be made absolutely beautiful to look at.'

Many of the VDP chip's darkest secrets are soon to be revealed in a Kuma book on the subject. 'We go into a lot of the undocumented modes. Unless people are told about the potential of the computer they won't use it — and that would be a real shame.'

Kuma is another company which downloads new software from a separate development system, and a spin-off from this process is about to come onto the market.

It's an RS-232 serial interface for MSX machines — serial interfaces are, of course, the standard way of piping software and data files from one machine to another. You'll have to really want one to buy it, though — the price is set at a cool £99.50 including the dreaded VAT. (See our review on pages 23 and 24.)

Documentation

We suggested to Tim that the MSX documentation included with the machines currently available was not very helpful to the budding programmer. What's the best way to get to know the computer inside out? 'Well, we took a slightly left-handed approach to this. What we did was completely disassemble the operating system — the whole ROM in fact. Once we had it opened up in front of our eyes, so to speak, we spent a few months going over and over it until we understood the whole thing. This process tells you much more than documentation ever could.'

Doesn't this make advanced MSX programming an experts-only activity?

'Well, anyone with a decent disassembler can take the first step. After that, you don't have to be an expert when you start out — though obviously a working knowledge of Z-80 machine code is pretty essential. By the time you've finished, you *will* be an expert, though!'

All in all, the future of MSX software development looks bright, with some class-leading products on the horizon. We doubt that the practice of converting software from other home micros to MSX will continue for very long, though — for one thing, it's a waste of the computer's superior video and sound characteristics, and for another, MSX will be one of the first choices for new software products.

BUSINESS

Go to work on a micro

Some serious advice on getting down to business with your micro

It can happen to anyone, even the most dedicated alien-zapper or adventure-solver. There you are bathed in the glow of your trusty TV, hunched over a humming Hit Bit or HX10 when a sudden feeling of frustrated ambition sweeps over you. What else can you do with this hi-tech £300 computer? Fun and games are . . . well . . . fun and games, but how about maybe using this substantial investment for something a little more productive?

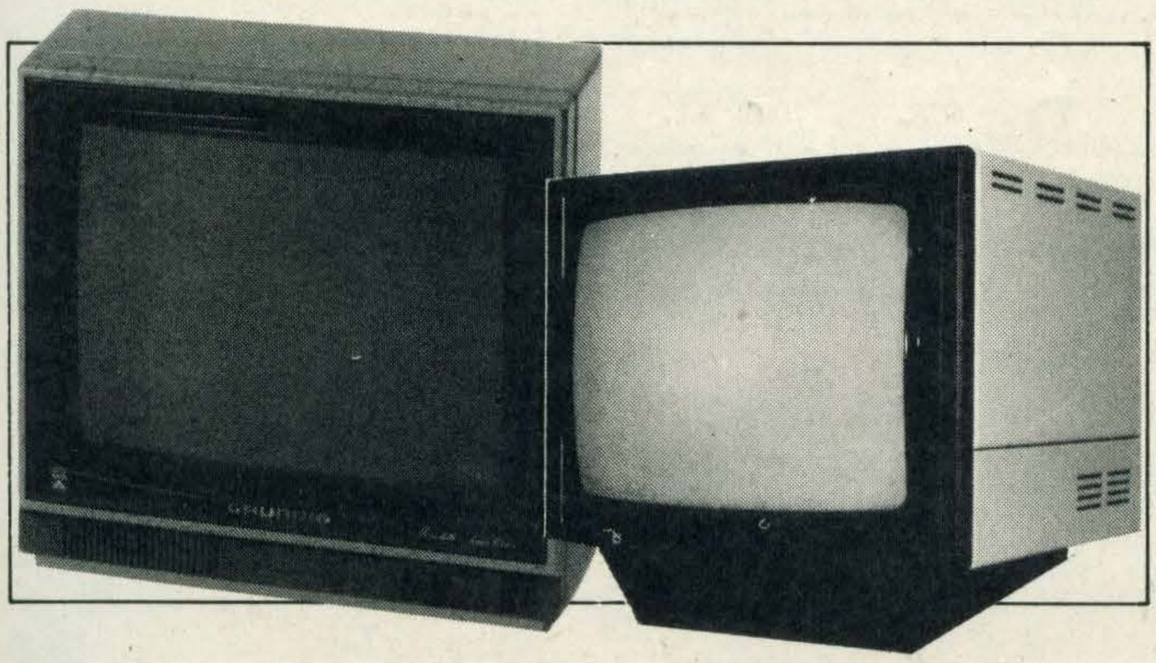
First the good news. As the basis for a low-cost professional computer system, the MSX specification has more going for it than most home computers. The machines all have sensible keyboards, a wide selection of standard peripheral ports, and good expansion capabilities via the cartridge slot and the 50-pin expansion bus (which for some reason masquerades as a second cartridge slot on some machines).

What it costs

Now the bad news — you guessed it — this is all going to cost a fair amount of money.

Apart from the £300 typical initial cost of the system, you are going to need one other item before you can do *anything* serious with the computer. Number one priority is a printer of some kind. This single addition will make your life so much easier that you'll soon wonder how you managed without it. The necessity of a printer for any kind of word processing task is indisputable, but it has many less obvious uses.

Sony is one of the first MSX manufacturers to release a disc drive system for UK users — an essential for serious use



Two colour monitors from Grundig and Microvitec

Many MSX owners will be tempted by the excellent BASIC to try their hands at some serious programming. If you have ever tried to debug a program longer than about two screenfuls of listing, you'll know that a hard copy of the program cuts down dramatically on those red-eyed, all-night keyboard sessions, when the program is *almost* working but there's just this one *teensy little* problem where it jumps to the wrong subroutine . . .

You will also find your MSX computing enhanced in other ways by the possession of a printer.

For example, if you play adventures a lot, you will appreciate the usefulness of being able to record your dialogue with the game on paper. If you use the machine to calculate the answers to mathematical or word problems, then you can let the computer work away all night if necessary, recording its answers as it goes.

Fortunately, the MSX micros available in this country all have sensible arrangements for hooking up printers, based around the Centronics parallel port with which most printers are equipped as standard. Budget about £250 minimum for a respectable dot matrix printer, one which offers a selection of print styles and could conceivably be used for writing business letters without dying of shame.

Printer choice

Avoid the kind of thermal printer which can only use special heat-sensitive paper. They may be cheaper to buy in the first place, but even plain listing paper for dot matrix printers costs quite a bit, and you will be amazed at how quickly a big box gets used up.

Another worthwhile feature when you're investing in a printer is a unit which can handle both single sheets and continuous stationery. Otherwise you'll kick yourself whenever you want to do something outside your normal printing requirements.

The classic choice for this type of printer is the Epson RX80 F/T, at around £285. Even if you go on to buy something else, looking at this printer will give you a good idea of what's available and how the rivals measure up.

An option worth looking into if word processing is your only requirement is one of the low-cost daisywheel printers which are now infiltrating the popular £350 to £500 market hitherto dominated by dot-matrix types. (*Also see pages 69 and 70*). The Juki

6100, at around £360, is a good example.

These printers are often faster and quieter than you might expect, and their print quality is equivalent to that of a good office electric typewriter. The main drawbacks are a lack of flexibility — no graphics, a limited selection of type sizes, and usually no option to run on continuous stationery, which is inconvenient for program listings and the like.

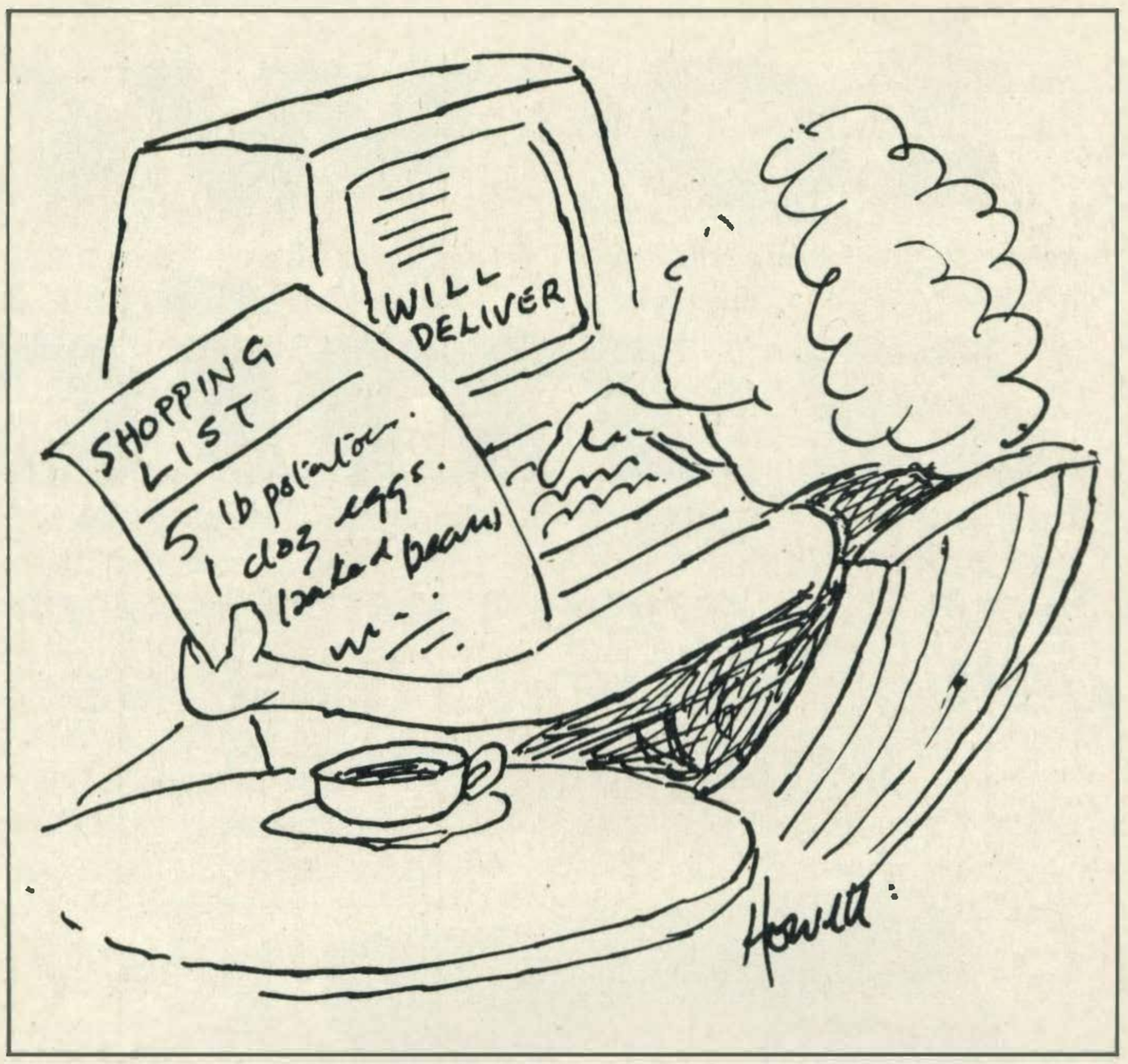
The next step in preparing your system for serious use is working out what kind of software you will require.

The most popular application for personal computers, once games are taken out of the picture, is word processing.

A good word processor is much more than a writing tool, however. MSX BASIC is blessed with three SAVE/LOAD options, one of which sends a program to cassette or disc in pure ASCII format rather than the compressed format normally used to boost loading speed.

To untangle the jargon, the ASCII format is like recording to tape or disc all of the key presses you or the original programmer made to enter the program into the computer.

A program saved in ASCII format can therefore be loaded into a word processor and edited there, with all the advantages this implies. Automatic search and replace, find facilities, block moves and copying, block deletion — every program editing facility you have ever wished for. Best of all is the ability to scroll *up* the listing as well as down!



To perform this task, your word processor should be one which also works with pure ASCII files — most do, but check before you buy.

Another off-beat use for a good word processor is as a simple filing system. Imagine you have a list of names, addresses and telephone numbers. Typing these into the word processor as an ordinary text file not only gives you a potential labelling system, but also gives you some database functions. Using the search facilities you can type in a name and watch the cursor jump to the part of the address file which contains the appropriate details. You can search for any part of the name, address and number.

When you are choosing a word processor there are some vital features to look out for. One of the most important of these is the maximum document size. If you are using cassette as the storage medium for your deathless prose, you will have to choose a program which holds the whole edit document in RAM all the time. If you have a disc drive, you can benefit from a program which 'pages' the document in and out of memory automatically as you progress. Overall document size is then limited by disc capacity rather than RAM size.

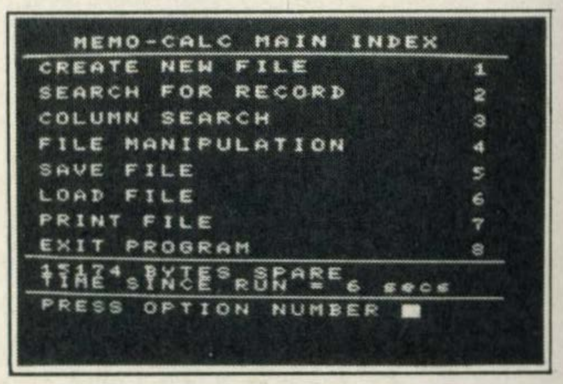
The other big generic group of 'business' programs (rather a misnomer, as they can frequently be used to great advantage in applications well outside the business sphere) is the spreadsheet program. Note that I didn't call it a 'financial planning' program — this is only one of the ways in which you can use a good spreadsheet.

Spreadsheets are less dependent on disc drives for a satisfactory performance, and it is even possible to derive some benefit from the system without using a printer — you don't always want to have a permanent record of your 'what if' calculations.

Once you start using your MSX machine for serious purposes, you're going to find yourself spending longer at the keyboard and also concentrating on the screen much more intently. The humble domestic TV is likely to start showing its limitations quite soon, with visual fatigue levels imposing a limit on the amount of time you can work before taking a break.

Once again, the MSX owner is in a better position to improve his lot than the average home computer owner. As well as the UHF output most MSX contenders have a composite video connection which can be used with a colour video monitor as well as the high definition monochrome monitor which is most suitable for prolonged programming or text work. A good monitor can be had for about £120.

If you need the very best text reproduction along with colour, then the only option is a high-quality RGB monitor, hooked up via the SCART connector. But to get really sharp 80 column text you need to spend up to £500.



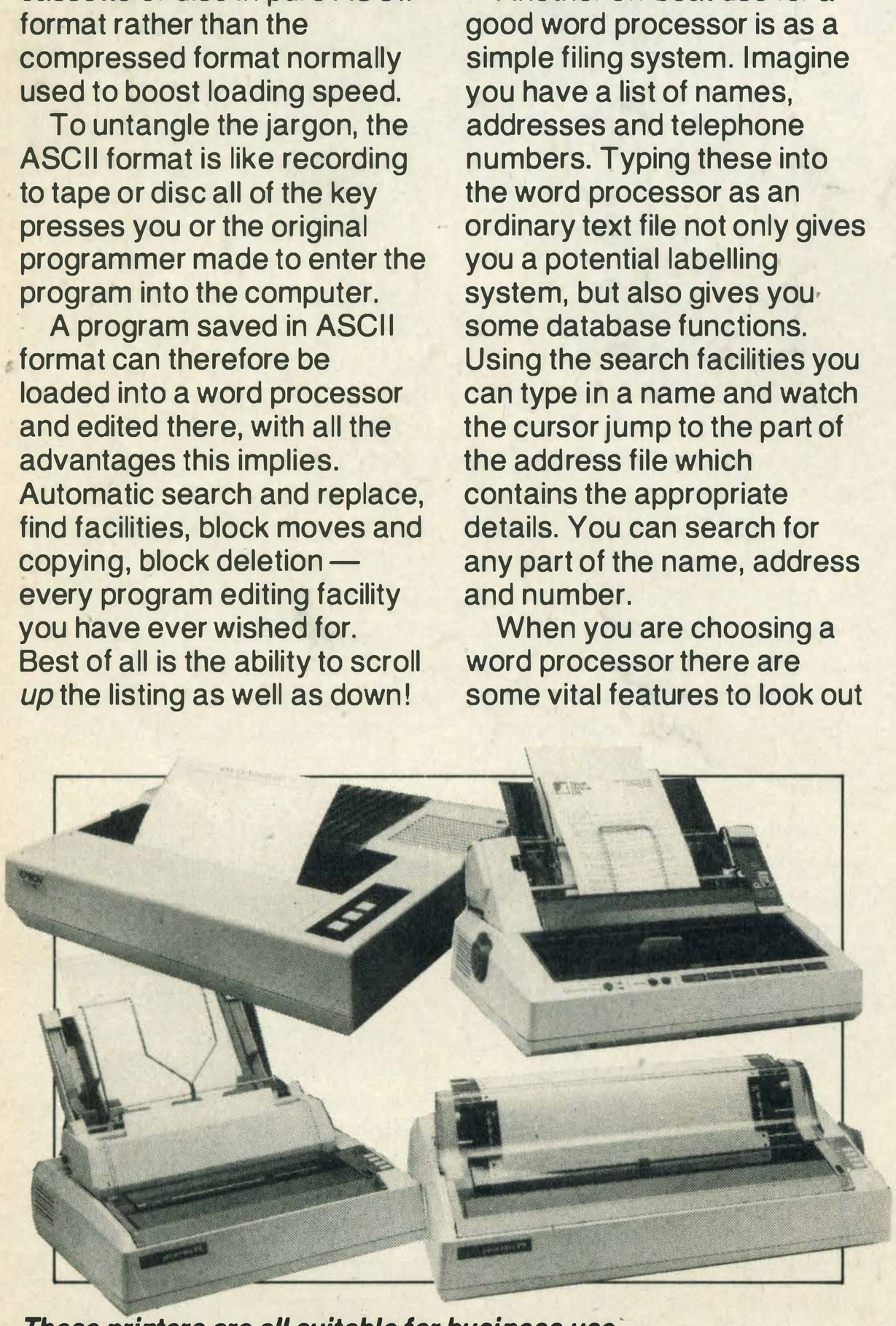
This database costs £14.95

Most people would find a monochrome monitor, with a colour TV for colour work, rather more economical.

Mention of 80 column displays may seem out of place, but already Spectravideo has an 80 column display adaptor to run CP/M software on the 728, and it is a sure bet that MSX-DOS will benefit greatly from a full 80 × 25 display.

It would be quite easy to spend well over £1000 on a professional standard MSX system, but don't feel put off. The advantage of working your way up to professional computing with an MSX system, rather than going out to buy an IBM or an ACT Apricot straight away, is that you can buy various components as you go, spreading the cost. Since computer hardware gets cheaper by the week, this can only be to your advantage.

The other advantage is the amazing things you can do with your MSX machine in the meantime!



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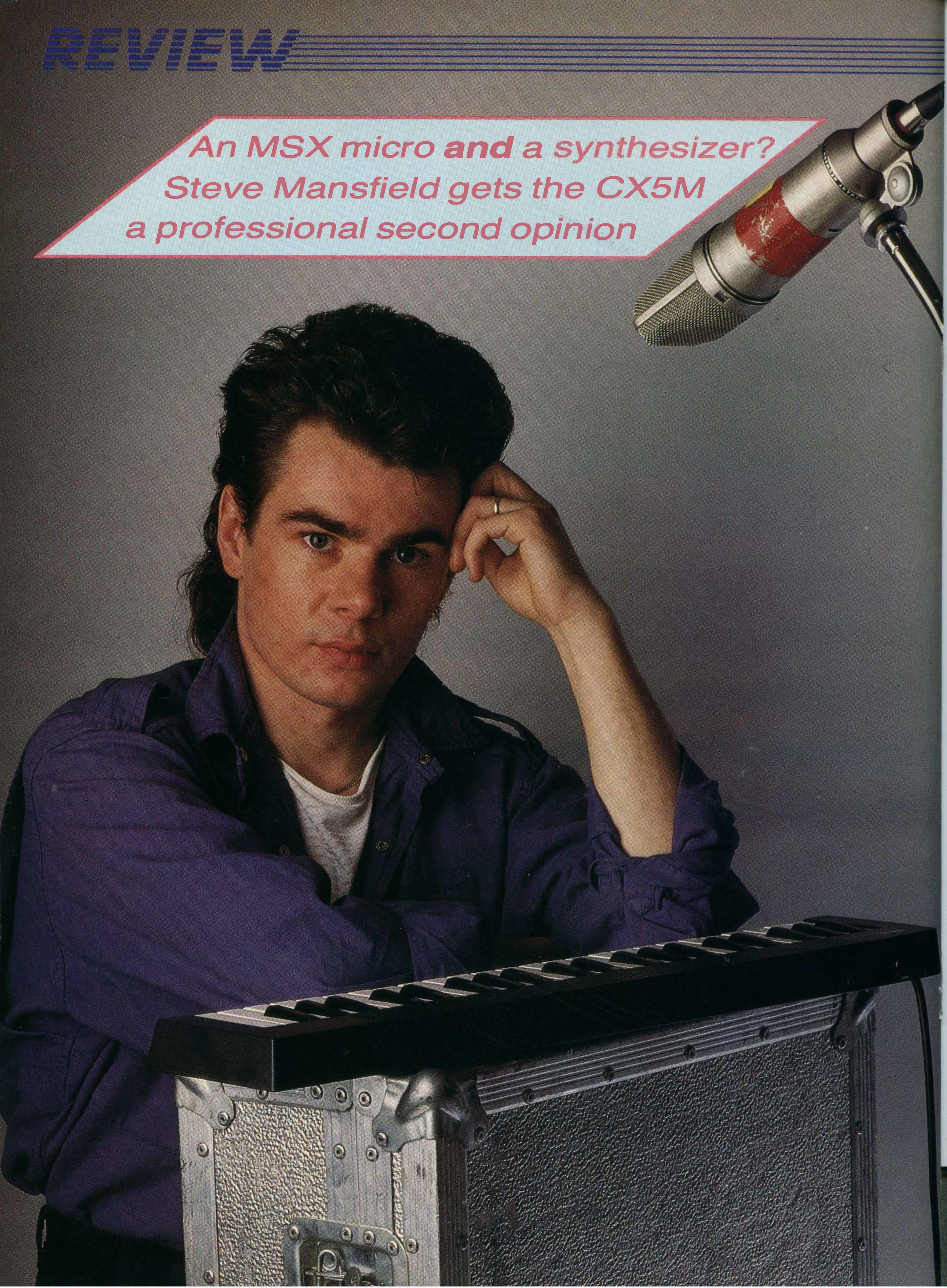
REVIEW

An MSX micro **and** a synthesizer? Steve Mansfield gets the CX5M a professional second opinion



YAMAHA

Nik Kershaw on Yamaha

It was just another day in the recording studio. Banks of lights and LED digits glowed in the shadows cast by the subdued lighting. One side was lined with rows of mixers, tape machines, amplifiers and digital sequencers. On the other side, a 28 grand Fairlight synth. And in the middle, Nik Kershaw sitting at an MSX micro.

Huh? What, you might reasonably ask, is an MSX machine doing in the middle of all that expensive recording hardware? The answer is that we lent the micro to Nik to see what he would make of it.

At first sight, it may seem strange giving a computer to a musician. But not in this case. The micro in question is the Yamaha CX5M, which is being sold as a synthesizer.

When I went to see him, Nik was busy recording his new album, *The Riddle*, which should be in the shops by the time you read this. Soon he starts on his sold-out UK tour, and after that he's off around the world. Like I said, a busy man. But he had time to go through the manuals and put the gear through its paces — including the FM Voicing, DX7 Voicing and Music Composer programs, and the small YK-01 keyboard. So what did he think?

'For 600 quid it's amazing. I would probably buy one, because I don't think it's too complex — it's a very basic computer once you get into it. It'll obviously be a lot better once they get disc drives, because that means you can use it on stage a lot easier as well.'

Fairlights are more commonly used for this sort of work. These are computerised

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synthesizers which, apart from being able to create any sound you want, can also sample. This means that you can give a Fairlight a sound (by microphone or tape) which the machine will digitize. You can then play the sound.

'You could use the Yamaha live the same way you use a Fairlight — as a sequencer. I don't see why you can't use it this way, as long as it doesn't throw wobblies all over the place. That's the basic problem. On stage you're looking for reliability. Even if you're using a Fairlight, which costs around 28 grand, it can decide not to work some nights. That's why we use tapes — we put the Fairlight sequence on tape and use two tape machines running together. It's either that or have two Fairlights!

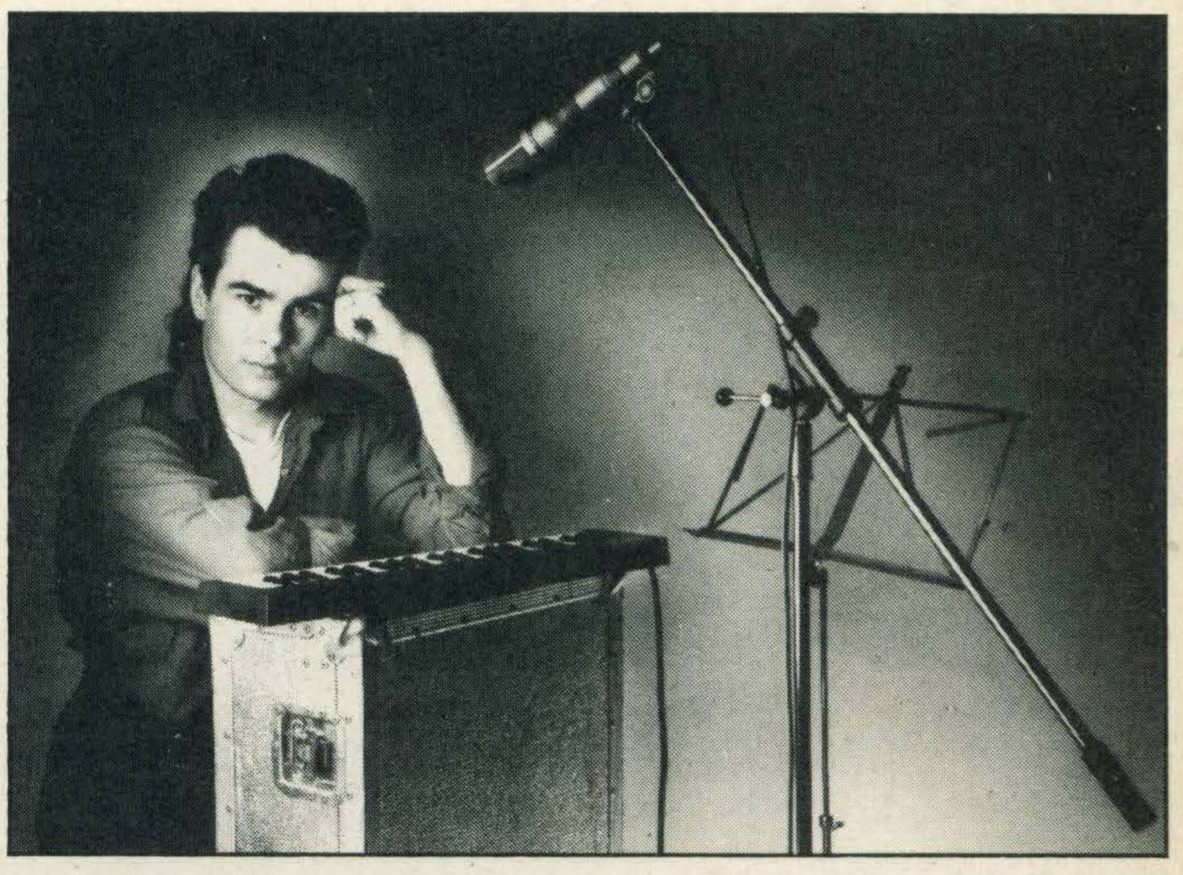
'The Yamaha's the sort of thing you can just take up to a hotel room on tour and mess about with, where you can't lug about tons of Fairlight gear. At first sight, it seems to verge on a home keyboard with a rhythm box, rather than a professional synthesiser. But it can certainly be used professionally.'

'Trial and error is actually the best way of working out a lot of the features'

Nik seemed to have mastered the Yamaha very quickly, so I was interested to find out if he was already a computer enthusiast.

'I haven't really delved into it much yet. My first insight into it was in the music sense — Fairlights and that sort of thing. But I'm interested in any sort of gadget.

'I mean, we talk about computers — in this studio we're surrounded by them. I don't claim to know how any of them work, but I know how they affect me and how they make my life a lot easier.



'It's good that you can use the Yamaha as a normal computer. If all else fails you can do your accounts on it.'

But how easy to use are these computerised systems? After all, Nik is a musician, not a programmer.

'It takes a lot of work. When the Roland MC-4 keyboard controller came out a lot of people bought them, then sold them again because they couldn't get to grips with it. But we've actually used one a lot on this album because the guy who's using it sat down for a couple of weeks and studied the thing.'

Nik's fairly familiar with the Yamaha system, already having a DX7 synthesizer. This sophisticated keyboard can be connected to the CX5M via the MIDI system, and programs are available to control it. But Nik was pleasantly surprised by the sound of the CX5M on its own.

'The voices should be the same as the DX7, as it's the same FM system, but somehow they sound better. The small keyboard is fine for messing about and also for composing. You only really need the bigger keyboard for playing live.

'Sampling is something I'd like to see on it, but you won't get that for 600 quid, although sampling machines are coming down in price.

'The computer is a help with the DX7, because the DX7's keyboard's only got a small read out with one number, and you can't really see how that affects everything else. The most difficult thing to get to grips with on the DX7 is the envelope generator which seems to work backwards.

'So having everything on the screen is great — very useful. For that alone it's probably worth the 600 quid.

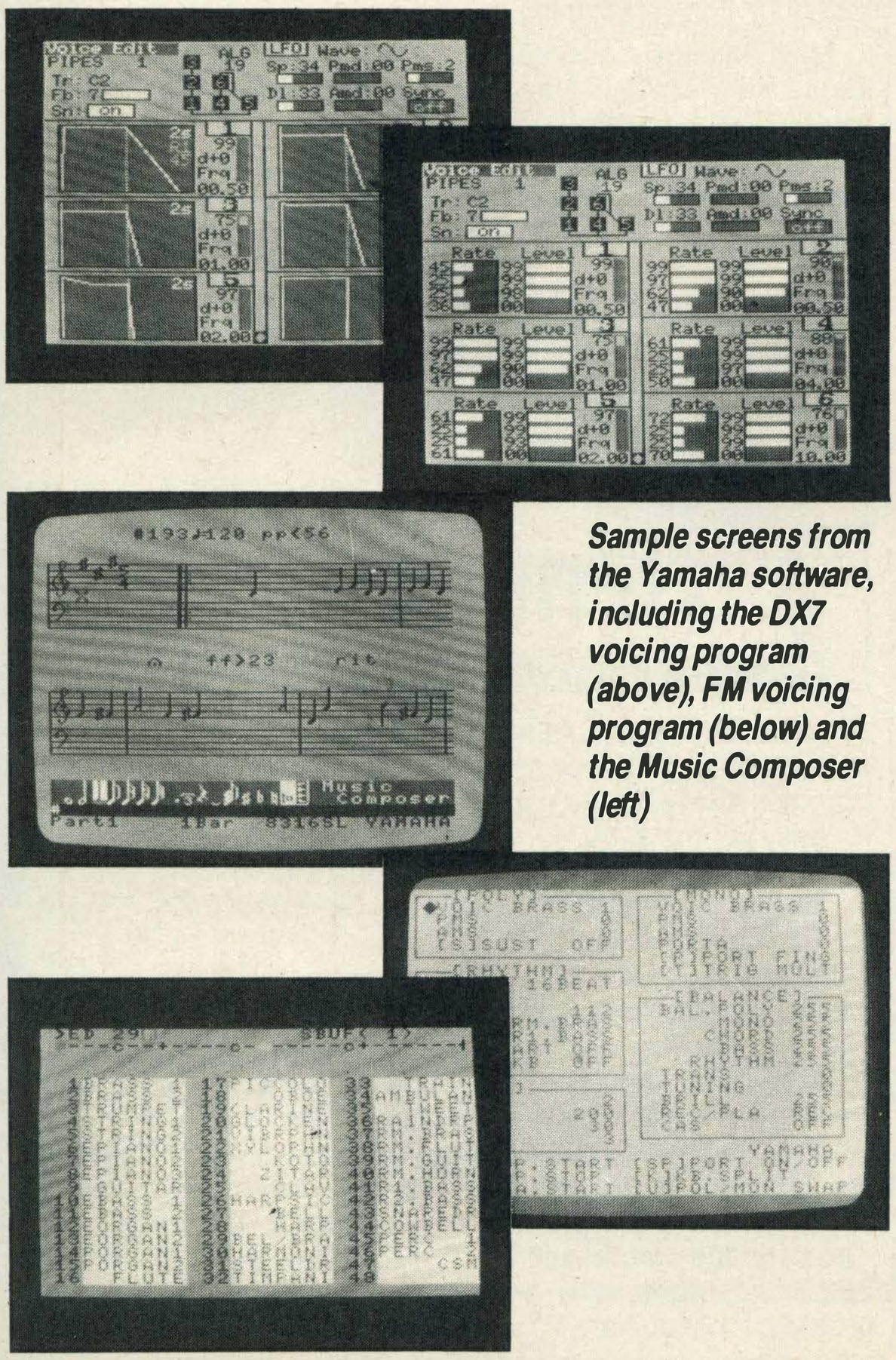
'We've used the DX7 quite a lot on this album, mainly because I've got one and I wrote a lot with it. And also I've programmed a lot of sounds into it, so when we came into the studio we didn't have to search for a sound every time we wanted something different.

'Having everything on the screen is great. For that alone it's probably worth the 600 quid'

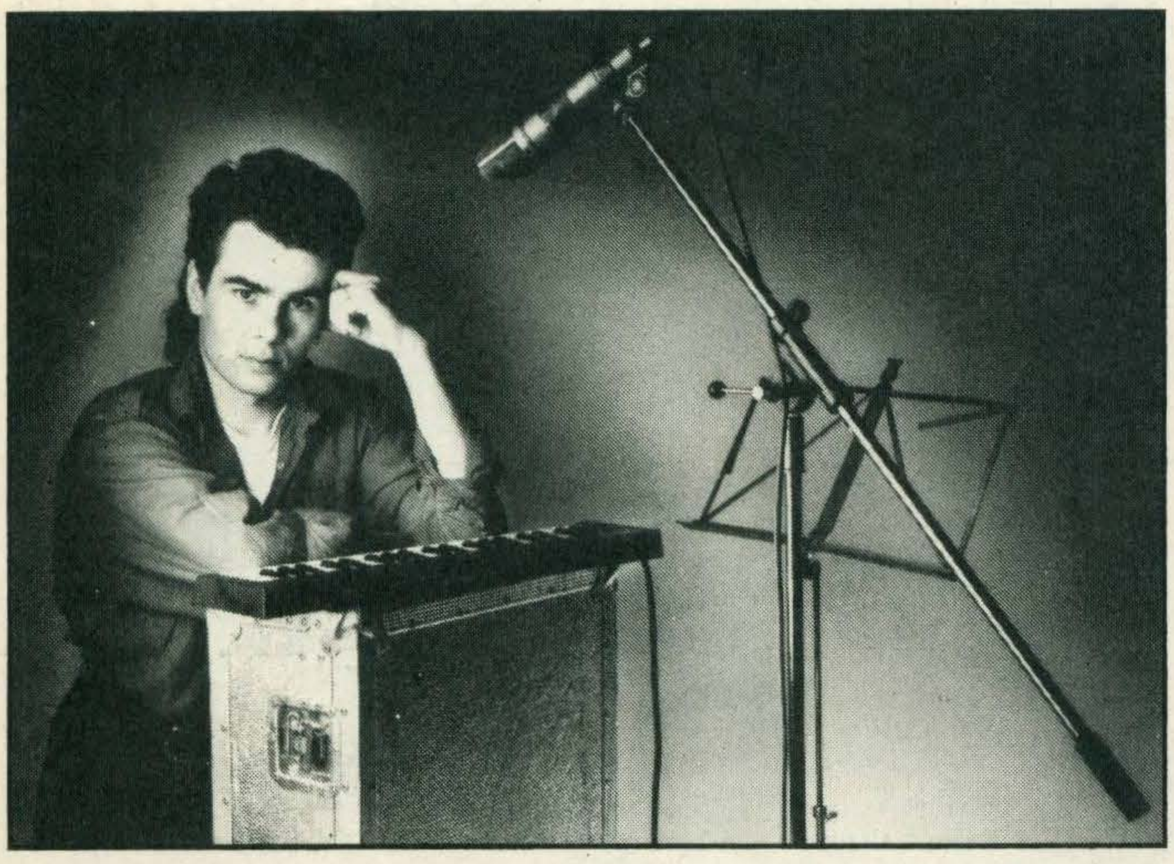
'The biggest bonus with the CX5M is having the sequencer — the Music Composer — in a small, neat package.

'Mind you, there does seem to be a couple of problems with the software. With the Music Composer, for example, it doesn't look like you can edit dynamics into it too easily. You have to be sure what you want to do, otherwise it throws a wobbly.

'Trial and error is actually the best way of working out a lot of the features. Basically, once you've found out which button does what, it's then a matter of finding out how you



Sample screens from the Yamaha software, including the DX7 voicing program (above), FM voicing program (below) and the Music Composer (left)



can use it.

'That's why I said that about the editing and dynamics — like changing the tempo after you've written a piece — there probably are ways of doing it, but I just haven't sussed it out.

'The first thing Yamaha needs is a new instruction manual. There's a lot that's wrong in the present one — it says this does that when it doesn't — it does something else.

'It's good that you can use the Yamaha as a normal computer. If all else fails you can do your accounts'

'You have to adjust to the way *it* works — you can't dictate to it too much. If it won't do something, it won't do it, and you have to think of another way around it.

'The graphics can be criticised. I think its something to do with the amount they're trying to fit on the screen. If you put a demi-semiquaver on a stave, on that read out you can't really tell what it is.

'But the composing program is useful. Like most of these computer things, once you get to grips with it you can be a total technical idiot, musically, and still get something out of it. But it's a lot easier if they do play, and if you can read music as well.'

To help you develop your music, you can dump your creations to a printer. It's not quite as good as a proper manuscript, but is useful as a permanent record. This type of facility is easy to provide as the machine has all the usual MSX features, like the printer port, for example. The FM synthesizer module simply adds to these features, giving the machine its amazing range of voices.

'As far as controlling the voices is concerned, I have a basic idea of what I'm going for — what's required in a synth sound. I might just want to add some bass or middle to a track, to give it the right feel. But sometimes you come across sounds totally by accident.

'If you find a sound that's nearly suitable you can play around with it, changing the various parameters. And that's a great bonus of the graphs — that you can actually see the envelope change on the screen!

Considering how versatile these synthesizers are, I asked Nik if he ever uses 'real' instruments on his records.

'I'm mainly a guitarist, so if I want a guitar sound I play the guitar: We *always* use real drums. And I use some real percussion and vocals — obviously!

'We've had weeks and weeks of all this technology going on, with synching tracks up to a computer, and all that stuff. But I did a backing track with a couple of other guys recently — the first time I've done that for a few years — and there was none of this worrying about synching things up. We just played it. And I really enjoyed it. It made me think twice about all this technology stuff.'

YAMAHA PRICES

CX5M micro with YKO1 keyboard	**£534**
CX5M micro with YK10 full-size keyboard	**£614**
Program cartridges	**£36**
YK10 full size keyboard	**£165**
VOC-01 4K RAM cartridge	**£65**
CA-01 cartridge adaptor	**£19**

Is it a computer or a keyboard? The Yamaha CX5M has everything that other standard MSX computers have, including 64K of memory, the usual sockets and interfaces, and the familiar MSX-BASIC.

But the first thing you notice is that the power supply unit is external. The space normally taken up by the transformer is already occupied. Screwed on underneath the machine is the FM Digital Synthesizer module which gives the micro its special musical qualities.

The synthesizer module has sockets for a musical keyboard, MIDI and stereo output. The latter gives a signal suitable for feeding into a mixing desk or amplifier.

MIDI (Musical Instrument Digital Interface) is a standard interface in the music business. Its main application here is to link the micro with Yamaha's DX7 and DX9

synthesizers. With suitable software, this gives you the full graphics display of the micro for easy control of the instruments.

Talking of software, Yamaha also produce cartridges, at least one of which is absolutely essential if you're to use the machine as a musical instrument. The FM Voicing Program is the one which allows you to modify the sound output. In this way you can create almost any sound. The cartridge comes with 30-odd sounds already created, most of them emulating other instruments. But any that you create yourself can be saved to tape for later use.

Apart from letting you mess around with signal generators, envelope shapers, filters and the like, the program also has a highly versatile rhythm section, chord controls and a facility to split the keyboard for stereo output.

The DX9 and DX7 voicing programs do similar things when these keyboards are linked via the MIDI to the micro. This makes using these instruments much easier, and Yamaha expect to sell many of the micros to current keyboard owners.

The FM Music Composer ROM is ideal for the bedroom Bach. As you play the notes appear on two sets of staves on the screen. The music can be edited, with time signatures, key signatures, tempo, dynamics and phrasing all controllable. In short, it's the musical version of a word processor.

Other packages include a Music Macro ROM, to give you versatile sound control from BASIC, a 4K data cartridge for instant storing and retrieval of your own voice parameters, and an adaptor to allow you to connect this to the expansion socket.

Finally, the CX5M comes with a choice of musical keyboards. The YKO1 reviewed here is the smaller version, while the YK10 is a full size piano-style version.

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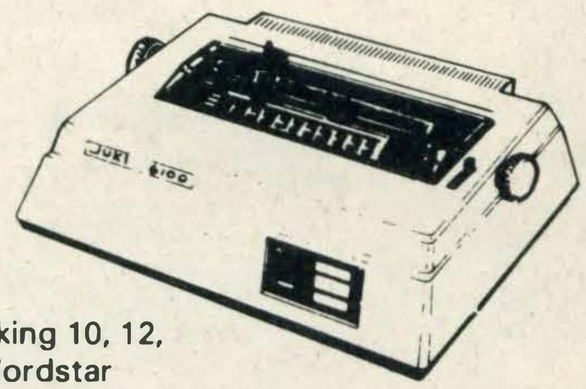

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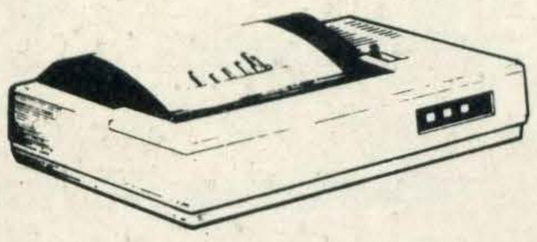

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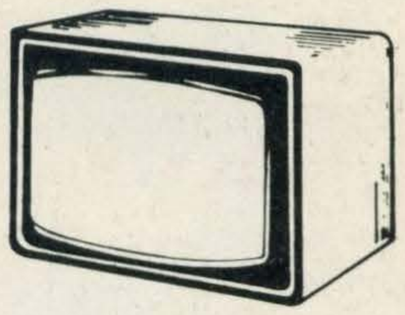

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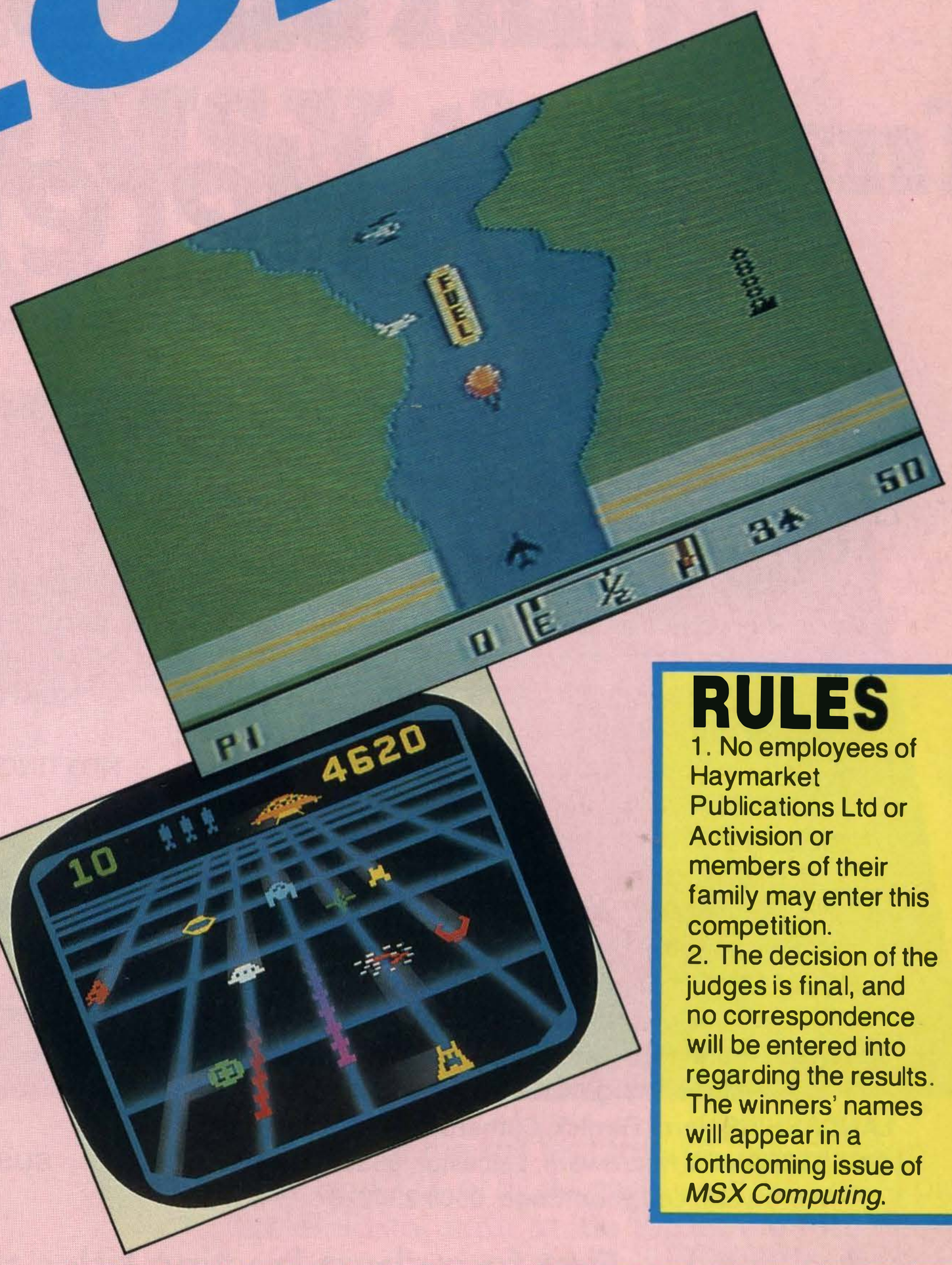

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JUKI 2100/2200
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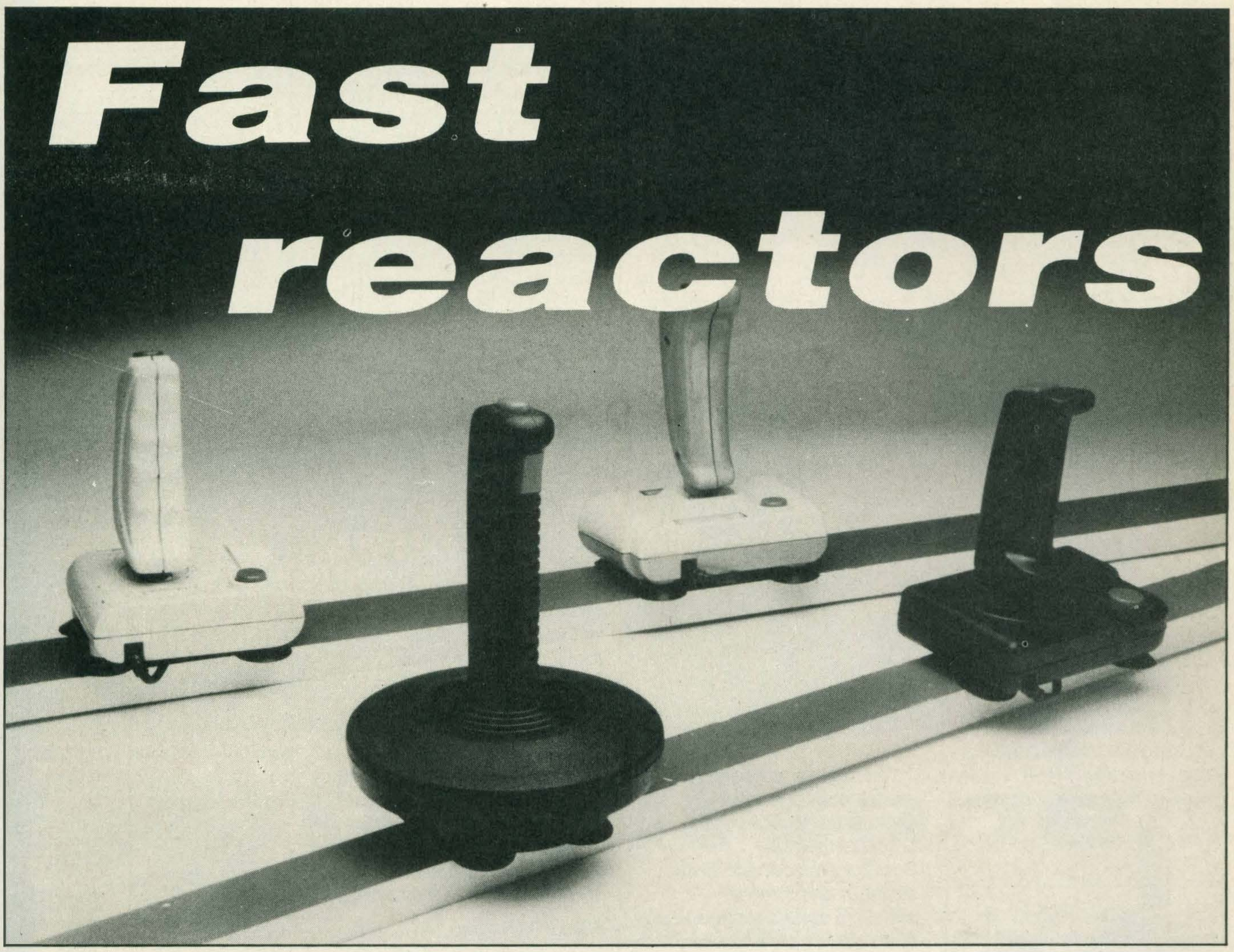
Fast reactors



It's when your fingers permanently twitch and tremble and the computer's cursor keys creak and rattle that you realise the time has come to invest in a joystick.

But which one do you buy? A bewildering variety of weird and wonderful joysticks fill the shops and choosing the right one is a problem.

How anyone with a newly purchased MSX computer, anxious to play all the latest games, knows which one to buy is a mystery.

To help you make the right choice, we've tried to make sense of the numerous joysticks currently available for the MSX machines and by reading our guide you will have a better idea of what you require.

The standard joystick model — the stout column or joystick handle protruding from the squarish base plus the fire buttons — is best typified by the Atari CX-40 at £8 or Consumer Electronics' Starfighter at £11.

Buying a joystick? We find you the right one for your kind of personality

They both respond to the ham-fisted 'zap 'em as quickly as possible game fanatics as well as the more delicate among us.

Most of our joysticks fit into this category, but we were surprised how much their performances varied.

Joysticks are by no means confined to a standard design — imaginations have really run riot on some of them. Trak Balls, Suncom's Joy Sensor with its pressure sensitive pad at £20 and Sanyo's JS-75 remote control joystick at £65 are some of the more unusual models.

Konami has even produced its own version of the joystick for use with the Konami *Hyper Olympics* and other track and field games — the Hypeshot at £16. Instead of the stick which usually has to be rapidly waggled backwards and forwards in running events (very tiring on long distances like the 1500m), Konami has a button.

Another unusual joystick soon to be sold in the UK is the Joycard from Mitsumi. This product is more like a keyboard extension because the stick is replaced with cursor keys.

Price is, as we all know, always important. Piggy banks will remain intact with most joysticks as they are under £20 and priced to suit most peoples' pockets. Luxurious models like the Trak Ball and remote control units cost up to three times more.

But the most important criterion is of course the way you use your joystick.

After weeks of careful observation in amusement arcades, our office and of our computer-obsessed friends, we've compiled a guide to the most common species of games player: the games they like to play; the way they play them and the sort of joystick which would suit them.

A sort of dating agency — we match you with a joystick!

Cool Dude

The dude reclines languidly before the screen sipping a dry martini (shaken not stirred) from one hand and holding the joystick in the other.

He prefers to play serious sophisticated games like *Cribbage, Bridge, Chess* and perhaps a spot of flight

simulation or *Hyper Olympics* — when he's in the mood.

Joysticks would have to match his living room decor, lifestyle and be suitably sleek and elegant, and preferably stripped down and waxed.

The Toshiba HX-J400 and the Canon VJ-200, at £13 and £15 respectively, would be ideal. Their smoothly designed handles would fit snugly into his unsweaty palm and the ball and socket joint on each one would give flexible stick movement for the gamesman who doesn't like to try . . . too hard!

The blue and orange firing buttons would make a change from the boring old red colour (though orange might just clash with his stripey pink tie).

Other elegant joysticks include Consumer's Joy Sensor, the Atari's Super Controller at £10 and Voltmace's Delta 3Sc at £10. The only problem is that, with the former joystick, the cool dude may have to concentrate very hard on pressing the right place — forcing him to abandon his martini cocktail.

Desperado

Spent all of his formative years in arcades, zapping the alien hordes on *Space Invader* machines.

His eyes are tinged with red because of staring at monitors for days on end and his conversation, if any, revolves around his latest very, very high scores as well as strategies for gaining more.

Only *Space Invaders* or possibly *Super Cobra* by Konami will do for him. As quick responses, total concentration and superb hand to eye co-ordination are needed in these games only the most responsive joysticks will do.

He usually hunches over the desk to get as near the screen as possible, so the desk top joysticks will be needed.

Dean Electronic's Superchamp at £13 would be the best. Its huge, heavy round base and powerful sucker feet remain stuck to the desk no matter how much it is pushed and pulled during play.

The handle is ridged and even the most slippery, sweaty palm would find it difficult to slip off. Superchamp combines its strength and size with sensitive control response and although the stick is a little stiff it works.

The Lightning de luxe at £7.50 from Lightning unfortunately lost its bounce and started to click after four hours of fairly vigorous play. More suited to the gentle player who requires a handle to grip because it does have a nicely shaped stick. Spectravideo's Quickshot 1 at £13.50 and Vulcan's Gunshot at £10 would also please the Desperado. Hand moulded sticks give plenty of grip and the well positioned fire buttons and sucker feet make them ideal for the desperado's games style.

Clubber

We're all familiar with these computer buffs. They all have the thin under fed look caused by too many snack meals taken fleetingly during hands-on sessions or eaten while dismantling and reconfiguring their latest hardware acquisition.

He loves playing any type of game, but only to find out how they work. He has the same attitude towards his joystick — the more unusual the better.

The huge rolling ball in the Trak Ball which replaces the conventional stick, fascinates him (unfortunately we weren't able to look at an MSX compatible Trackball ourselves). Suncom's Joy Sensor holds him captivated, but Sony's JS75 remote control unit will occupy him for days when it eventually arrives in the UK.

The retractable cord in the Superchamp from Dean Electronics particularly amuses computer clubbers partly because it won't go back in unless you coax it properly!

Kempston's Competition Pro 3000 at £12.75 is ideal. It has three fire buttons, although the top ones are sometimes not quite so responsive as the base button.

The stick is very responsive and is narrow enough for even the smallest hand to play with.

Kempston's newest model, the Junior Pro at £6, Vulcan's Gunshot and Voltmace's Delta 3Sc are also all lightweight and easily held in the hand.

Fast Mover

A violent swaying to and fro characterises the fast mover. No game can be enjoyed unless he or she feels they are actually part of the action.

Fast action games such as Konami's Super Cobra or Time Pilot inspire their sense of rhythm.

A strong joystick would be best so that the handle can be manoeuvred violently. Of the desk top controllers, Lightning's Lightning De luxe, Spectravideo's Quickshot and the Kempston Competition Pro 5000 at £3.50 will do.

Of the lighter models Atari's CX-40, Kempston's 3000, the Toshiba HX-J400 and Canon's VJ-200 would give enough leverage for the Fast Mover to sway to his or her heart's content.

Mr Resigned

Occasionally visits his computer fanatic friends and steels himself for an evening playing 'silly, boring, can't see the point' computer games. It all seems a bit daft, but an interesting selection of joysticks might capture his interest.

Voltmace's Delta 3Sc, Suncom's Joy Sensor, Sony's JS-75 remote control and Kempston's 5000 with its odd-looking bulbous handle and two outsize firing buttons on the base may amuse him and help to make the game more enjoyable.

Mrs Precise

No sweat beads her brow, no hair is out of place, and no sighs or shouts of elation escape her — even when she's just completed the Penguin's trail around the Antarctic 20 times at one sitting.

It will have to have both a responsive stick and very accurate firing buttons; she won't waste her time on a joystick that doesn't work properly.

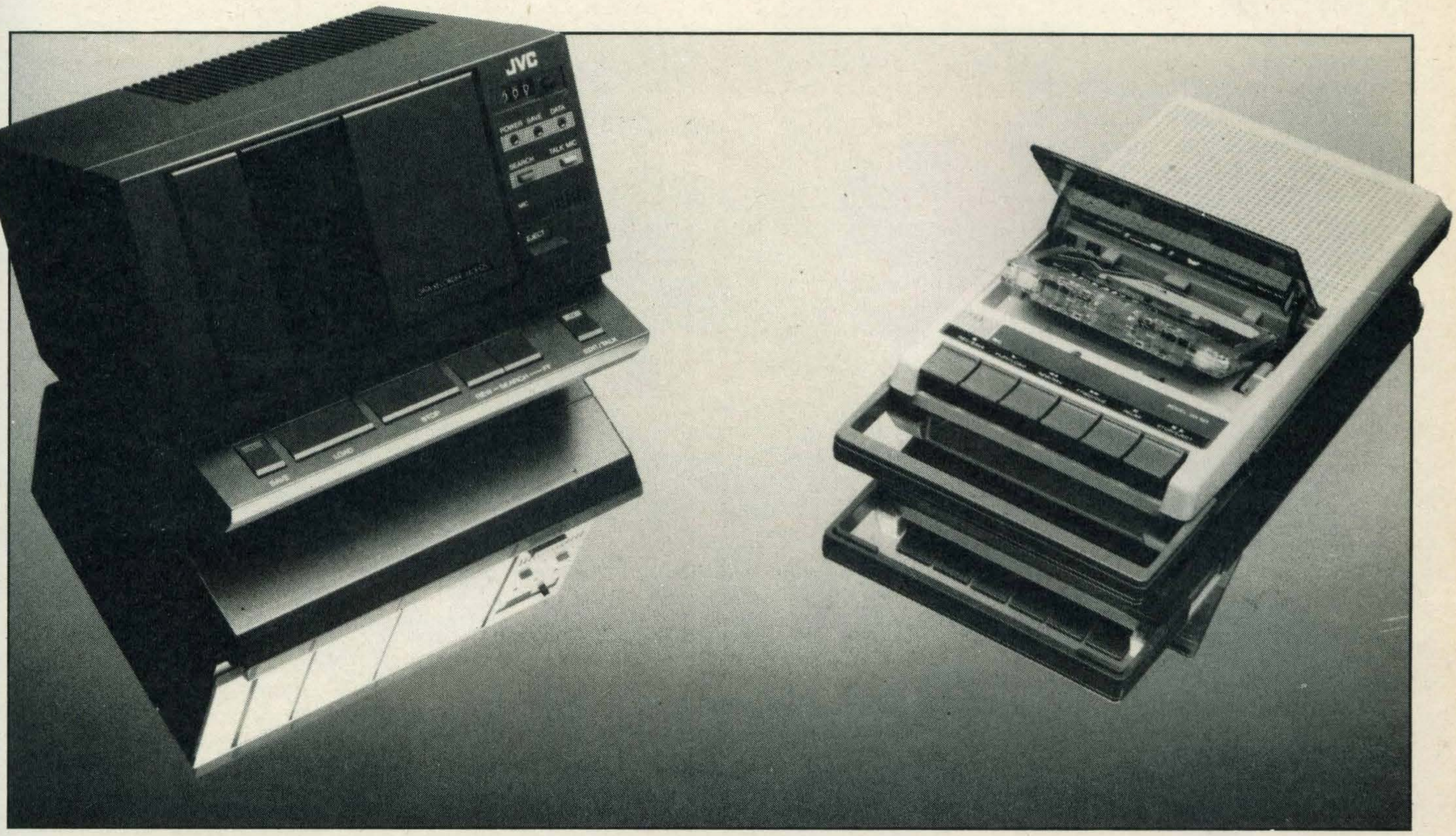
Toshiba's HX-J400, Canon's VJ 200, Atari's CX-40 and CX-24 Super Controller,

Voltmace's Delta 3Sc and Kempston's 3000 will all do very nicely. The Superchamp from Dean Electronics would be alright except that it has rather a stiff stick and might be a mite too heavy.

Once you've fitted yourself into the right species category and discovered whether you're the heavy handed Desperado or the delicate Mrs Precise — count your money, go into your local joystick shop, select a few you like and play with them all.

Even the most tolerant salesman's patience will wear thin, but persevere, because you are the one who'll be spending the time using it.

The wrong joystick could leave you with aching arms, knotted fingers and talon-shaped hands.



Getting it taped

A dedicated data recorder is a useful add-on for your MSX system. But how much need you pay?

Okay, now that you've spent over 14 hours writing a really brilliant program, what are you going to store it on?

Well, the answer in most cases is a cassette recorder of some description. This is simply because, apart from data cartridges, (which can be expensive) they are the only cheap, readily accessible means of storing your MSX programs.

The good news is that you don't need to lavish hundreds of pounds on a really sophisticated piece of equipment. Virtually any ordinary cassette player will do the job and not put too much strain on your flexible friend!

But if you're after quality and durability then it's worth seriously thinking about buying a data recorder, which is a cassette recorder specifically designed for use with your computer.

Although you can save a lot of money by using an 'el cheapo' recorder, in the initial stages you may well find one or two difficulties.

The main one is that cassette recorders aren't really designed for use with computers. You may find that in some cases the cassette player has to be altered before you can do anything with it. Computers can be very temperamental about sound quality and will quite adamantly refuse to accept a program unless the tone and pitch are just right.

But, don't be alarmed! We are not recommending for one minute that you raid the toolshed and dig out a soldering iron. However, you may have to adjust the volume control on the cassette player.

Deciding whether or not to buy a data recorder instead of using an existing cassette recorder really depends on exactly what you intend doing with your MSX micro.

If it's only going to be used for loading and playing commercially available games, a cassette player should be fine. But if you're a keen hacker and intend writing a lot of your own software a data recorder is a must.

Computer and hi-fi dealers stock an abundance of computer equipment, peripherals and all sorts of paraphernalia, and may well try and stitch you up with the latest technological marvel.

So, having decided that you are going to buy one, how do you go about making the right choice and just what should you look out for?

Your cassette or data recorder should have a tape counter. These can be found on ordinary cassette recorders, and will enable you to quickly search forwards or backwards for the program that you require.

This will save you a lot of time, as trying to guess the position on the tape simply by looking at it is a very hit or miss affair, and more often than not it just won't work.

Apart from a counter the next item should be a tone control, as well as the normal volume one.

As the ability of any cassette or data recorder to work properly with a micro depends on the quality of the signal that it's sending out, you'll need to be able to adjust that signal as finely as you possible can. Volume adjustment alone isn't always sufficient and may not allow

you to load some of your programs.

After that, providing you've got the rudiments of play, record, fast forward, and fast rewind there isn't too much else to look for in a data recorder.

If you haven't got a tape counter, a monitor switch is equally useful but these can only be found on dedicated data recorders. This switch allows you to actually listen to the programs on the tape as you are doing a fast forward/rewind, and means you can gauge roughly where one program ends and another one begins.

You'll soon get to know what the beginning of a program — the leader — sounds like. It bears an uncanny resemblance to a really high pitched squawking bird!

To see exactly what kind of facilities you can get for your hard-earned pennies, we laid our sweaty hands on a couple of models from both ends of the price scale.

At the top end is JVC's 'accurate, adaptable and affordable' data recorder, priced at a very modest £89! It certainly looks very sleek and attractive in a very subtle charcoal grey colour.

Coming in at the slightly more modest £29.99 level is Sanyo's dedicated data recorder, the DR101.

Taking the JVC first, the recorder itself is electronically controlled by light-touch controls or can be remotely controlled from your MSX micro.

There is also a phase changeover switch on the right hand side of the data recorder. This means that software written by a friend and saved to cassette on another cassette recorder can be loaded into your own system without any hitches.

On the front is an Edit/Talk switch and a Talk Microphone switch. The first lets you create no-signal blanks between programs you're going to save, to facilitate program search.

When it is operated together with the microphone switch, you can add comments ('voice-filing') to each program through the built in microphone. The switch can also override commands from your computer.

Although we were very impressed with JVC's offering we felt that the price was a little steep. But according to Steve Michaelis, JVC's assistant marketing manager, it is the 'ultimate data recorder for the ultimate price'. And he reckons that most buyers will be orientated towards the hi-fi and video market, and that 'for a high quality deck in hi-fi terms it's not expensive'.

We must admit the quality and the performance of the HC-R105 was impressive. And what was even more impressive is that if you so desire you can even play ordinary music cassettes on it.

Sanyo's data recorder looks very much like an ordinary cassette player.

The phase (PH) button can be located on the right hand side of the machine. It's particularly useful when loading a cassette that has been saved on another machine, because if any errors occur or the program cannot be found, just simply flick a switch and it will accept the data.

If you're after something a little more sophisticated then according to Peter Mitchell-Jubb, Sanyo's UK engineering and customer support manager, the DR202 model for £59 is right up your street and includes an automatic data search.

The DR101 can also double up as an ordinary cassette player and gives reasonable sound quality, but in mono of course. The biggest difference between JVC's and Sanyo's machines is — yes, you guessed it — price. If money is no object and you like the idea of having a data recorder that looks as though it belongs to part of a Bang and Olufsen hi-fi, then this is the machine for you.

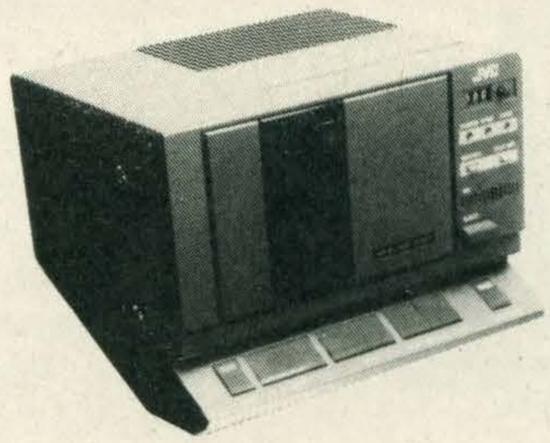
In terms of design its light touch controls are an absolute boon to anyone with long fingernails!

As regards quality and performance, there is really very little to choose between the two. Both load very rapidly, are lightweight, sturdy and neither gave us any problems loading a variety of cassettes.

For most of us, money is the limiting factor when buying a computer and the necessary peripherals. That £89 does fall out of the reach of most of our pockets. There's really little point in forking out a large sum of money when a no-frills data recorder for half the price is probably just as reliable, and serves the same purpose.

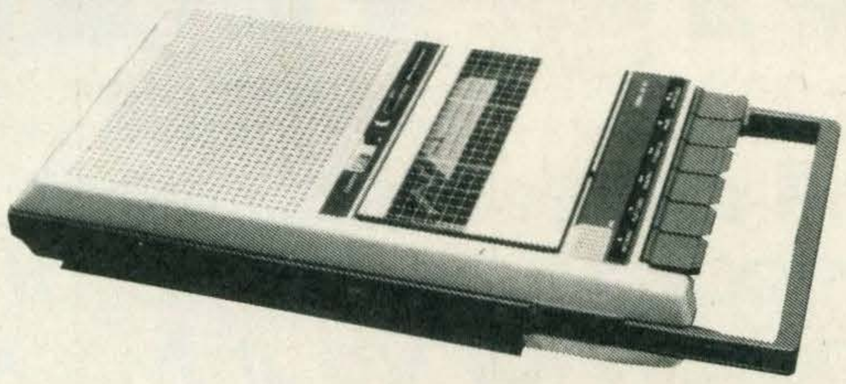
Finally, don't spoil the ship for a ha'porth of tar! In other words, use decent cassettes. Go for a well known make — that little bit of extra expense is well worth it if you want a trouble free life with your computer.

JVC HC-R105



Track system	2-track
Rec/Play head	Metaperm head
Recording system	ALC (Automatic Level Control)
Talk microphone	Electret condenser
Speaker	65mm
Mechanism	Full logic control mechanism
Motor	Electronic controlled DC motor
Tape speed	4.75cm/sec
Fast forward/Rewind time	Approx 110 sec (with C-60 cassette)
Input jack	3.5mm
Output jack	3.5mm
Remote control jack	2.5mm
LED indicators	3 (Power, Save and Data)
Dimensions (W×H×D)	190×150×200mm
Weight	2.0Kg

SANYO DR101



Track system	2-track
Rec/Play head	RP head
Recording system	ALC (Automatic Level Control)
Talk microphone	Electret condenser
Speaker	55mm (approx)
Mechanism	Mechanical
Motor	Electronic controlled DC motor
Tape speed	4.75cm/sec
Fast forward/Rewind time	Approx 120 sec (with C-60 cassette)
Input jack	3.5mm
Output jack	3.5mm
Remote control jack	2.5mm
LED indicators	2 (Load and Save)
Dimensions (W×H×D)	142×50.5×269mm
Weight	1.1Kg

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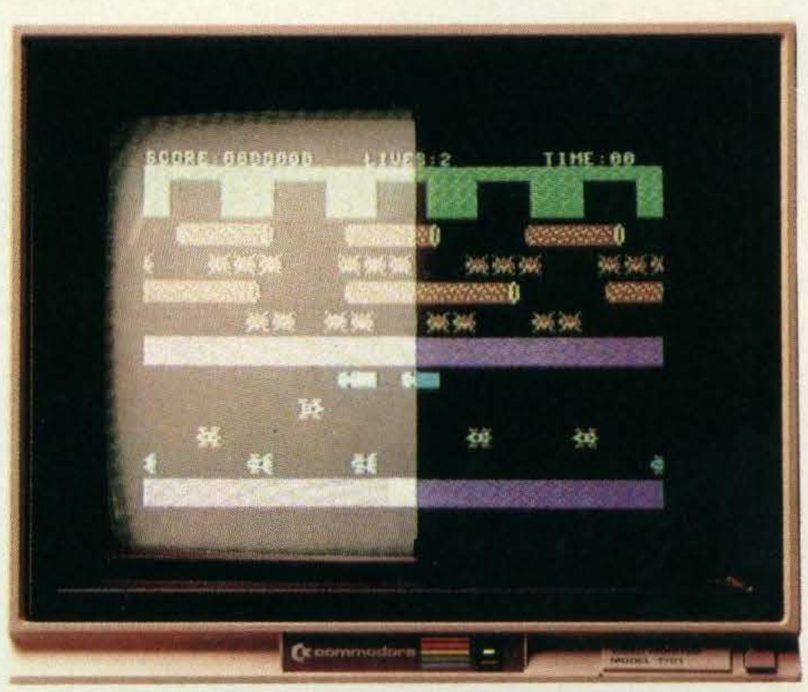

ROAD FROG by courtesy of Ocean Software. MTA 4628

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The new Mitsubis

For those in the know

Anyone conversant with home computers will know precisely why MSX was worth waiting for.

The sheer proliferation of computer and software systems flooding the market loudly underlined the need for a unified standard.

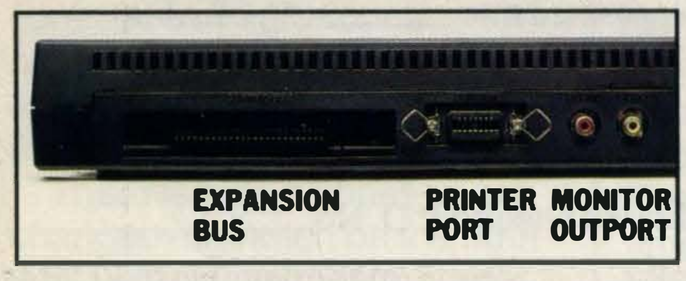
So the major companies jointly developed a single computer and software system. The result – MSX – the format that will be standard for all time.

And those in the know will not be surprised that Mitsubishi are in the vanguard of the MSX movement. For, with the F-series, Mitsubishi offers everything that MSX is and more.

GRAPHICS

Maximum resolution of 256 x 192 pixels with all 16 colours available on the screen at the same time. 32 sprites in two sizes and two magnifications allowing easy creation of '3D' graphics. 255 pre-defined characters all of which can be used as straight text or easily mixed with graphics.

JOYSTICK AND CASSETTE PORTS



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SOUND

Three independent channels which can be output through the TV loudspeakers at any volume, individually or simultaneously, at any of the available 8 octaves. All three channels can use the 'noise' generator for stunning sound effects.

KEYBOARD

73 moving keys, ergonomically designed for many hours of fatigue free use. Large cursor control keys which are excellent for both programme editing and game playing. 5 function keys giving 10 pre-defined functions which can easily be redefined from 'BASIC' using the 'KEY' command.

BASIC

MSX BASIC is possibly the most comprehensive version of the original language. There is a complete set of commands for creating graphics and sounds, manipulating text and moving sprites. In addition to this there are 'built-in' interrupt routines for detecting sprite collisions, function key selections and joy-stick fire buttons.

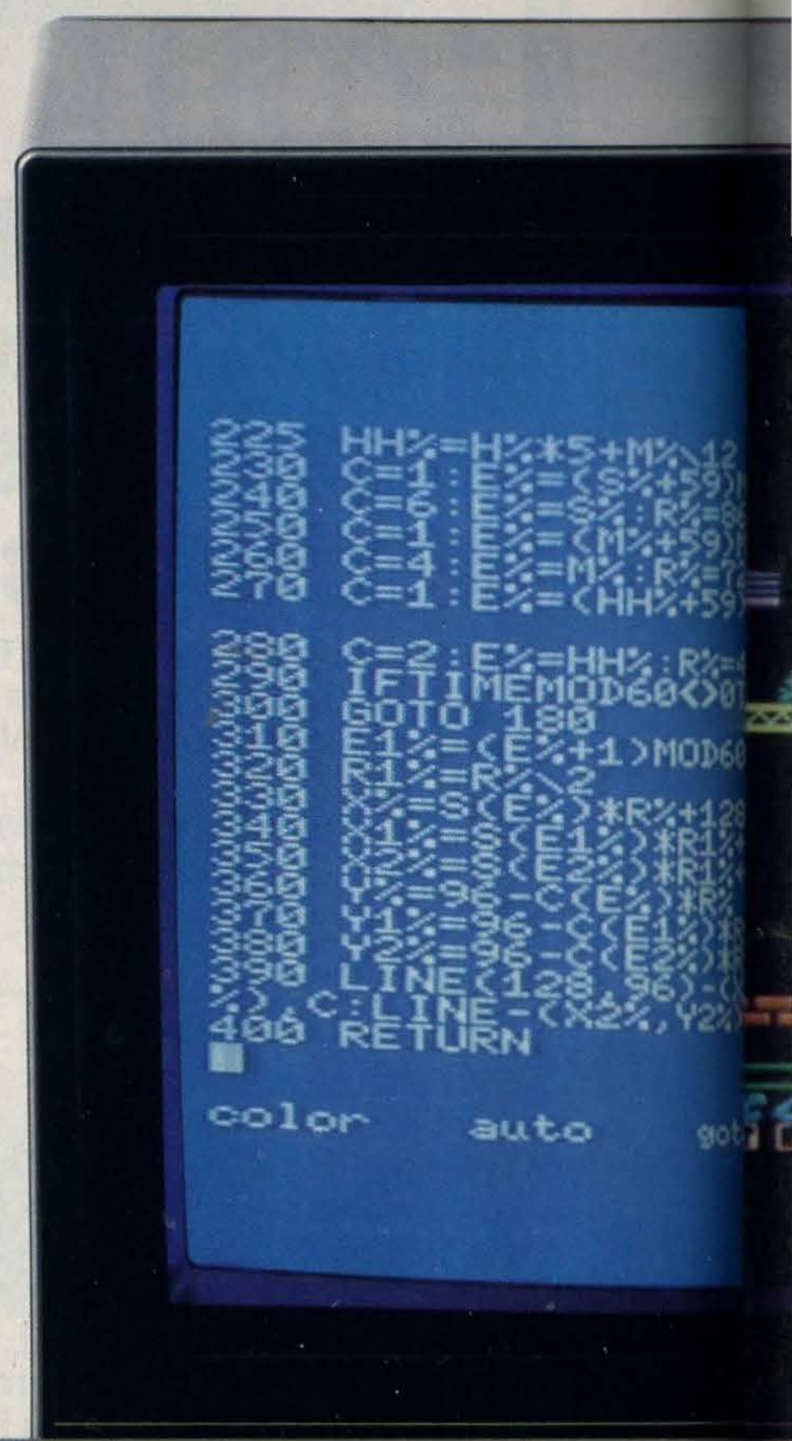
EXPANSION

The Mitsubishi 64k ML-F80 and 32k ML-F48 are both equipped with 2 cartridge ports, 2 joy-stick ports and a centronics compatible parallel interface. It is through these devices that the MSX system can be expanded for use with disc-drives, printers, serial interfaces, modems and other peripherals.

SOFTWARE ON CASSETTE

The MSX system can load and save data onto cassette at 1200 or 2400 baud and unlike certain other home computers, the Mitsubishi F-series can be used with a normal domestic tape recorder for this purpose.

When you put all of these features together, with the knowledge that Mitsubishi is the largest manufacturer of Mainframe computers in Japan, those in the know will immediately recognise the true potential of the Mitsubishi F-series.



i MSX Computers

For those who aren't

The Mitsubishi MSX family computer is everything you wanted to know about computers, but didn't know who to ask.

It's friendly, it's fun and so simple, a grown man can use it. Yet so versatile even his computer-versed children would be hard-stretched to over-tax it.

It operates with any colour TV set. Just plug it in, and the full power of the computer is instantly at your fingertips.

FOR FATHER

The Mitsubishi MSX can do many things, from keeping a simple check on the bank balance to running a complete business with customer account files, stock control programmes and word processing. It is just as much at home keeping control of your record or stamp collection or playing 'strategy' games such as chess, othello or contract bridge.

FOR MOTHER

There is the opportunity to store recipes and other household information or keeping record of the children's progress at school. Household accounts can also be recorded so that savings can be planned for holidays and other seasonal expenses.

FOR THE CHILDREN

There is education, particularly computer education. In a world where computer literacy is now of foremost importance, MSX offers a broad base of educational software. With simple programmes for the very young through to complex programmes for older students like language learning.

Also, the graphics system of the Mitsubishi computer ensures that the MSX versions of your favourite games are reproduced with incredible speed and accuracy.

Undoubtedly, MSX is the format for the future, and will become the byword for computer education and entertainment.

And you can be secure in the knowledge that regardless of future developments, any investments made in MSX hardware, software and peripherals today will always be compatable with the Mitsubishi F-series.

So if you've waited until now to buy a computer, you couldn't have timed it more perfectly. Get to know one today.

MITSUBISHI COMPUTERS

Mitsubishi Electric (UK) Ltd., Hertford Place, Denham Way, Rickmansworth, Herts WD3 2BJ. Tel: 0923 770000.

SPECIFICATIONS

CPU:
Z80A (3.6 MHz)
Memory:
ROM: 32 KB
RAM: 64 KB (F80)
RAM: 32 KB (F48)
Video Ram: 16 KB
Screen Displays:
*Text Mode:
40 columns x24 lines
*Graphics:
256 x 192 pixels
Colours: 16 (15+transparent)
Sprites: 32
Output: RF, Composite Video
Keyboard:
73 moving-key keyboard
5 function keys
Cursor control keys
Special keys for screen editing
Sound:
8 octaves
3 channels for sound or 'noise'
Output by TV sound or External Audio Amplifier
Cassette Interface:
1200-2400 baud
Motor controlled by CPU
Parallel Interface:
Centronics
Joy-Stick:
2 x 9 pin connectors
Rom-Cartridge:
2 x 50 pin connector

*Subject to Scan of Monitor

ML-F80

ML-F48

MSX

MSX

SOFTWARE

WORDMATE — **£24.95**
A comprehensive menu-driven word processor. Includes full justification, selective wordwrap, full printer controls, search and replace, full tape file handling including append. On-screen HELP facility. Developed specifically to use all the facilities of the MSX system. SAE for full details.

CRIBBAGE — **£6.95**
A superb implementation of this popular card game. Uses MSX graphics to the full, plays a very mean hand!!

MSXMON — **£9.95**
Allows the machine code user to examine and modify memory contents, disassemble, set breakpoints, examine registers, etc. An excellent machine code debug tool.

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Cut price quality

For letter quality type at a dot matrix price our test department takes a look at two new printers

There was a time, not so long ago, when computer owners faced a terrifying decision. When it comes to buying a printer, which is most important — high quality or low price?

Getting the sort of quality you expect from an electric typewriter means going for a daisywheel or equivalent machine. But they tend to be pricey. Dot matrix models are available at very reasonable prices, and offer advantages like graphics facilities. But the quality of the type is thought by many people to be too poor for applications like letters, manuscripts and general business use.

The good news is that this is changing. We've just taken a look at two printers giving letter quality printing at an exceptionally good price.

The Smith Corona L-1000 is a daisy wheel printer costing £299 (+VAT). And from Ibico comes the LTR-1. This has a rather unusual print drum.

mechanism which gives daisy-wheel quality for just £199 (+VAT).

As you might expect, the Ibico is the simpler of the two machines. It has the barest essentials as far as features go. But it does have that rather novel printing system.

All the characters are on a revolving drum, arranged into five rings. The drum spins and shuttles from side to side to bring the correct letter into position. As the drum rotates it rubs against an inked roller, transferring the ink onto the raised letters.

Once the letter is in position, a small plate pushes the paper onto the drum. Talk about bringing the mountain to Mohammed!

There are a few advantages to this method. For a start, it would seem to be a fairly inexpensive way of doing things. And there's no expensive ribbon to buy — you can just re-ink the roller. Printing speed is 12 characters per second, which is about normal.

The system is also remarkably small, making for a compact, slimline printer. Mind you, this has its drawbacks too. The maximum paper width is A4 giving a total of 80 columns. It's friction feed only, and there's no provision for perforation skip from software or hardware.

Control codes can be sent from within software to give various combinations of line feeds, carriage returns, tab settings, line spacing and so on. Apart from that there's little in the way of controls. Line feed and form feed buttons are conspicuous by their absence.

Unlike a proper daisywheel printer you can't change the character set. But the Elite font supplied is attractive, and the print quality is very neat — certainly up to daisywheel standards.

Parallel and serial interface versions of the LTR-1 are available, although all of the MSX machines announced so far only have parallel ports.

If you want a printer for general heavy use, then you'd be better off with a low-cost dot matrix version. This is particularly true for listings as the 96 character set of the Ibico does not include some of the special symbols used in computer programming.

On the other hand, if you need a printer to produce

good looking letters or documents, then the Ibico could be useful, especially at such a low price.

The Smith Corona L-1000 is a different proposition altogether. This is very much a traditional daisywheel printer. As a result, it's four times the size of the Ibico, twice as noisy, and a hundred quid more expensive.

For all that you might expect a few more features. Fortunately the L-1000 lives up to most expectations.

For a start, the machine uses a conventional daisywheel. That means you get a choice of different typefaces.

The quality of the type is very good. A cartridge film ribbon is used which gives very clean-edged characters and is simple to replace — you don't end up with inky fingers and smudged paper.

Versatile

The character spacing is easy to control. A rocker switch on the front allows you to select between 10, 12 and 15 characters per inch. The middle one was the most readable, while 15cpi was somewhat cramped with the typeface we had.

Two more switches on the top plate let you set top of form (important when feeding in several sheets), and also give line and form feeds. These can also be done from software with the appropriate escape codes.

Holding down the line feed button when you first switch on the power engages the self-test. The print head goes through various physical jerks — including wheel spinning and ribbon lifting — and then prints out ten lines of characters.

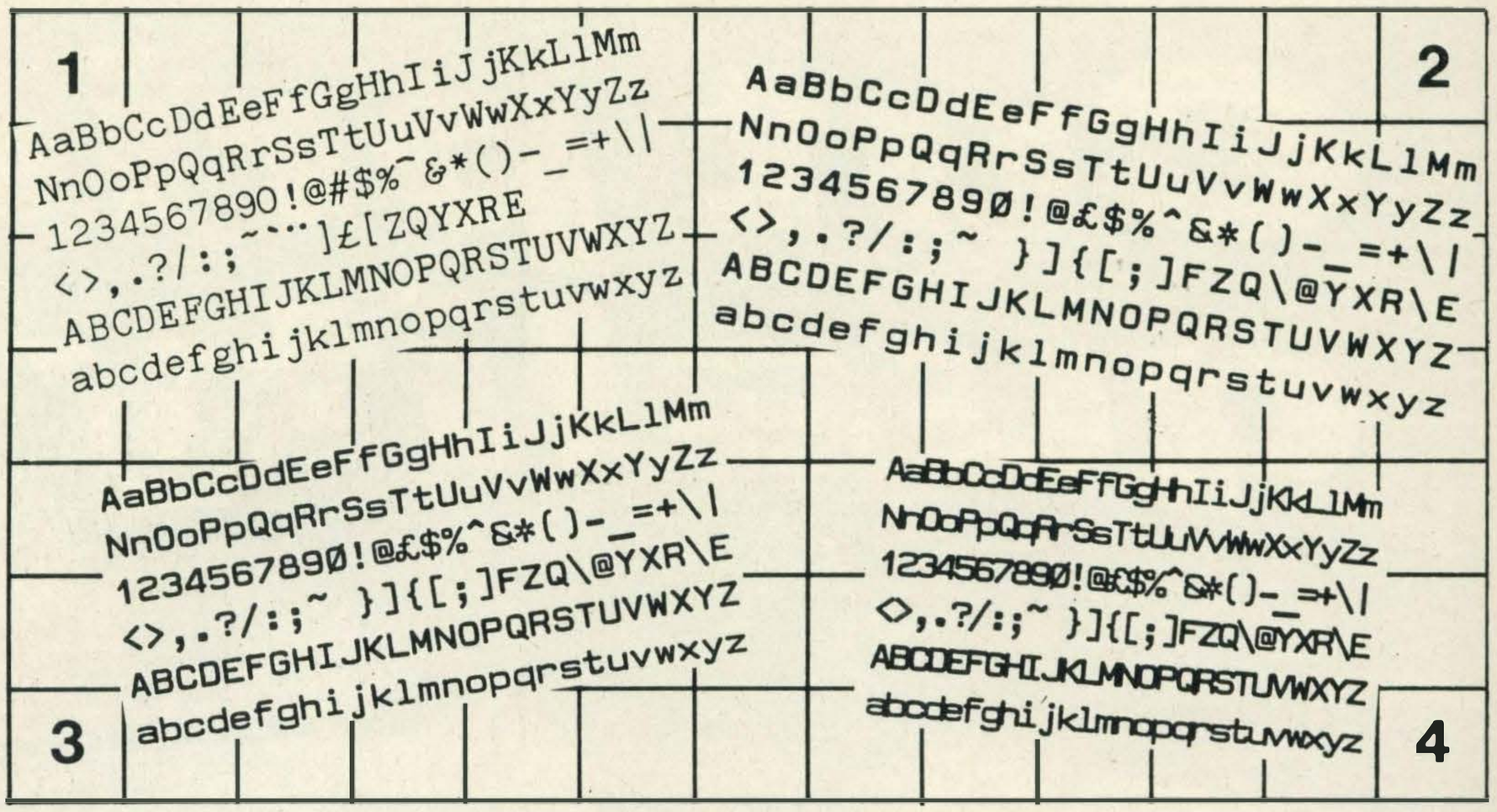
The default print width is 105, 126 and 157 columns (at 10, 12 and 15cpi settings respectively). This is something to bear in mind when you first use the machine. If you just bung in a piece of A4, the type could easily run off the right hand side, which would do the roller no good at all. To overcome this a right hand margin can be set from software.

The maximum paper width is 33cm, so you can easily get a piece of A4 paper in sideways, if that's the sort of thing you want to do.

One problem I did encounter was with the hash symbol. With the Ibico the hash was printed correctly. But on the Smith Corona it got turned into a pound sign. This is a common fault, and is to do with the non-standardisation of some of the character codes. The hash and pound symbols share the same code (hex 23). Often it's possible to change from one to the other by selecting one of the foreign character sets — for example by swapping from English to American. With the L-1000 this can be done either in software or by setting the appropriate dip switches inside the machine.

The DIP switches can also be used to vary things like the baud rate of the RS232 interface. Fortunately for the MSX user, the L-100 also has a Centronics parallel port.

I was well impressed by the Smith Corona. It gives the kind of quality you would normally expect from much more expensive machines. At the price it makes an excellent choice for the small business.

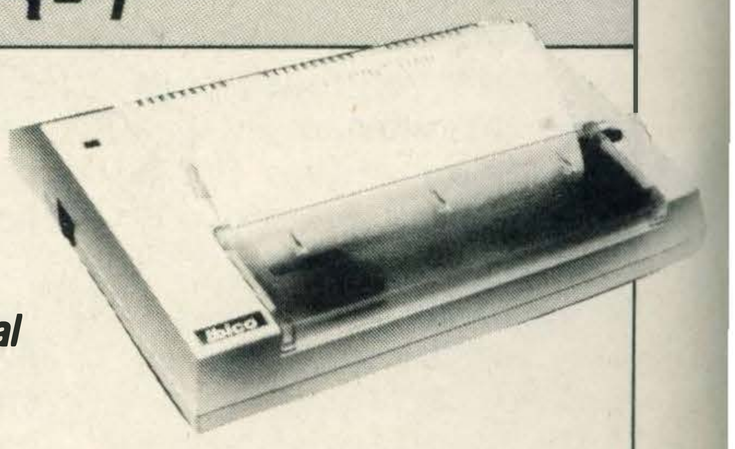


***Sample printouts.** 1. Ibico LTR-1 2. Smith Corona L-1000 at 10cpi 3. Smith Corona at 12cpi 4. Smith Corona at 15cpi*

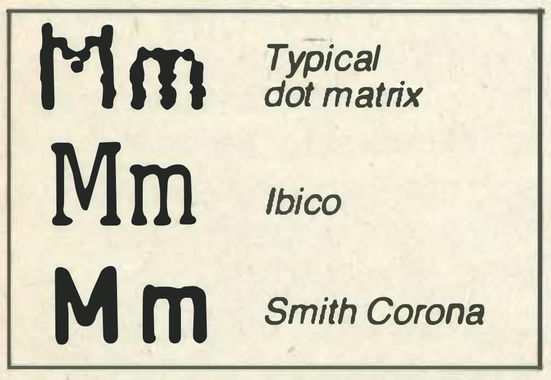
SMITH CORONA L-1000

Type: Daisywheel printer
Print speed: 12cps
Number of characters: 88 to 93
Character pitch: 10, 12 or 15cpi
Printing mode: Bi-directional, logic seeking
Paper width: 33cm
Max columns: 157
Line spacing: 6, 4.5 or 3 lines per inch
Max paper thickness: 0.5mm
Paper feed: Friction
Interfaces: Parallel (Centronics) Serial (RS232C)
Input buffer: Max 570 characters
Dimensions: 1625mm × 4960mm × 3373mm
Weight: 9.4kg
Price: £343.85 (inc. VAT)
Distributor: SCM (UK) Ltd, Unit 23, Northfield Industrial Estate, Beresford Avenue, Wembley, Middlesex, HA0 1RN

IBICO LTR-1



Type: Letter quality printer
Print speed: 12cps
Number of characters: 96
Character pitch: 12cpi
Printing mode: Bi-directional
Paper width: 215.9mm
Max columns: 80
Line spacing: 4.2mm
Max paper thickness: 0.11mm
Paper feed: Friction
Interfaces: Choice of parallel or serial
Dimensions: 298mm × 63mm × 198mm
Weight: 3kg
Price: £228.85 (inc. VAT)
Distributor: Ibico Ltd, 181 Spring Grove Road, Isleworth, Middlesex, TW7 4BE



A comparison of print quality when enlarged considerably

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106 PAYROLL (Weekly) £29.95
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107 MEMO-CALC £14.95
"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".
— Review by *MSX Computing*, November 1984.
This database program allows up to 255 columns. The rows are automatically set from 5 to over 1000. Both numeric and alphameric data can be stored in any cell and can be of any length up to 255 characters. Any cell or label can be changed at any time. Searches can be made by Number of Key Field. Column searches can be made on any column by any field with all those, equal to, less than or greater than options being displayed. Sorts can be performed using any column as the key. Column and row totals are calculated and averaged. The whole automatically formatted sheet can be printed full width on any size printer from software within the program. There are a multitude of uses for this program from accounts to diaries, club or personnel records etc and is probably the one program that we all need.

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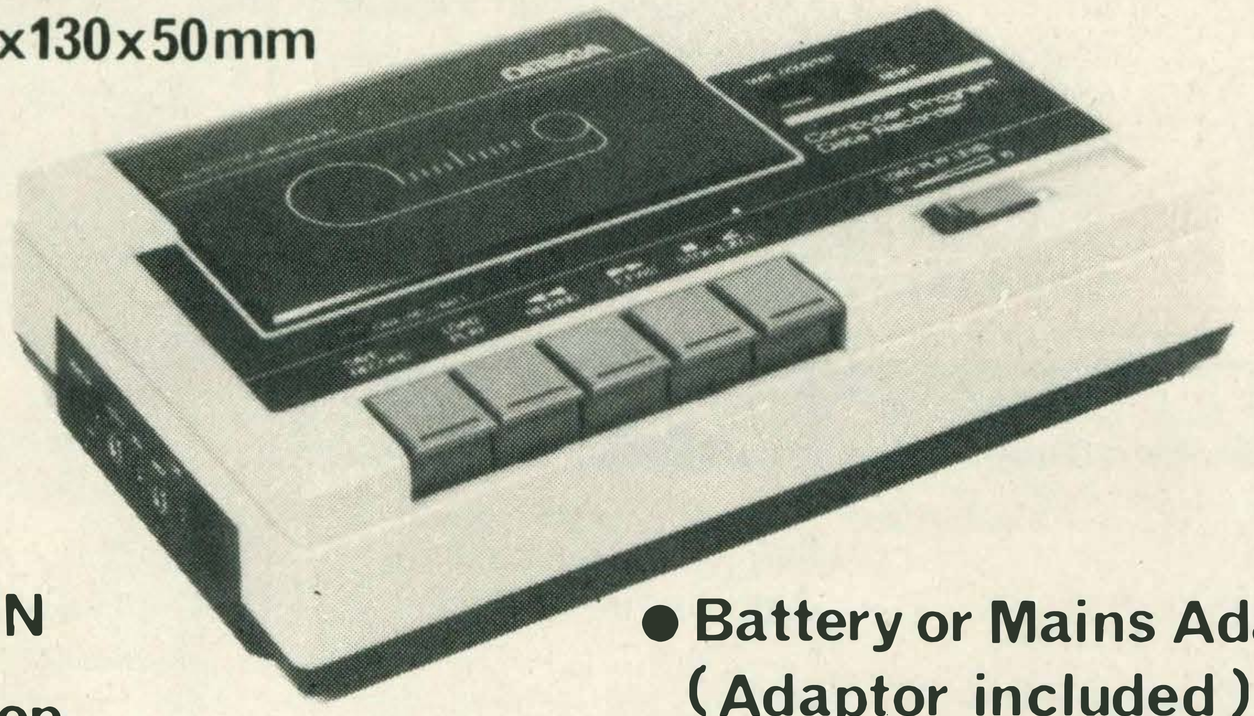

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MSX-NET is a Telecom Gold based network intended purely for MSX micro owners. We will be providing information on the NET (full details to be announced soon). But it is also an excellent way for you to contact us. It saves all that messy and unreliable business with ink, paper and stamps, and it's a lot faster. So if you have a question, a problem or simply something to say, you can send us a few lines.

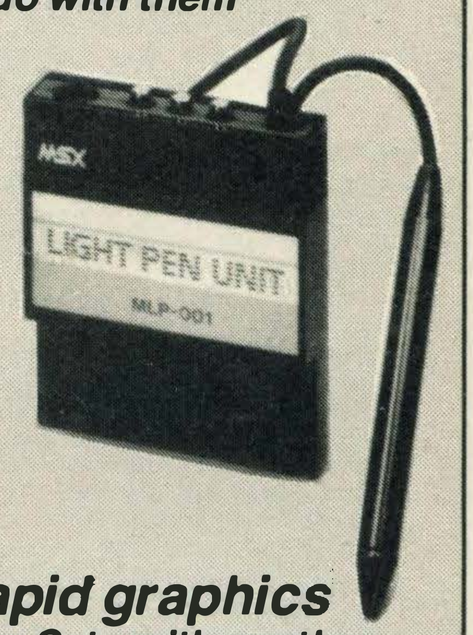
Any interesting messages or questions will be printed in *MSX Computing*, unless you specifically request otherwise. We'll try to get back to you as soon as possible with the answers to your technical queries, although difficult ones may take a little time, and impossible ones a little longer.

MSX-NET is also a good way of telling us what you would like to see in the magazine, what you think is wrong, and, of course, what you think is right! And any tips you have to pass on to other MSX micro users will be gratefully received.

So how did you do it? For a start, you have to log on to Telecom Gold, system 83. Then go to the MAIL system, write your message and address it to our mailbox — MSX013. We'll be checking the box several times a day, so your words won't go unheard.

NEXT MONTH

Micro artists
Light pens and graphics tablets — what they are, how they work and what to do with them



Rapid graphics
Tom Sato with another installment on MSX BASIC. This time it's the turn of sprites

Machine talk
Talking to the micro in its own language. Adam Denning gets you started on machine code

In a spin
We look at the Sony disc system. Is this all you need to get serious about business?

In the NET
MSX-NET puts you in touch with other enthusiasts — and us! Find out how to communicate

Soft touch
The latest software releases under the scrutiny of our expert reviewers

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Useful, amazing and entertaining listings in our DIY section

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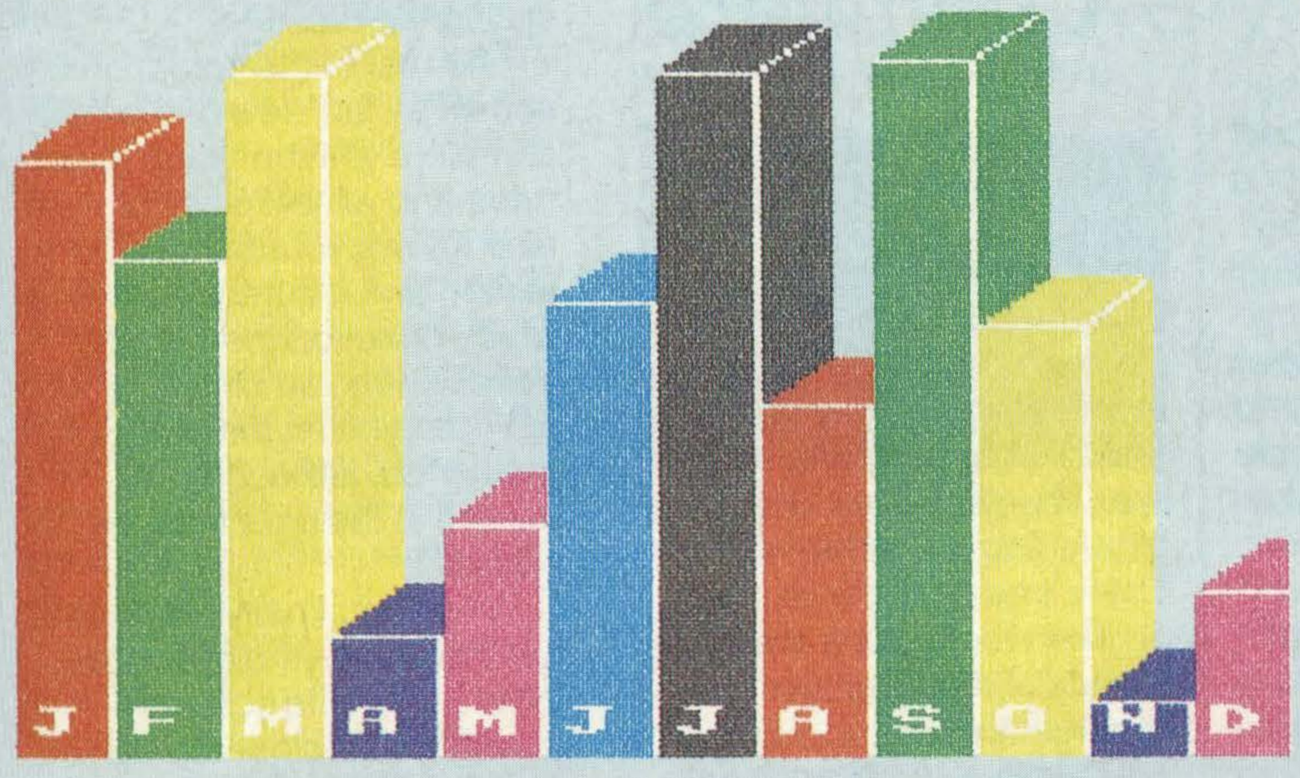

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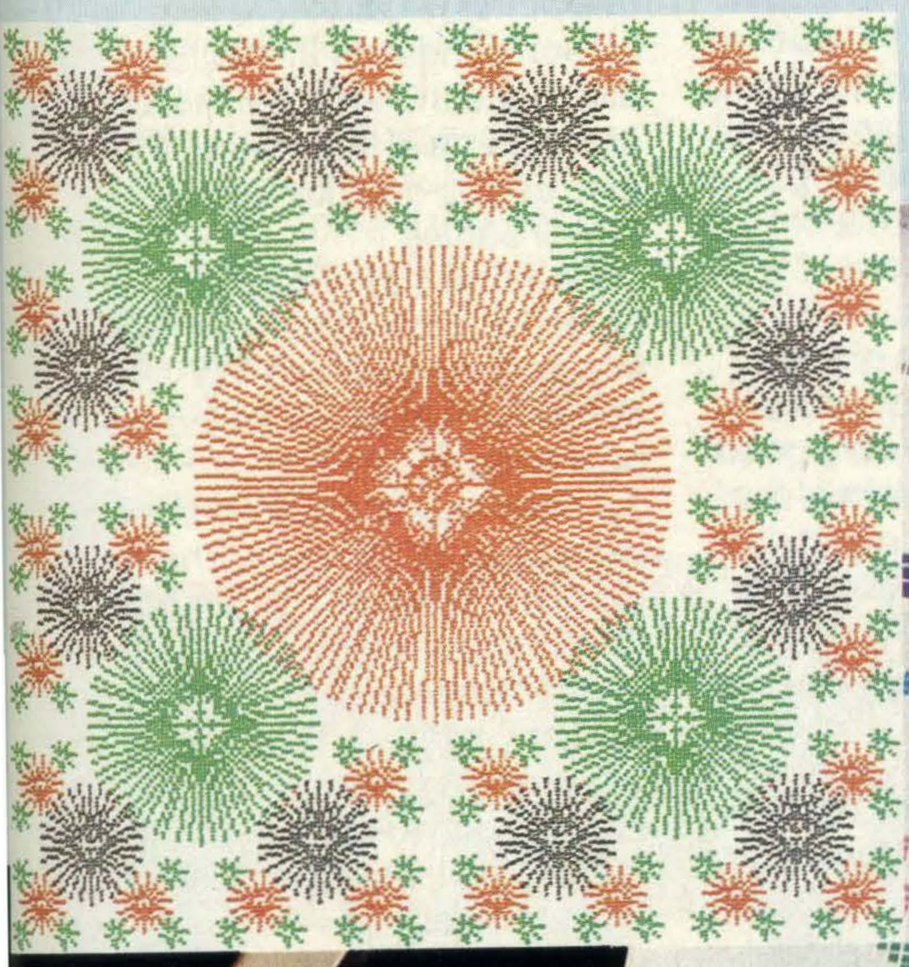


INTEGREX LTD.

REVIEWS

Software scene

We review all the very best – and the rest – in the latest MSX software

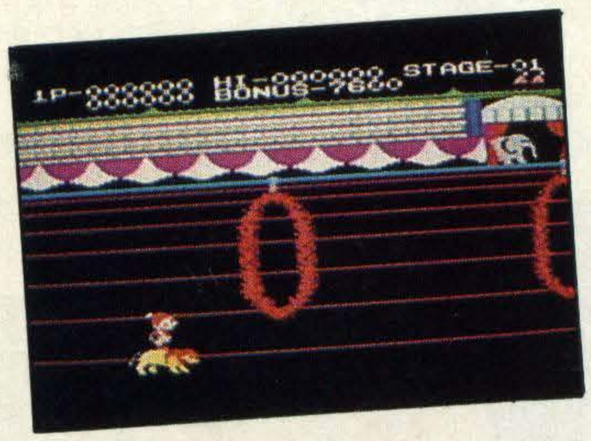
CIRCUS CHARLIE

Supplier: Konami Ltd/Micro Peripherals Ltd (0256) 473232
Type: Arcade game
Format: Cartridge
Price: £18.99

You can tell a good game by the way the rest of the office reacts when it is first loaded up. With some games there's a huddle of people around the monitor clamouring for a turn at the keyboard. *Circus Charlie* didn't get quite that reaction and hasn't reached hit status.

As the name suggests, the action takes place under the Big Top. You control Charlie the Clown and he has five feats to perform. Success in one task lets you attempt the next.

Cartridge loading is fast, as usual. The opening menu gives the usual one or two player options, using keyboard or joystick. A demonstration mode starts up if no key is pressed.



The action takes place against a background of a circus tent, crowd and so on. It changes little during the game. Musically, there is the usual type of tune that stays in the brain long after the lights have gone out. Other ditties accompany your death and leaping.

The five tasks are varied and demand a reasonable degree of skill. In the first, you have to ride a lion, making it leap through rings of fire and over flaming urns. Each section has a length of 60m — reaching the end gets you to the next task.

Trick number two is a tightrope walk, leaping over small monkeys. Trick number three is a walk along rolling balls. Next is bareback riding and finally a spell on the flying trapeze.

A useful feature is that when you have used up all your lives (you start with three), you can continue from the section you were on. It means that you don't have to start from scratch if you have mastered early sections. Other games should have this feature but often don't.

The graphics are only mediocre, by Konami standards. Death by fire is a horrendous experience, with Charlie being turned into a ball of fire. Other deaths, however, are less dramatic. The action is quite slow too.

Current and high scores are shown at the top of the screen, together with lives remaining. You get points for avoiding obstacles, completing a course within a certain time or picking up bonuses.

Getting the knack of *Circus Charlie* doesn't take long. Some of the screens are pretty difficult and all will pose a challenge.

The trouble is that there is little to make you want to master each task. You know what the five tricks are and you know that once you have got a technique there is no challenge apart from totting up a really high score. There is little to get the adrenalin flowing. Your money would be better spent on a game like *Athletic Land* which has a greater variety of obstacles and what is in store is not revealed until you get there.

Given the £18.99 price, this game is no bargain either. Our advice? Give it a miss.

Graphics: *Boring background*
Sound: *Sticks in the brain*
User appeal: *Little to get the blood racing*
Conclusion: *Konami can, and does do much better*

GOLF

Supplier: HAL (04243) 5840
Type: Arcade
Format: Cartridge
Price: £14.95

This is what golf should be like. There's none of the effort of trudging round the fairways. There's none of the expense of green fees, clubs and rounds of drinks at the Nineteenth.

There's also precious little excitement for the non-golfer. Of course, you don't expect the kind of adrenalin buzz you get from kill-o-zap games. But golf must have something going for it, after all, it's Japan's most popular pastime.

As we've come to expect from cartridge games, the graphics in *Golf* are very good indeed. The left portion of the screen shows all relevant data and controls. There are score cards, hole number, length of hole and par.

At the bottom of this section are three indicators which help you make your shot. The power of the shot is shown by a sliding bar scale. You press the space bar when the level is at the power setting you want.

Attention then switches to the curve indicator. This uses a similar system to the power setting. With it you decide whether you are going to drive the ball straight ahead or curve it a little. If you don't pay attention you can end up really slicing the ball.

The rest of the screen shows a plan view of the hole, complete with bunkers, hills, trees and water hazards. It also shows your ball (not to scale!) and a cursor indicating which direction the ball will travel when you hit it.

When you hit the ball it really flies, although not always in the direction you planned.

When you finally manage to get the ball on the green the main part of the screen changes to a close-up view, and the choice of club defaults to a putter. Again there is a cursor to indicate the ball's direction, and in fact, this part of the game is fairly easy, so long as you don't overdo the power setting.

Once the ball is safely in the hole, the picture changes back to a general view and the screen scrolls to reveal the next hole.

I have to admit that I haven't yet played all 18 holes. The reason for this is that I simply got bored. There wasn't enough variety and action to hold any interest. But golf fanatics will probably find themselves hooked, even if there is little lasting appeal for anyone else.

Graphics: *As stunning as a flying golfball*
Sound: *Thwack! Plink! Otherwise not much*
Addictiveness: *For golf addicts only*
Conclusion: *Good for the enthusiast*

HOT SHOE

Supplier: Eclipse Software
(0279) 26721
Type: Arcade
Format: Cassette
Price: £5.95

Fancy being a spaceman hurtling through space and saving the galaxy from nuclear destruction? If the answer's 'yes' then *Hot Shoe* is right up your Solar System.

Cast as Dan the atomiser man, you have volunteered to boldly go where no other man has gone before. Your mission is to try and deactivate nuclear reactors that are orbiting space in a very unstable condition and threatening life in your galaxy.

Before getting anywhere near saving the universe you have to skilfully guide your shuttle through a heavy asteroid belt, which ain't easy!

There is also a slight problem; it's absolutely essential that Dan avoids colliding with any of the asteroids. Should that happen your shield of energy is then drained. And, if all of your energy runs out your protective shields will fail and you will be blown to smithereens.

Having survived the perilous asteroids you then make your way to the reactor and save the world!

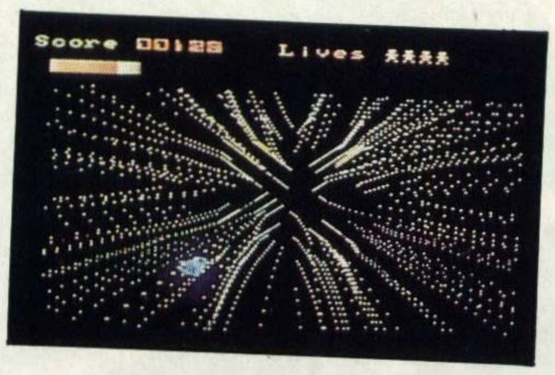
Stabilising it involves making Dan jump up and down on the coloured discs that make up the core. Each time Dan jumps on to a disc it turns a lighter colour and the reactor is made slightly safer.

When a disc turns green it will stay that way but if a disc turns red then you have to act very quickly otherwise it will explode.

But, that's not the only problem. A really nasty hazzard to watch out for is Ron the robot.

There's also the problem of the mutant atoms. They keep drifting from disc to disc trying to drain you of energy.

Should you be successful and manage to turn all the discs green (and we didn't)



you will be awarded an extra life. But, should you fail all the discs turn red and there's an explosion. The mission will be over and your failure will end in galactic destruction.

This is the sort of game that children will love to play. But, as mature (?) adults we found the two scenarios very limited and too repetitive. Before we could even play the game we had to sit down and work out how to get a high score and stay alive at the same time!

Playing with the joystick poses no problems. However, using the keypad caused us a few headaches. Instead of using the cursor keypad you have to press 'O' to move to the left, 'P' to move to the right, 'Q' for jumping and the space bar to fire the lazer. Until you get the hang of it, getting a score let alone surviving the first level is nigh on impossible.

Graphics: *Depressingly dull*
Sound: *Not for the discerning*
User appeal: *Okay for kids, but for the intellectuals amongst us it gets a thumbs down.*

HYPER OLYMPIC 2

Supplier: Konami Ltd/Micro Peripherals Ltd
(0256) 473232
Type: Arcade game
Format: Cartridge
Price: £18.99

Don't buy this game unless you are a glutton for punishment. It is another from the *Track and Field* stable, and it contains a punishing 1500m event.

The program is loaded from cartridge in a few seconds, and opens up with play options. One or two players can participate, using keyboards, joystick or the special Konami Hypershot. The Hypershot is a must if you want to be any good at these events, and can be used with any of the *Track and Field* type games.

The first event in this quartet is the 110m hurdles. (With two players, you race against each other.) The trick is to run as fast as possible, by pressing cursor keys as quickly as possible or wiggling a joystick. At the same time you have to jump the hurdles. Once you get the knack, it's not too difficult. All you then have to do is beat the initial 15 second qualifying time.

A large scoreboard above the track shows the highest score so far and your own score, updated after each event. The world record is shown, the time needed to qualify and the elapsed time for the event. Your running speed is shown between the lanes, if you have the chance to look at it — but don't count on it!

If you hit a hurdle, you fall spectacularly and have to start running again. To qualify, you'll have to clear all hurdles. Fail, and the game is over. You can also lose if you make three false starts.

The second event is a javelin throwing competition where you have three attempts to beat the qualifying distance. The technique is to run as fast as possible up to the throwing line, then throw the javelin for all you're worth.

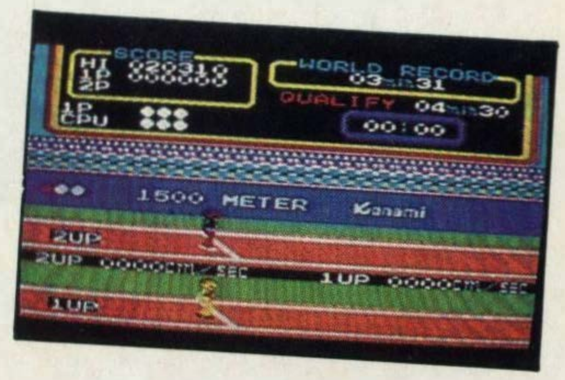
Your speed is indicated by a bar below the track, and a cm/sec figure. A box on the screen shows the angle at which the javelin is launched — depending on how long the space bar/fire button is pressed. This is the crucial factor in this event — you'll have to work out the best angle for getting the qualifying distance. Run over the throwing line and you score a foul.

For the third event, you have to master the art of high jumping. Again, run as fast as you can and then jump, executing a very impressive flip over the bar.

The fourth and final event is the 1500m, and it's a killer. Even hardened *Track and Field* players have been known to give the 1500m a wide berth. It is a real endurance event. Although, I suppose, we're lucky there isn't a marathon — yet!

In all the events you score according to your performance. Beat the world record and the crowd will cheer you.

Graphics and sound are up to the standard we expect of these games, which is to say the games look and sound great.



If you're into these kind of arcade games, you'll probably want this one in your collection. Because of the 1500m, we'd leave this one until last. If you have the rest, get it for the first three events, or not at all.

Graphics: *Just like the arcade version*
Sound: *As if you were there*
User appeal: *Indoor athletics without sweating*
Conclusion: *Hate that 1500m*

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REVIEWS SOFTWARE

SUPER COBRA

Supplier: Konami Ltd/Micro Peripherals Ltd
(0256) 473232
Type: Arcade game
Format: Cartridge
Price: £18.99

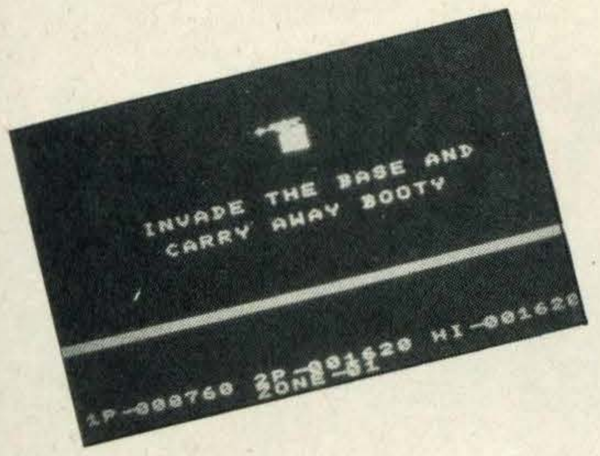
'Into the valley of death . . .' fly you in your armed helicopter. Your mission is to reach a crate of munitions, deep inside enemy territory. You are armed with guns and bombs, up against mutants, UFOs, missiles and tanks. You didn't think they'd let you in without a fight, did you?

One or two players can take part, using the keyboard or a pair of joysticks. Being on cartridge, *Super Cobra* loads in just seconds.

Movements are quite simple — up, down, forward and reverse. Firing lets off both a bullet and a bomb. You'll pick up the game in a minute or so.

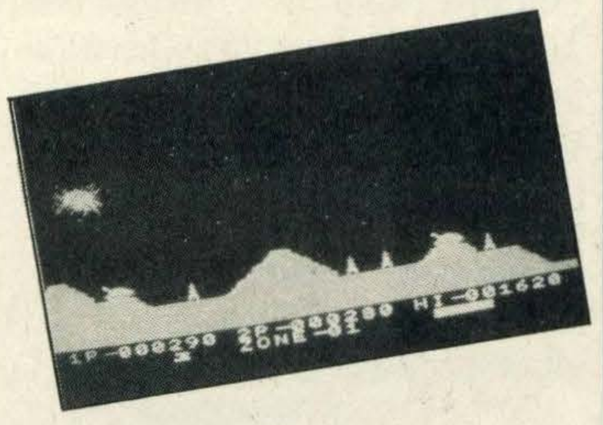
The display shows a rugged green terrain against a starry black background. You are a small, white chopper with spinning rotors. Player scores and the current high score are show at the bottom of the screen.

The stage which you have reached is also shown, plus a yellow bar indicating the amount of fuel you have left. Fuel is topped up by having a bomb hit a fuel dump on the ground. At higher stages fuel dumps are few and far between.



The first stage has missiles coming up from the ground, mutants coming in from the right. Flying low and fast is the best policy. You'll find that you can't fly right to the edge of the screen — that lets you see what's coming.

Complete 100 miles over this terrain and you get a brief pause. Then you get the next stage, with red and yellow UFOs after you. The yellow ones bounce around in a manner that is not difficult to avoid but the red UFOs are very hard to out-manoeuvre. You'll have to shoot them down quickly, while still avoiding missiles and hills.



The third stage is in a cave, with terrain above and below you. Bombs rain down from above as you pass — you didn't expect it to be easy, did you? The final stage is similar to the first, except that tanks on the ground start firing and missiles are even less predictable.

Survive 100 miles of this and you see the crate you have to pick up. Then it is back to the beginning again, with more of the enemy to beat.

Points are scored for destroying opponents, covering distance and completing each stage. You get a fourth life at 10,000 points, usually sometime in stage two.

Sound is used to good effect. There is an opening ditty — that's all the music you'll hear. The rest is the thookathooka of helicopter blades, the blast of bombs and ping of bullets, turned up as loud as you dare.

Graphics are kept simple to speed up the action. The terrain is a block of green and other objects are just rapidly moving sprites.

The emphasis is on high speed action. You'll need quick reactions and a clear head if you are to get very far in *Super Cobra*.

Though not an original game, and one already seen on many other micros, this Konami version is very good indeed. If you are an arcade addict, you'll want to have this cartridge in your collection.

Graphics: *I was going too fast to see*
Sound: *Turn that racket down!*
User appeal: *Kill or be killed action*
Verdict: *Dated idea but still worth playing*

COMIC BAKERY

Supplier: Konami
(0256) 473232
Type: Arcade
Format: Cartridge
Price: £18.99

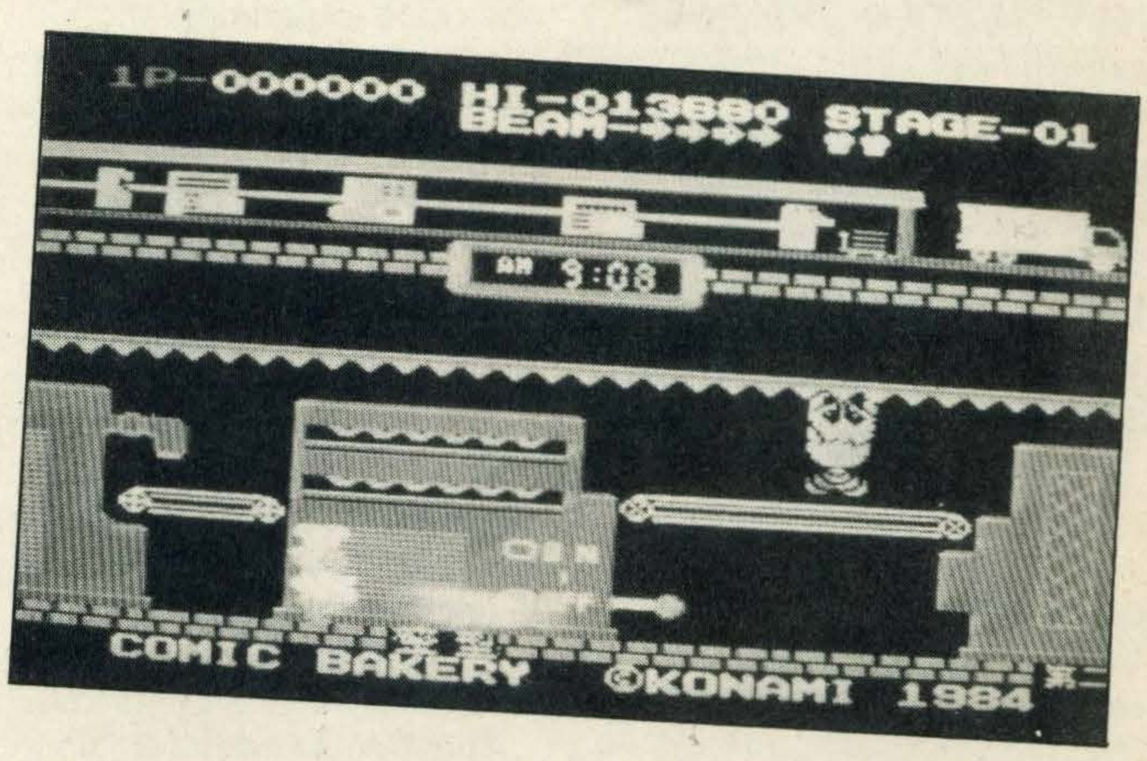
This game casts you as a very podgy looking Italian baker called Joe. Your daily task is to make sure that as many croissants as possible manage to travel safely along a conveyor belt, get cooked and end up in a trolley by 5.00pm.

The trolley is then wheeled into the bakery shop where four very hungry little girls are eagerly waiting to fill their stomachs.

As in all good games there are a number of snags! The bakery is over-run with ravenous raccoon dogs, who will stop at nothing to satisfy their appetites. They run along the top of the conveyor belt hooking croissants with their bushy tails.

And that's not all. The little devils chase the baker in an attempt to terminate his life, turn off sections of the conveyor belt and do their best to halt production.

But in defence the wily old baker keeps zapping the raccoon dogs with a hidden hypnotic lazer gun and then very swiftly boots them up the backside into obscurity.



The idea of the game is to stay alive for the whole day so that you can go on to level two. To make it a little easier you are given three lives, ie three 'Joes'. At a certain score you will be rewarded with additional 'Joes'.

If you bump into one of the raccoon dogs and fail to knock him out, a life is lost. You lose another if you fail to get at least four croissants through the whole system within working hours.

Getting a high score is relatively easy once you've managed to suss out what's going on. If you manage to put a raccoon to sleep and give it a kick in the rear this gets 200 points. Knocking out the raccoons running along the top of the conveyor belt is pretty tricky but if you manage to zap them, it's worth 300 points.

If you manage to get four croissants into the trolley within the working day then the hungry quads are deliriously happy. If only three get fed the fourth one starts to wave her arms, kick her fat little legs and sulk. And the owl sitting above them swears in Japanese!

Once onto level two the going gets a lot tougher. The raccoons are craftier and it's not so easy to zap them as they keep jumping up and down. And the raccoons on the top of the conveyor belt are now after loaves of bread! It was as much as we could do to keep the baker alive, let alone get any bread along the conveyor belt and into the trolley!

Pitting our wits against the raccoons we managed to survive the course (only just) and make it to level four. To our horror and surprise the raccoons now started to appear at the same time, needless to say Joe the baker didn't last very long!

Graphics: *Brilliant*
Sound: *Boringly repetitive*
User appeal: *You can make a real meal out of this*
Conclusion: *It's a real picnic to play*

REVIEWS

HYPER SPORTS I

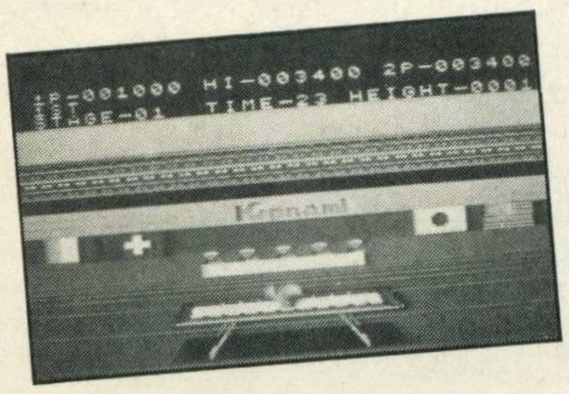
Supplier: Konami Ltd/Micro Peripheral Ltd
(0256) 473232
Type: Arcade game
Format: Cartridge
Price: £8.99

Track and Field has been a fabulously successful arcade game. It was the work of Konami, a company which has not been slow to capitalize on the genre. *Hyper Sports I* is another collection of four athletic events for one or two players.

The format is the same as previous sports games from Konami. Each event has a qualifying score and achieving that score allows you to get to the next event.

The four events here all have the common element of jumping. First off is a high diving competition where you have three attempts to beat a set score.

This all involves much pounding of cursor keys and waggling of joystick. A row of five judges hold up score cards giving marks out of 10 which are averaged out by the computer to give a score. Beat the minimum and you are through to the next event, with a cheer and a wave from the crowd.

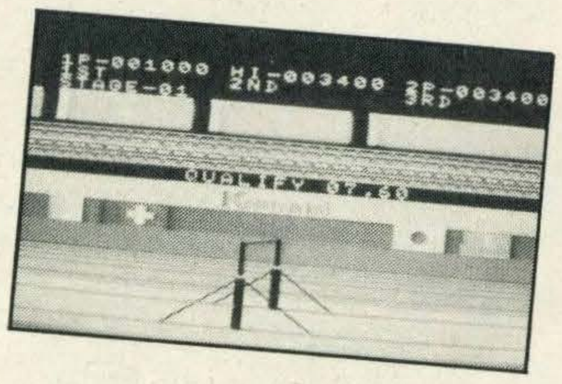


The next event is the long horse jump. You run down the track and jump from a mat onto the horse. Press the jump button again and you'll leap into the air in a long arc, again trying to spin furiously. Points are scored on the number of spins, the distance covered and whether you land upright.

Event number three is trampolining. Again you have to jump and spin, trying to impress the panel of judges with your virtuosity, in a 20 second time limit.

And so you come to the last event — the high bar. Clasping the bar, your man spins round and round, building up momentum. You press a fire button to release him, spin him through the air and try to land upright. Again you have three tries to qualify. After that, it is back to the diving, with a tougher qualification score.

As with previous Konami sports titles, there are some amusing touches. Lose and your athlete shows his disgust. If you don't land upright your man will roll along and then stand up.



There's a demonstration mode so that you can see all the events, and get an idea of what's involved.

Sound is kept to a minimum. You hear the sound of running, the springboard boing, the splash on entering the pool, the roar of the crowd . . . all thoughtful stuff. *Track and Field* fans will know the standard to expect.

This game can be played with a joystick, cursor keys or the Konami Hypershot. After not a little experimentation. We found a joystick the most useful control.

Mastering each event will take some doing. Knowing when to press a jump button, when to stop spinning in the air and when to straighten up takes some experimentation.

A practice mode for each event is something that anyone who plays this game will wish for. As it is, you have to get through each event before getting a crack at the last.

That takes time, and if you are consistently getting one event wrong, you'll be frustrated at not being able to get to further sports. Still, that's the challenge of *Hyper Sports I*, a definite must for *Track and Field* fans.

Graphics: *Gold medal standard*
Sound: *Not overdone, realistic*
User appeal: *Could do with a training mode*
Conclusion: *Definitely for video athletes*

ROLLER BALL

Supplier: HAL (04243)5840
Type: Pub game
Format: Cartridge
Price: £14.95

To most young or youngish people arcades mean the zapping and beeping of video games. But there is an older generation who think of the flashing lights and flapping flippers of pinball machines when arcades are mentioned.

Pinball machines have a kind of nostalgic glory — a bit like 1950s Cadillacs — which is more to do with the design of the machines and the time of their popularity than any inherent quality of the game.

So combining the game of the 50s with the technology of the 80s is not quite as successful as you might expect. That's not to say that this is by any means a bad implementation. Indeed, by and large the quality of the game is excellent.

The graphics are extremely smooth, bright and cheerful. Only part of the pinball table is shown at any one time, the screen scrolling up and down as necessary.

On each section of the table there are two flippers for bouncing the ball back up the table. As the ball hits the various knobs, buttons and obstacles you get suitably garish lights and a variety of strange noises, which are all quite entertaining for a while.

The left and right cursor keys are used to select a difficulty level, from novice to pro. The other two keys let you toggle between a one or two player game.

The only other controls you need are for the flippers. For the right flipper you press either BS or RETURN. The left one is controlled with the ESC or TAB key. This is a good choice as the left and right keys are well separated. And the response to a key press is fast and accurate, giving a good 'feel' to the action.

At the lowest skill level the ball travels fairly slowly, and it's easy to build up an impressive score. But at the higher levels the ball whizzes around at incredible speed, and your reactions are really tested to the utmost.

The game works pretty well. The only time I had a problem was when the ball was oscillating between two parts of the table. The scrolling then became quite rough and jittery, and was sometimes quite uncomfortable to look at.

I was completely hooked for half an hour. In common with many games the main attraction is in trying to beat the high score — there are no other goals to aim for. And the game can be very exciting, especially at the faster levels.

But there's something missing. Sitting at a micro in the comfort of your own home doesn't quite have the style and panache of leaning on a pintable in the smoke-filled atmosphere of the local greasy spoon cafe. And you can't really kick the machine when you fail to get that all-important high score.

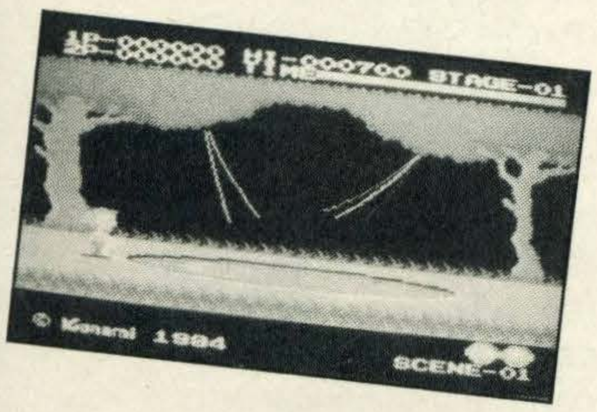
Graphics: *Smooth and flashy*
Sound: *Nearly amusing*
Entertainment: *Should keep you gripping the flippers*
Conclusion: *Fun for a while*

ATHLETIC LAND

Supplier: Konami Ltd/Micro Peripherals Ltd (0256) 473232
Type: Arcade game
Format: Cartridge
Price: £18.99

Athletic Land is a title that might lead you to think this was yet another variation on the *Track and Field* theme. It's not, though the character you control needs a fair degree of athleticism to get very far.

This character is a young lad. His task is to get through a park full of obstacles. To get



past them, he has to do plenty of running, jumping and swinging. Combine the reflexes needed to master each situation with the intelligence needed to work out how to overcome each obstacle and you have a real challenge.

Being in cartridge format, loading is almost instantaneous. The menu gives one or two player options, with keyboard or joystick control. With two players, you take alternate turns and compete for the highest score.

If you don't do anything now, the game goes into a short demonstration mode. This gives an idea of what is to come and the standard of the graphics.

The programmers have been able to make good use of detailed sprites, unhampered by the restrictions imposed by fast movements. Each screen has a detailed background against which the action takes place.

The object of the game is to master the obstacles on each screen. Getting through ten screens gets you back to the opening screen, to start another round. Obstacles are passed by jumping over or across them, with the occasional need to resort to swinging ropes, or to avoid falling objects.

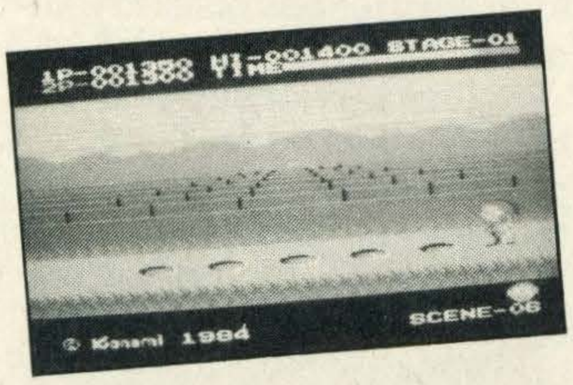
A wide variety of obstacles are presented to you. There are ponds to cross, rolling balls to leap over, pools with fish leaping from them, rows of boxes, flying bees, falling chestnuts, bonfires, platforms on fountains of water . . . the further you get the more challenging the obstacles.

To master the game takes a mixture of skill and judgement. Timing jumps is critical. We found that most people got the hang of the first few screens without too much difficulty. The challenge comes in trying to get as far as possible.

The action is not particularly rapid and not all of the early screens have an obstacle. Accompanying the activity are a range of sounds, imaginatively chosen to complement the movements. There's a cheery background tune, a plinking walking sound, a boing when you jump and much more.

Some of the obstacles aren't as detailed as they might be but the boy has a good range of movements. When he falls, a cross obliterates his face!

You start with three lives, getting another at 10,000 points and more at every 20,000 points. Current and high scores are shown on screen.



An unusual feature is that the game can be played with the character going from left to right or from right to left. We always used the latter.

Though it lacks the excitement of more violent arcade games, *Athletic Land* is appealing. It is a true family game as each player will endeavour to get further than before.

Graphics: *Colourful and varied*
Sound: *Imaginatively used*
User appeal: *Easy to pick up*
Conclusion: *A challenging change*

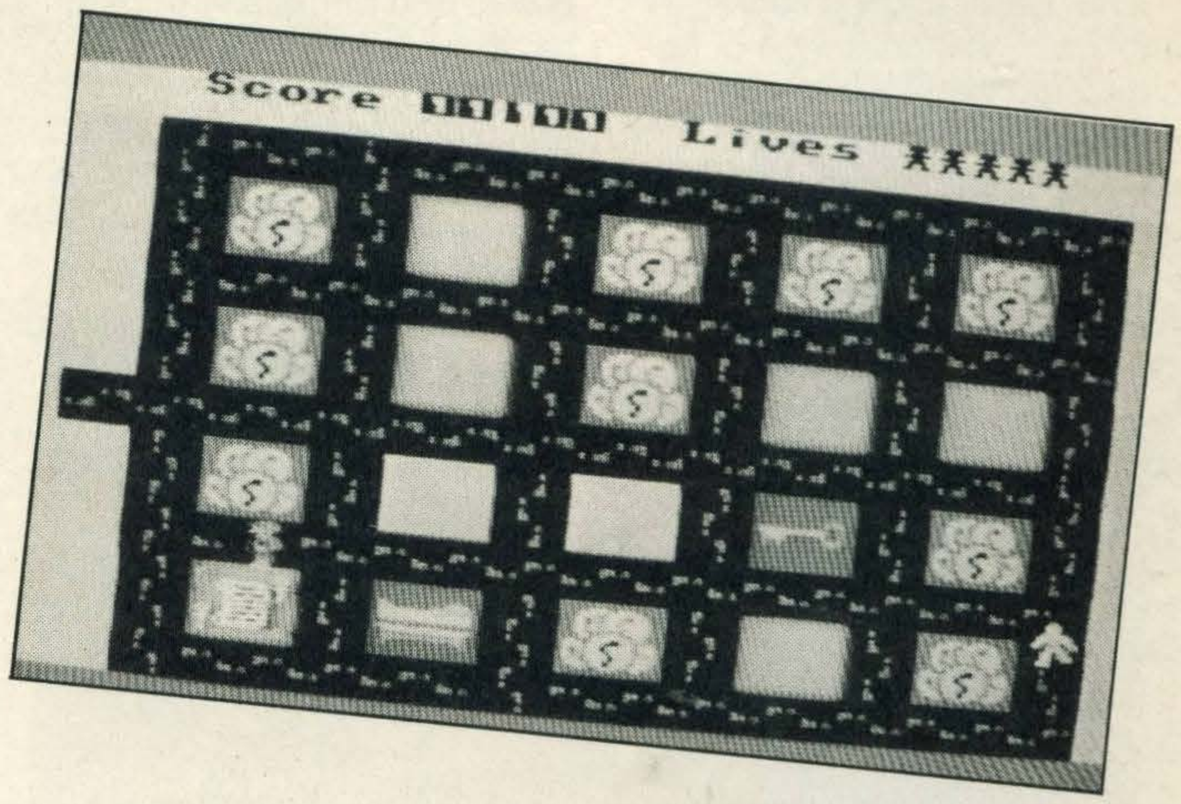
OH MUMMY!

Supplier: Eclipse Software
Tel: (0279) 26721
Type: Arcade
Format: Cassette
Price: £5.95

This is a great game for all you aspiring Egyptologists. Cast as the head of an archaelogical expedition sent out by the British Museum, your task is to explore newly found pyramids.

Your expedition party consists of five men and the aim is to enter the five levels of each pyramid and retrieve from them five royal mummies and as much treasure as possible.

Each level is represented on the screen by a grid made up of



several dozen boxes. As you make your way around the grid, you release various treasures —or otherwise—from the boxes.

Local workers have already partly uncovered the five levels in the pyramids. It's up to you and your team to finish the dig.

The snag is that the activities of the workers have woken the guardians, left behind by the Pharoahs to protect their tombs.

Whilst you and your team are collecting the treasure, the guardian mummies will do their best to foil your excavations, following you around the pyramid doing very passable sleep-walker impressions.

The only way to kill a mummy is by uncovering the Magic Scroll. This allows you to bump into and kill the mummy but without any harm coming to your team.

Once you have managed to uncover the Key and a royal mummy it is then possible to go onto the next level.

Any mummies that you have not been able to dispose of will follow you onto the next level and will make your job even more hazardous.

There are two ways to collect points; by uncovering a royal mummy or uncovering the treasure. We found both extremely difficult. Those mummies sure are crafty!

We didn't manage to complete three levels let alone five. But if you do manage to survive them all, you are rewarded by either extra bonus points or an extra man in the team. The excavation then continues into level one of the next pyramid.

The game has five skill levels. These determine how clever the mummies are at the beginning of the game. You can also choose between five different speed levels, ranging from very moderate to down-right murderous!

The scenarios are much the same in each level, a little more effort here would have been welcome.

We found playing with a joystick was a distinct disadvantage. Using the keyboard increased our chances of escape by allowing us to belt round corners at great speed when a mummy was hot on our heels.

Being chased round pyramids by characters swathed in bandages may not be everyone's cup of tea but we found it a novel departure from the usual run-of-the-mill maze-based game.

Presentation: *Colourful*
Sound: *A lively dirge*
User appeal: *Addictively scary*
Conclusion: *Worth more than a curse-ory glance*

REVIEWS

MR CHIN

Supplier: HAL (04243) 5840
Type: Arcade
Format: Cassette
Price: £14.95

Spinning plates on poles isn't exactly death defying. But, don't be put off, with this game first impressions are definitely deceiving!

The character in this game, Mr Chin, looks typically Chinese, dressed in traditional attire, pig-tail and all.

He has the formidable task of keeping as many plates as possible spinning on poles.

Sounds easy enough. But, trying to get the little fella to run up and down the poles, keep the plates spinning and stay alive isn't easy.

Life is made just a little difficult by the presence of an old woman who could very easily pass as a distant relative of the hunchback of Notre Dame!

Anyway, she has a nasty habit of throwing plates at Mr Chin, hoping he'll trip and break his neck. And that's just for starters! When she really gets going, Samurais start flying all over the place in an attempt to 'persuade' Mr Chin that life's really not worth living and he ought to do the decent thing and commit Hara-Kiri!

The name of the game is to keep plates spinning on all seven poles. Once that is achieved one of the seven poles suddenly grows and Mr Chin finds that he has seven more poles to fill on the next floor. If he manages to survive the bombardments of the old woman at this stage and keep the plates spinning on the poles, one of them then grows and he finds himself having to keep more plates spinning on a third floor.

We (after a lot of practice) managed to keep plates spinning on all three floors (it wasn't easy) and for doing so we picked up a well deserved 2,000 point bonus.

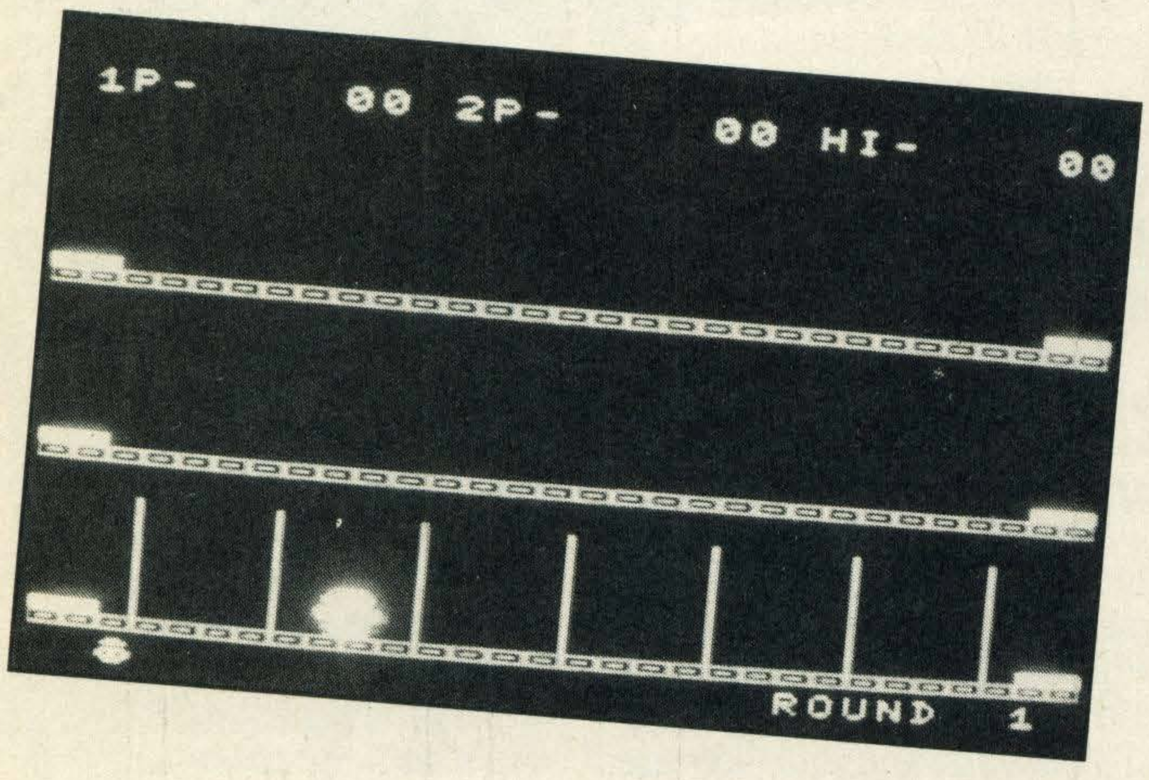
We found this game a hundred per cent easier to play with a joystick, because once the plates start flying Mr Chin has to quickly shin up the nearest pole or jump over them if he's to survive the course.

The keyboard tends to delay reactions and can lose you valuable points.

Your reactions are really put to the test. It is so easy to concentrate on spinning plates and forget all the other hazards.

At one point we got so panicky when the Samurais started flying that we couldn't manoeuvre Mr Chin up the pole. Fortunately he jumped just in time, only to be polished off by a plate that followed barely two minutes later.

This game is well designed and crammed full of action. Thinking ahead and anticipating the worst is the key to achieving a high score.



Great skill and dexterity are needed for this game, and it is more suitable for those of you who are able to concentrate for a great length of time. And as the graphics are good, looking at the same scenario all the time doesn't drive you up the wall!

Graphics: *Attention grabbing*
Sound: *Annoying*
Conclusion: *A plateful of fun and a smashing good game*

COCO IN THE CASTLE

Supplier: Kuma
(07357) 4335
Type: Arcade
Format: Cassette
Price: £6.95

It's only fair to tell you that we were not very impressed with this game.

The plot is very reminiscent of those old Hollywood films, where boy rescues girl from a demon abductor.

Coco (of clown fame) has the job of finding and rescuing his beloved fiancée, who's nameless so we'll call her Doris.

She is being held in the Creepy King's Cavern, and can only be rescued if Coco can find the hidden path, and survive all the obstacles that are deliberately set to trap him.

There are ten scenarios and you can choose from five levels of play, wizard, knight, squire, knave and serf. The first obstacle (like most of the others) is relatively easy. All you have to do is run away from the dreaded black knight and jump onto the drawbridge.

Sound easy enough? Well, having done that your next obstacle is to cross a bed of lava covered in slugs (yuk!).

Jumping onto the slugs' backs and progressing onto the next level is child's play — honest! There just weren't any children around at the time we were playing.

We then found ourselves dodging arrows and grabbing sunshades at the same time. It all seemed to take place in slow motion so we didn't have much difficulty surviving and reaching the next obstacle.

We found sharp spears winging their way towards Coco — who deftly leapt over them stuffing his face full of strawberries at the same time!

Crumbling pits really *were* the pits! Despite a so-called 'challenging' head wind Coco managed to jump over the lot, grabbing a few cherries for extra strength along the way.

Avoiding cannonballs, Coco then has to pit his wits against the lava monster. We must admit jumping onto the ferry was a little tricky.

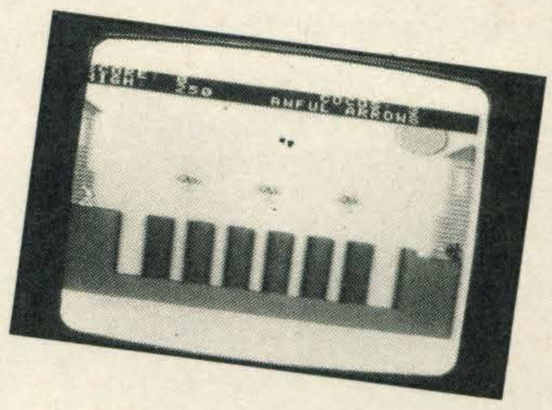
However we managed to get through and battle with the tree trolls, and Coco had time to partake in a chalice of mead.

The deadly dash filled us with intrepidation; rescuing Doris was almost within our grasp. Skilfully we guided Coco along the path and into the King's cavern from which no-one has ever returned — or so they tell us.

Looking like one of Picasso's paintings, the King's cavern caused us to stop and ponder. Before we could reach Doris, a river, several cannonballs and an archer continuously firing arrows had to be negotiated.

After the fourth attempt we reached Doris, and to our surprise nothing happened, we didn't even get any extra points!

The obstacles don't seem to get any more difficult no matter what level you play. We tried jumping the lava slugs in Wizard mode (supposedly the



most difficult) and then in Serf mode (the easiest) and couldn't find any difference between the two.

And as for Doris, well, her real name is Erma, a discovery we made by stopping the program and listing it.

As for the graphics — well if bright pink, fluorescent green and electric blue are your favourite colours, then you'll love this.

Graphics: *Dazzingly bright*
User appeal: *Not everyone's cup of tea*
Conclusion: *Overwhelmingly underwhelming*

TIME PILOT

Supplier: Konami Ltd/Micro Peripherals Ltd
(0256) 473232
Type: Arcade game
Format: Cartridge
Price: £14.99

Konami is one of the leading lights in the Japanese software world, with an impressive string of arcade hits to its name.

Time Pilot, one of Konami's first releases for MSX in the UK, is an extended aerial dogfight. To get very far takes skill, nerve and not a little luck.

The scenario is that you are the pilot of a manoeuverable fighter. You have to annihilate waves of attacking planes to move on to the next stage and continue the carnage.

The time element comes from the date given to each stage. At the first level, it is 1910 and your opponents are mere biplanes. They attack alone or in waves of three, launching bullets and bombs in your direction. Shoot down enough biplanes and an airship will fly onto the screen. Shoot that down and you reach the next level.

Here you find yourself in 1940 and your opponents, now red monoplanes are faster, harder to hit and more deadly. Dispatch 25 of them, plus the large bomber that appears at the end of the wave and you get to 1970.

Here you have to fight off yellow helicopters armed with homing missiles which seem to know exactly where you are very tricky. The fourth wave is set in 1984, where you pit your wits against hordes of blue Vulcans. Beat them and you reach 2000, where UFOs and even smarter bombs are on your tail.

After that, it is back to the biplanes, with more of them to beat. It takes some clever flying to get that far — we know as we made it only after plenty of practice and practically wearing out one joystick.

Time Pilot can be played with either joystick or the cursor control keys. Joysticks are definitely better. Two players can compete as well.

The controls are simple enough. Your fighter sprite rotates to point in the direction you want, firing when the fire button is pressed. It is not difficult to spin and fire at the same time, spraying bullets through an arc.

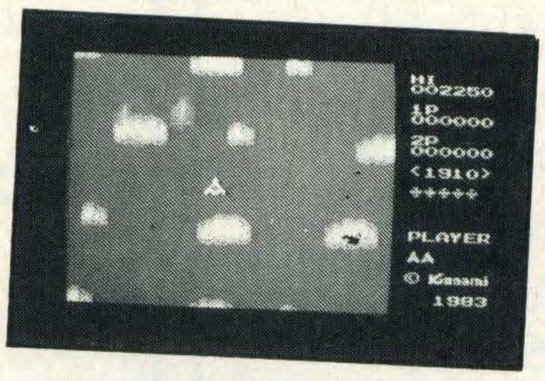
Your plane stays in the centre of the screen, with a background of sky and clouds scrolling past.

Down the left hand side of the screen are the high score, up to two player scores, the year and a row of enemy craft. One disappears for every give you shot down.

Points are scored for shooting down enemy craft, missiles and completing a stage. You get a bonus too if you steer through descending parachutists.

You'll lose a life if you are hit or collide with an enemy aircraft. You start with three lives, and won't get another until you've totted up a considerable score.

Graphics are simple sprites and relatively unambitious. Sound too is restricted to an opening fanfare, shots, explosions and so forth. The main excitement is not the



Given the expense of the cartridge, we would have liked to have seen higher quality graphics and more stages. After all, getting back to biplanes after the UFOs is a bit of a letdown.

Graphics: *Limited characters*
Sound: *Zap, Explode, Kapow*
User appeal: *Armchair pilots will love it*
Conclusion: *Great, but needs more levels*

SUPERMAZE

Supplier: Morwood
(04243) 5840
Type: Arcade
Format: Cassette
Price: £9.95

Super is the last thing you could or even want to call this maze!

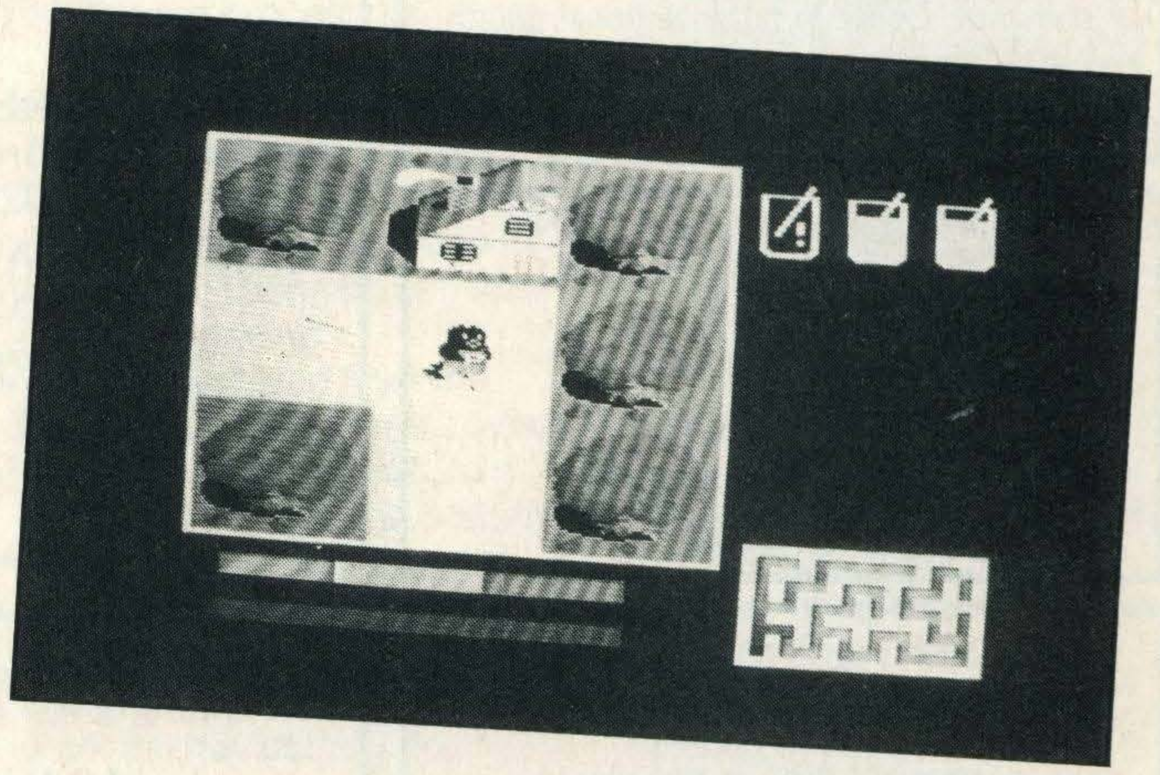
The object of the game is to guide a penguin-like creature round a series of mazes.

In order to make it difficult you can't actually see where you are going and it's all a question of guesswork.

However, there is a blank square in the bottom right hand corner and above it three glasses of a liquid that looks rather like orange juice.

By getting the animal (which we christened Patsy because it had the letter 'P' on its jumper) to gulp down some orange juice, you can take a peek at the solution.

While the orange is being drunk the blank square shows



the correct route to follow to get to the end of the maze.

Once the orange has been drunk the solution disappears and you have to rely on your visual memory to get Patsy to the end of the maze.

You can look at the solution to the maze three times. If you try a fourth time, the empty glasses disappear and are replaced by a white flag. This presumably means that you're surrendering!

Having said that, the parameters of the game seem to be very slack because it still allows you to continue even when the time limit has expired.

If Patsy makes it, she teams up with a white rabbit that would be more at home in Alice in Wonderland than a 'super' maze.

How do you get a high score? Quite simply, you don't! There are no facilities for scoring points so you're left wondering what the attraction of the game is.

There are three types of maze to choose from; small, medium and large. They are all as difficult (easy) as each other and the same rabbit makes an appearance in all three.

Top marks should be awarded for the graphics. The design and colouring of the rows of houses, trees and ponds in the maze are by most standards superb.

After a while we got a little bored with this and started experimenting. We discovered that if you get Patsy to drink all the orange juice and then deliberately guide Patsy straight up and ignore the maze altogether some pretty amazing things happen.

All the rows of houses disappear and Patsy is left to wander around in a void. More interestingly, the path in the maze starts to accelerate vertically.

The end result is that Patsy wanders aimlessly through a blanket of white space while the path zooms to the top of the screen!

We don't think this is supposed to happen, but the effects are pretty stunning to say the least. Still, not recommended.

Graphics: *Amazing*
User appeal: *You'll like it, but not a lot!*
Conclusion: *Nice graphics, shame about the game*

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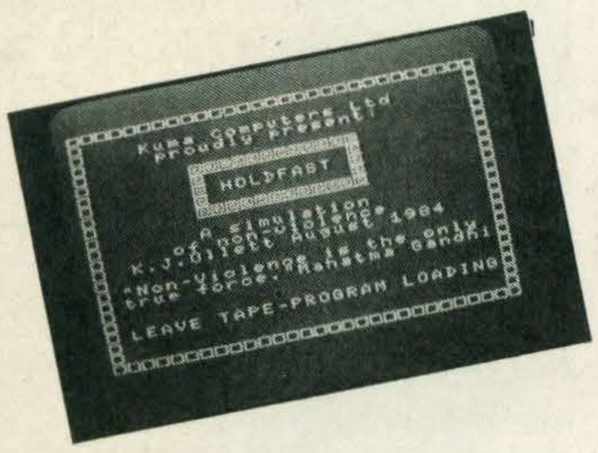
REVIEWS SOFTWARE

HOLDFAST

Supplier: Kuma Computers (07357) 4335
Type: Strategy
Format: Cassette
Price: £5.95

'Non violence is the only true force' said Mahatma Ghandi. Kuma has based its strategy game, *Holdfast* on this wise truth. Holdfast, a small village in the country of Dictatoria, is in dire need of adequate schools and clinics, but the powerful government won't give it any.



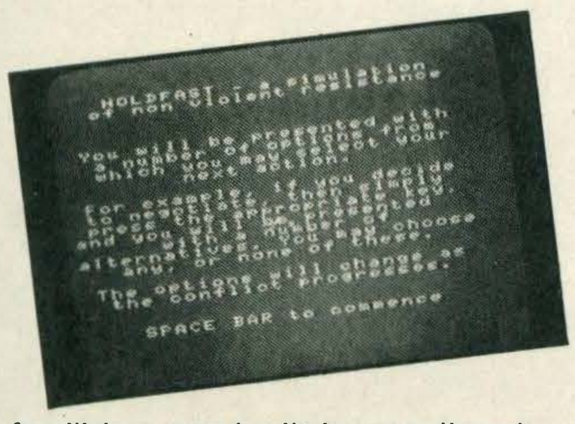
So the fight is on, but since a small village can't take on a big institution using force, cunning tactics and crafty strategy have to be used. You take the part of an influential village member.

As the weeks pass by, your progress is indicated by a Determination Percentage. The government starts with 100% whereas you start with just 85%.

As soon as you've undermined the government's determination to succeed and it drops below 50%, you've won and they concede defeat — your amenities get built.

All the work is done from the keyboard and a menu-based list of options. Negotiate, indirect action, no further action and seek advice are the first options to appear on screen.

If you decide to negotiate and agree to pay high taxes on the proviso that the



facilities are built immediately, the government will probably take the taxes, but put the building back a few years, blaming the delay on a border dispute. You obviously can't afford to be too reasonable and easy-going.

Without giving too much away, the best course of action is to subtly gain village and regional support by taking advantage of opportunities presented to you on the screen.

Once local support is gained, go on to draw international attention to your plight. This forces the government to give in, so that further embarrassing publicity is avoided.

The outcome of every choice you make appears on screen in the guise of news flashes and bulletins.

In the later stages of the game, Pravda pledges support, an old man dies from malnutrition (due to insufficient medical aid), the village shows solidarity and the children picnic in the woods to celebrate the campaign's success. These indicate how well you are doing.

By the 25th week you will be very near to defeating the government, but if you make the wrong decisions early on, the game ends and you start back at week one.

The problem is that, once you've worked your way through one game of *Holdfast*, it can't help but lose your interest. The constant lines of text, the complete absence of graphics and the minimal use of sound don't do anything to enhance the game, but for £5.95, you could do worse than to have a go.

Strategy games are always fun to play, especially if you have a good chance of winning.

Graphics: *None*
Sound: *Minimal*
Addictiveness: *You play until you've cracked it*
Conclusion: *OK for a beginner.*

WDPRO

Supplier: Kuma (07357) 4335
Type: Word Processor
Format: Tape
Price: £29.95

Kuma is trying to flood the market with MSX software, it seems. The latest in its long line of programs is a word processor. It has many features you might want and with practice should enable you to produce high quality documents.

The program loads in a few minutes and opens with a short menu. This lets you set up parameters for different printers. There are some built in printer installations for MSX, Epson and daisywheel printers. If you have some other model, you can configure your own printer, using the correct line feed, underline, emphasis, carriage return and other codes. It is the sort of versatility many other word processors lack.

With a printer installed, *WDPRO* is saved to tape. There is no disc storage facility — Kuma told us that a disc version may be made in the future. Then you can start word processing.

Text is entered from the keyboard and appears across the width of the screen, to a depth of 15 lines. The bottom third of the screen is a command area, for entering specific commands such as SAVE. DEL, BS and INS keys work as they usually do. Cursor keys move the cursor around text. RETURN switches from edit to command modes.

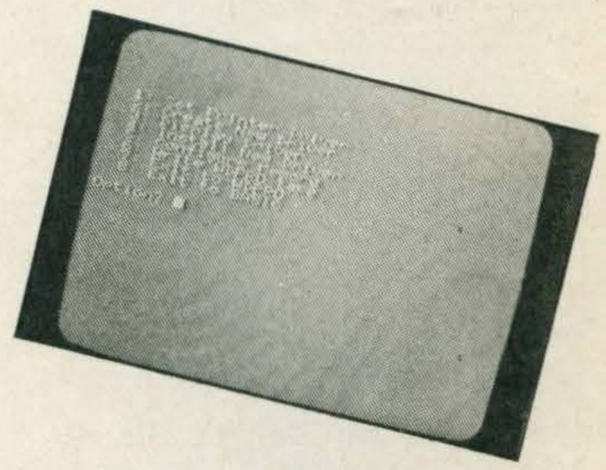
An odd feature is that paragraph ends are not marked with a carriage return. A dot P command signals a paragraph end. Nor is there a word wrap facility for text entry — text just moves up and off the screen as it is typed.

Commands are flexible and easy to use. Text can be saved to or loaded from tape. New text is automatically added to existing text unless a NEW command has been issued.

COPY, DEL and MOVE commands operate on blocks of text — just follow the prompts in the command box.

FIND, SHOW and REP are equally straightforward commands that search for and find or replace character strings up to 16 characters long. Their versatility lets you do things such as find the third occurrence of 'Brown' and replace it with 'Smith', or replace all Browns with Smith, or delete all Browns, searching backwards or forwards.

There is also a whole host of dot commands to control how text is printed. These set left and right margins, centre or justify text, set tabs, headers, footers, start new paragraphs, control underlining, double width and emphasised printing. SET V lets you see formatting on screen, though you can't edit at this stage.



Some features are rather unusual. For instance, you can have a succession of paragraphs numbered sequentially and subnumbered (1, 2.1, 2.1.1 etc), or indexed alphabetically. You can also mark text for insertion of names or suchlike at the printing stage.

But some things ar either missing or poorly implemented. It isn't possible to save or insert blocks of text. Deleting lines or words isn't easy and the text display makes editing long texts quite difficult. Combine that with a price that is rather on the high side and you have a word processor that we wouldn't instantly recommend. It is the most sophisticated we have seen so far for MSX, but we believe that there will be better programs from other companies, offering better value too.

Features: *Well specified, on paper*
Getting started: *Main commands are clear*
Documentation: *Comprehensive*
Conclusion: *See what else is available*

REVIEWS

HYPER VIPER

Supplier: Kuma Computers
Tel: (07357) 4335
Type: Arcade
Format: Cassette
Price: £7.95

If chasing nasty poisonous Vipers and Scorpions round a massive labyrinth is your idea of having a good time — *Hyper Viper* is for you!

Somehow you've ended up in a fluorescent green maze and as you wander up and down the corridors, long ghastly snakes appear from nowhere to pursue you around the maze.

Ultimately your aim is to escape from the labyrinth by completing all 10 of the maze levels, but be warned — it isn't easy, you'll probably find yourself wandering round the snake pit for ever!

To complete each maze level, you have to guide a little red and green beastie — bearing a remarkable resemblance to Pac Man — through the maze corridors. Four Vipers must be swallowed tail first by this beastie.

If the snakes meet you head on, only a skull and crossbones remains to tell the tale.

The mazes change their form each game, preventing you from getting too familiar with any particular maze layout. They also change colours — the first maze is green while the second and third are red and blue respectively.

The mazes also get progressively more complicated and much harder to move around in.

Accidentally bumping into the middle of a snake causes it to split into two — doubly horrible and dangerous, as both halves have to be consumed for it to count as one snake.

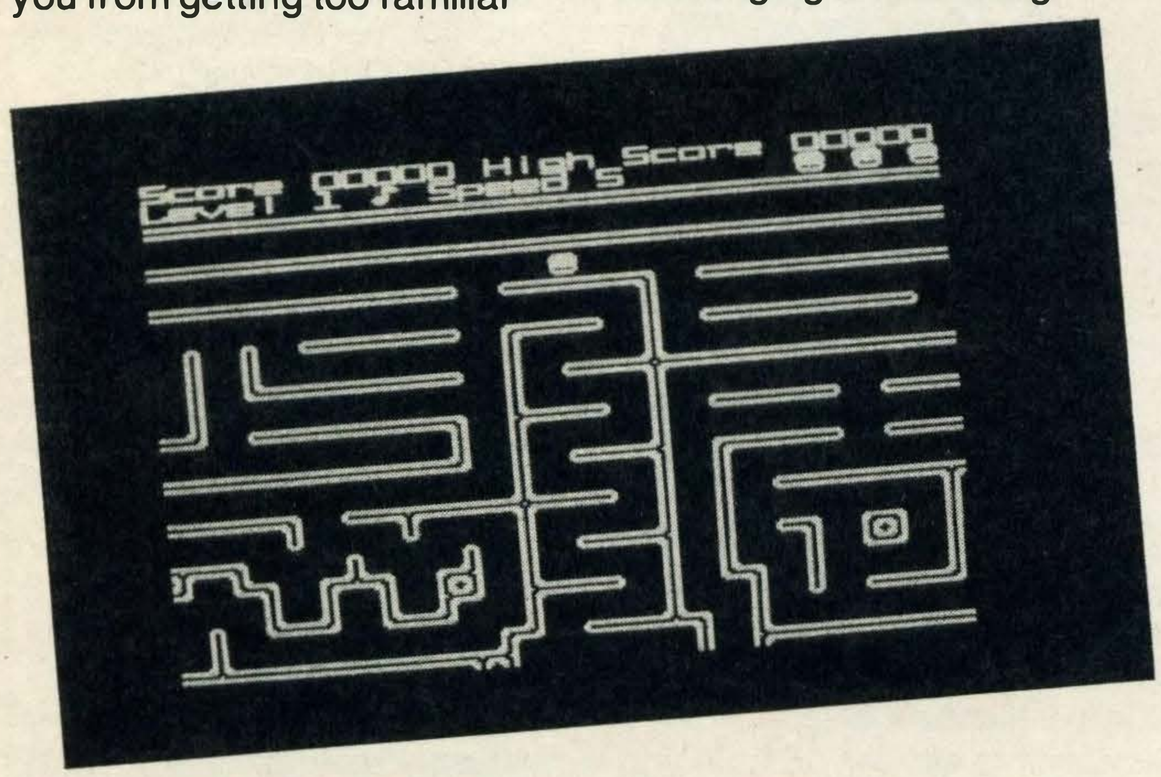
To add extra interest to the game, dubious-looking white eggs, fruit and purple scorpions also inhabit the maze. Points can be gained by eating the cherries, pears and scorpions.

The eggs, unfortunately, hatch into evil blue and red beasties endowed with incredible speed. Once they start chasing you — they usually catch up. However, since they only appear after you've been on the same level for a few minutes, it's possible to avoid them by eating four snakes and moving onto the next level as soon as you possibly can.

Contributing to the game's difficulty is the lack of a joystick control option. Even using the keyboard at the slowest speed of the three speed choices was difficult.

It's a shame Kuma didn't make better use of MSX's excellent graphics and sound capabilities. The pictures on *Hyper Viper* are of very average quality. Good sound and graphics can turn a mediocre game into a very good one.

As an entertaining, challenging and exciting game, *Hyper Viper* rates highly, but it certainly isn't easy to play!



Graphics: *Poor*
Sound: *Doesn't have any — a pity*
Addictiveness: *If nothing else, it's addictive*
Conclusion: *An enjoyable alternative to* Pac Man*-type games.*

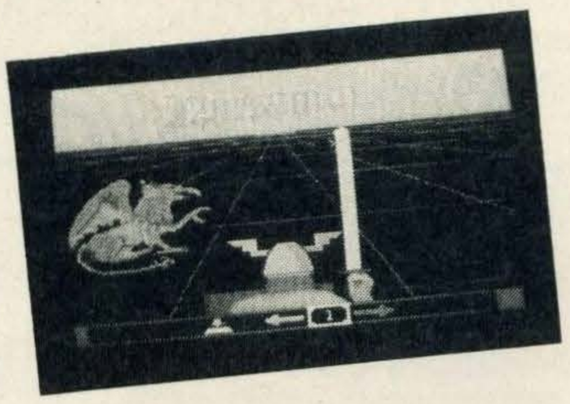
NORSEMAN

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

Going back to the 14th century, dressing up as a Viking and killing monsters is the theme of this game.

Cast as a Norseman (without the helmet), your mission is to exterminate as many of the gruesome monsters waddling around your grid as is humanly possible.

And, in common with most other games, you're not really given much choice — it's



either you or them! They are also trying to purloin the golden helmets too, which really keeps you on the ball.

The monsters keep arriving in waves (five per wave) and you have to repel five waves in a round.

To do battle with an individual monster, you move into its square; a successful encounter will render the monster totally senseless in a heap on his square.

Neither you nor the monsters can enter a square that is already occupied by a dead monster.

Playing the game is actually quite difficult as the monsters and the Norseman move very quickly and alternately, making the choice of which monster will move next very difficult. You have to keep watching all of them to see which one's going to move next.

Picking up a golden helmet slows your movements down to half the normal speed — making you easy prey!

But, looking on the bright side, should you manage to block a monster with the body of a dead monster he will commit suicide.

The game ends when a monster lands on a square that is occupied by a Norseman or a golden helmet. A round ends when all of the monsters are dead.

There are 10 levels to play, all providing different degrees of difficulty, but the game also becomes more difficult on a round by round basis.

This difficulty is achieved by speeding up the monster and the Norseman's movements each round.

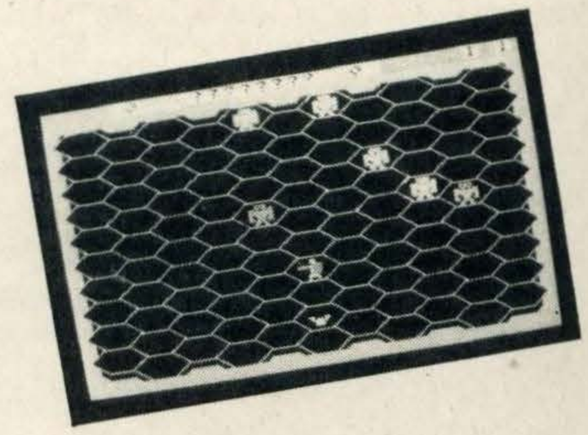
Playing the first three levels is quite easy; the monsters move uni-directionally and it's entirely up to you which ones get the chop first.

Again in levels four to six the monsters move in a single direction but you can only kill the ones that are flashing.

Level 10 is supposed to be the 'most difficult' as the monsters move in all directions, but funnily enough we found it the easiest one to play and even got a high score.

The graphics are very annoying and confusing. The Norseman is supposed to be jumping from square to square on a grid, but it looks more like a distorted hairnet than a grid. The characters themselves have blurred edges which doesn't do a lot for your eyes, especially if you're playing for more than half an hour.

We really couldn't see the point of the golden helmet which, if you carry it around,



slows you down. And if it's left lying around and a monster jumps on it, the game ends!

The game is only designed for one player and as such tends to lose all the excitement and competitiveness that's offered by games for two or more players.

Graphics: *Taxing*
User appeal: *Great if you're into monsters and vikings*
Conclusion: *Disappointing*

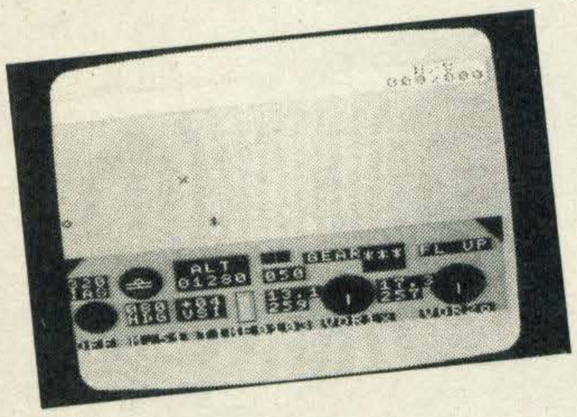
737 FLIGHT SIMULATOR

Supplier: Mirrorsoft
01-353 0246
Type: Flight simulator
Format: Tape
Price: £9.95

Over the weekend I managed to wipe out a dozen Boeing 737 aeroplanes. Fortunately, though, this debacle took place in my living room, with an MSX computer and this program.

Flying a Boeing 737 is not easy. Take off is a doddle — flaps down, power up and when you get to 100 knots, lift the nose. Flaps and undercarriage up, the climb rate at 400ft per minute and you're alone in the skies with only your radar and instruments to guide you. The only problem then is getting back on the ground in one piece — an art we've yet to master.

Simulating a 737 is not quite as exciting as, say, a Spitfire.



Once you're in the air, all you can do is fly around, watching dials. Unless you run out fuel, stall or go into a nosedive, the hum of the engines will set you dozing.

Landing is a totally different matter. You have to line up with the runway, get power levels right so that you don't stall, get the descent rate correct, remember to put flaps and undercarriage down — having four hands would be useful. Touchdown and you'll have to brake to a halt before the end of the runway. All straightforward stuff, really.

The program comes with a length manual, explaining the controls and the principles of aircraft piloting. The author is a 737 pilot, so the program seems pretty realistic, to the best of my knowledge.

Loading and fuelling up take a few minutes. But take our advice — before you start, do read the manual, or you'll be hopelessly lost.

An opening menu shows the large choice of options. You can start with take-off, in the air or on the final landing approach.

You can choose joystick or keyboard control, adjust the engine volume and turn off the keyboard bleep. You can also reset parameters such as stall speed, wind velocity and opt for a daylight mission. There is even the facility to set up your own airfield.

Controls are mainly function keys and joystick. There is a pause facility, so you can read up about something, a key to deliberately kill the engines, another to restart them, air brakes, automatic levelling and much, much more.

Used in conjunction with the instrument display, you should be also to pretty accurately get the hang of armchair flying.

The instruments show speed, altitude, rate of climb, elapsed time, flap angles and include such features as instrument landing aids. All sophisticated stuff.

Should anything go wrong a warning sounds and an appropriate message flashes up. Use the pause facility if panic sets in.

Apart from the instrument panel, graphics are restricted to a simple runway or a radar plot of your position. There is nothing much to look at, and the only rapid changes are in the dials.

The response to keys is at times pretty slow — you can end up pressing a key several times before action is taken, and the action is repeated for each time you frantically pressed the key. Don't panic in emergencies.

Just like the real thing, periods of intense boredom are punctuated by frantic activity. This may not be the most addictive simulator, but it certainly gives a taste of real flying.

Graphics: *Nice dials, but that's all*
Sound: *No in-flight music!*
User appeal: *Read the manual first*
Conclusion: *Heathrow, here we come*

SUPERMIND

Supplier: Morwood
Tel: (04243) 5840
Type: Strategy
Format: Cassette
Price: £6.95

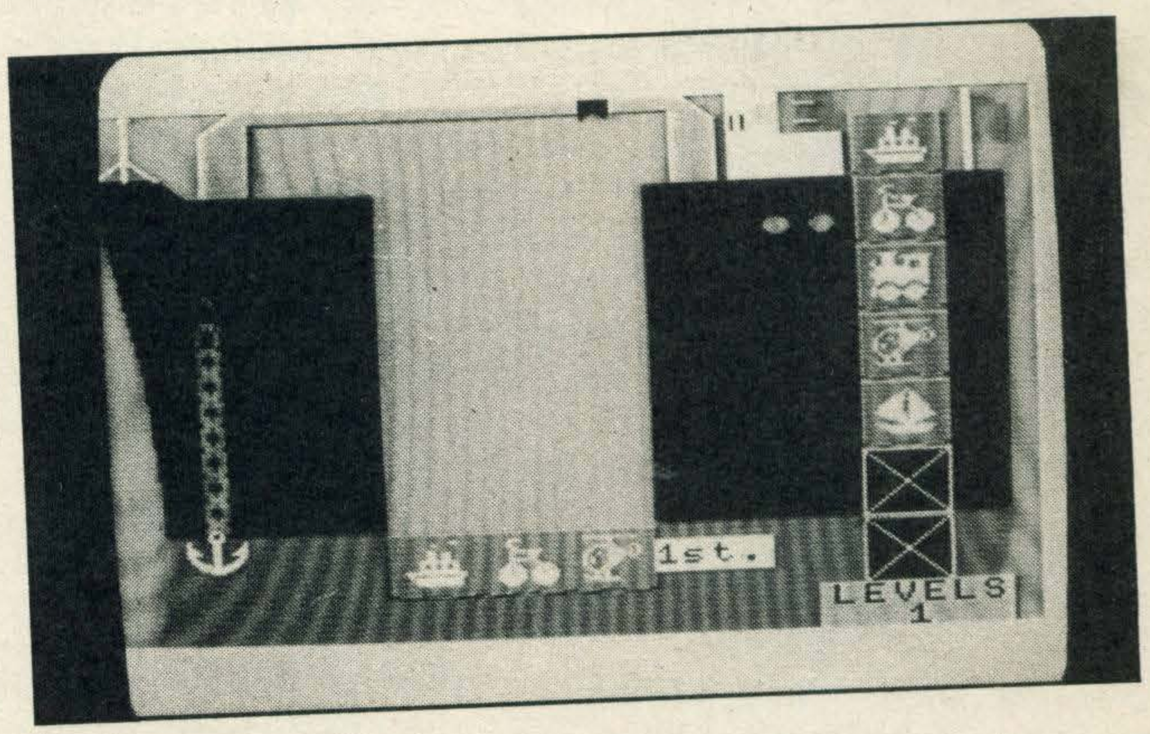
This can best be described as a brain game. Great powers of concentration and patience are required if you are to be successful. A lot of patience!

Confronted by a ship with an empty hold your task is to fill it with cargo.

The cargo consists of trains, bicycles, helicopters, cars and a yacht . . . it's a pretty big ship!

Your job is to place the goods in the hold but in the right order, which is a secret that you have to work out.

In the first level there are three containers inside the hold and it's up to you to decide which three of the five objects go into the containers.



By using the cursor keys to select your choice of a conveyor belt and then place them inside the hold inside their containers in the order that you think they should be.

Then, by pressing the space bar it is possible to find out how successful you've been. This is indicated by the containers changing colour. If they turn Red this means that you've picked the right object and put it in the right place.

If it is Yellow, this means that you've got the right object but put it in the wrong place. And if it turns green then you've got the wrong object and the wrong place!

Once you've managed to figure it all out you can decide which level you want to pit your brains against next.

Level four is the hardest. Here you have a choice of seven objects which include the addition of rockets, steamships and dolphins to put into three containers.

Pressing the space bar doesn't really help either. Only two colour codes appea. : Red and Yellow. Red means that you've managed to pick the right place but not whether you've got the right object.

And, as for Yellow, well that only tells you that it's the correct object.

All the objects have to be in their correct positions within a time limit. And this is measured by an anchor on the side of the ship. Once it reaches the deck your time has run out.

If you manage to get all the objects in the right place within the time a little rabbit dressed in a commissionaire's uniform appears on the bow.

Called Captain Sam he mumbles away in a totally uncomprehensive manner and then disappears. He decides the order in which the cargo goes into the hold. And at the end of the game it is his neck you'll feel like wringing!

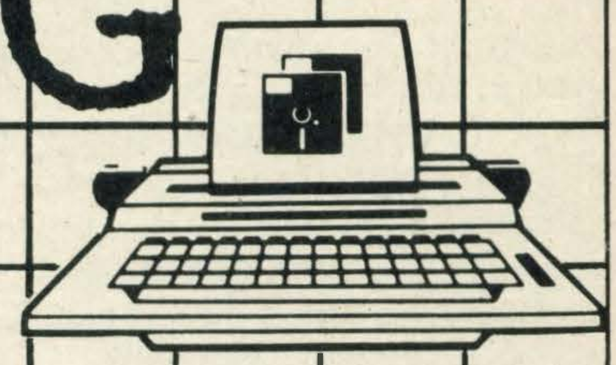
There are no points to be had with Supermind, it's really a strategy-type game that tests your powers of mental agility and organization.

We found ourselves getting a little bored after only a few minutes and don't think that it will appeal when there are other more 'active' games on the market.

Graphics: *Better than the game itself*
User appeal: *Ideal for those that lead repetitive lives*
Conclusion: *Mind boggling*

GET TYPING

Feel like doing it yourself? Get your teeth into our readers' programs



PLANETOID
by Andrew Lacey

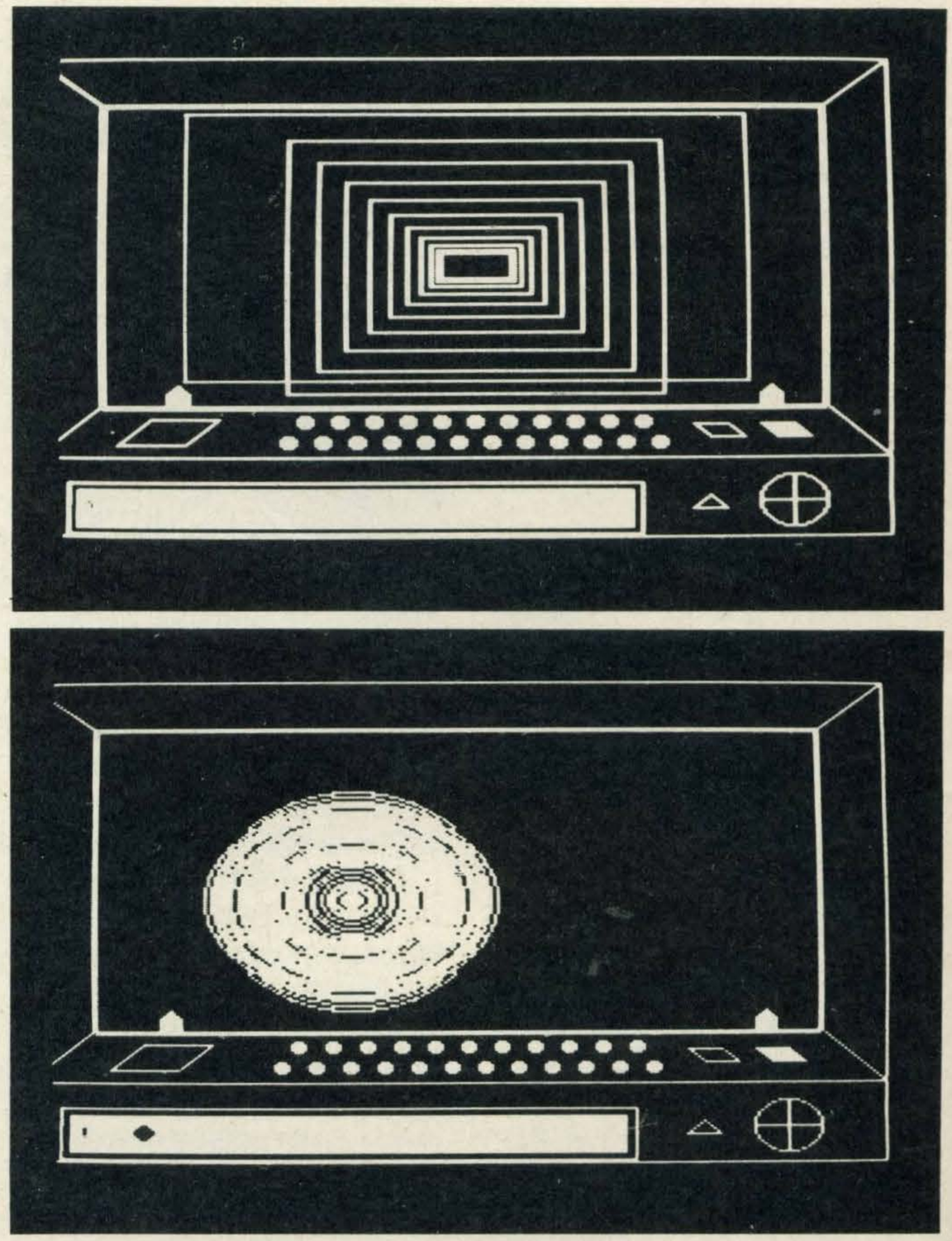
This program is taken from Andrew Lacey's forthcoming book, *MSX Games Book*, to be published by Melbourne House before Christmas. The idea is to: 'Venture through a space corridor into a zone full of destructive planetoids. Your lasers must strike a hidden weak spot on an approaching planetoid in order to save yourself from being converted into astral dust!'

There's plenty of opportunity to play around with this program to achieve different effects. For example, the way the planetoid approaches is controlled by lines 450 to 490. Changing R will modify the approach while messing about with AS gives the planetoid a new appearance. The difficulty level can also be changed by altering a couple of values in line 930.

The program, like a number of others in the book, makes use of a machine code support program. This is the short listing. Type this in first and SAVE it to tape as "SUPPRT". Then RESET the machine, type in the main listing, and SAVE it after the first program as "PLANET". To play the game, LOAD and RUN the support program, and then do the same with PLANET.

MAIN VARIABLES USED

PL	**Planetoid on screen?**
R	**Planetoid's radius**
WX,WY	**Weak point co-ordinates**
CX,CY	**Centre of planetoid**
AS	**Aspect ratio**
NP	**Number of planetoids destroyed**



These screen shots give you an idea of the action in store!

"SUPPRT"

```
10 CLS: PRINT"MACHINE CODE SUPPORT P
ROGRAM"
20 FOR I=60000! TO 60217!: READ Q: P
OKE I,Q: NEXT
1000 DATA 219,170,230,240,33,92,234,
94,246,8,0,0,0,0,0,0,0,0,0,0,211,1
70,219,169,71,0,0,0,0,0,0,0,0,0,0
1010 DATA 0,0,0,230,128,194,151,234,
203,91,202,151,234,62,3,50,94,234,19
5,209,234,120,230,64,194,170,234,203
,83,202,170,234,62,2
1020 DATA 50,94,234,195,209,234,120,
230,32,194,189,234,203,67,202,189,23
4,62,0,50,94,234,195,209,234,120,230
,16,194,208,234,203,75,202,208,234,6
2,1,50,94,234,195,209,234,201,62,0,5
0,93,234,58
1030 DATA 93,234,203,39,203,39,79,6,
0,33,0,27,9,58,95,234,71,58,94,234,8
7,254,0,194,250,234,205,27,235,121,1
52,79,195,44,235,254
1040 DATA 1,194,6,235,35,205,27,235,
195,244,234,254,2,194,20,235,205,27,
235,121,128,79,195,44,235,35,205,27,
235,195,14,235,125,243,211
1050 DATA 153,124,211,153,0,0,0,0,21
9,152,79,183,251,201,125,243,211,153
,124,246,64,211,153,121,211,152,251,
201
```

"PLANET"

```
1 CLS:PRINT "                Hit a Key"
2 IF INKEY$="" THEN D=RND(1):GOTO 2
5 COLOR 15,1,1: SCREEN 2,2
10 REM run machine code
11 REM support program
12 REM see appendices
15 FOR I=1 TO 32 : READ Q: A$= A$+CH
R$(Q): NEXT: SPRITE$(0)= A$
20 DEFUSR= 60000!: POKE 59996!,15: P
OKE 59999!,8
30 A$= "": FOR I=1 TO 8: READ Q: A$=
A$+CHR$(Q): NEXT:SPRITE$(1)=A$
100 LINE(20,140)- (235,20),15,B:LINE
(0,160)- (255,0),15,B:LINE(0,192)-(2
55,160),15,B:LINE(10,190)-(180,170),
15,B
110 LINE(13,187)- (177,173),15,B:PAI
NT(50,186)
120 LINE(0,160)- (20,140): LINE(255,
160)- (235,140): LINE(0,0)-(20,20):L
INE(255,0)- (235,20)
130 FOR I=80 TO 180 STEP 10: CIRCLE(
I,146),2: PAINT(I,146): NEXT: FOR I=
75 TO 185 STEP 10: CIRCLE(I,154),2:P
AINT(I,154):NEXT
140 DRAW"bm35,145r20g10l20e10bm195,1
47r10f5l10h5bm215,147r10f5l10h5":PAI
NT(220,150)
150 DRAW"bm200,175g5r10h5": CIRCLE(2
25,177),10:LINE(225,167)- (225,187):
 LINE(215,177)- (235,177)
160 LINE(21,141)- (234,21),15,B: DRA
W"bm40,139u4e3f3d4bm215,139u4e3f3d4"
:PAINT(42,138): PAINT(217,138)
165 IF NP=0 THEN 170 ELSE DRAW "bm35
,8": FOR I=1 TO NP: DRAW"g3f3e3h3br9
": NEXT
170 PRESET(17,178): PRESET(17,179):
PRESET(17,180): PRESET(1,179)
190 IF NP<>0 THEN 270
200 FOR J=1 TO 3 : X1=120: X2=141:Y1
=80:Y2=90
210 FOR I=1 TO 10 : B$="n"+STR$(I+20
): PLAY "m299s1119xb$;": LINE(X1,Y1)
- (X2,Y2),15,B: X1= X1-I: X2=X2+I:Y1
=Y1-I: Y2=Y2+I: NEXT: LINE(45,130)-
(211,24),15,B
220 X1=120: X2=141:Y1=80:Y2=90: FOR
I=1 TO 10: B$="n"+STR$(30-I): PLAY"m
299s1119xb$;": LINE(X1,Y1)- (X2,Y2),
1,B:X1=X1-I: X2= X2+I: Y1=Y1-I: Y2=Y
2+I: NEXT: LINE(45,130)- (211,24),1,
B: NEXT
270 PUT SPRITE0,(120,70),9
280 WX=0: WY=0: STRIG(0) ON: ON STRI
G GOSUB 900
300 A= PEEK(59996!): X=VPEEK(6913):
Y=VPEEK(6912): IF X<30 THEN POKE 599
96!,PEEK(59996!)
305 IF X>209 THEN POKE 59996!, PEEK(
59996!) AND 7 ELSE POKE 59996!, PEEK
(59996!) OR 8
310 IF Y<30 THEN POKE 59996!, PEEK(5
9996!) AND 14 ELSE POKE 59996!, PEEK
(59996!) OR 1
315 IF Y>100 THEN POKE 59996!, PEEK(
59996!) AND 11 ELSE POKE 59996!, PEE
K(59996!) OR 4
320 D=USR(D)
330 IF PL=0 AND RND(1)<.1 THEN GOSUB
 400
340 IF PL=1 THEN GOSUB 450
390 GOTO 300
400 CX=INT(RND(1)*90+80): CY=INT(RND
(1)*30+60): R=3: CIRCLE(CX,CY),R: PA
INT(CX,CY)
410 PL=1: PUT SPRITE 1, (170,176),1
420 WX=CX+INT(RND(1)*80-40): WX=CY+I
NT(RND(1)*70-35)
440 RETURN
450 IF RND(1)<.2 THEN R= R+2
460 AS=RND(1)/3+.8: CIRCLE(CX,CY),R,
15,0,6.28,AS
470 VPOKE 6917,160-3*R
480 IF VPEEK(6917)<15 THEN 2000
490 RETURN
700 STRIG(0)OFF: FOR I=1 TO 50 : PLA
Y"l40m380s8n24":X1=INT(RND(1)*90-45+
CX): Y1=INT(RND(1)*90-45+CY): X2=INT
(RND(1)*200+24): Y2=INT(RND(1)*110+2
5)
710 LINE(X1,Y1)-(X2,Y2),1: CIRCLE(X1
,Y1),1: CIRCLE(X2,Y2),2: PAINT(X2,Y2
): NEXT
720 PUT SPRITE 1,(100,200): PL=0
730 NP=NP+1: CLS: GOTO 100
900 IX= VPEEK(6913)+8: IY=VPEEK(6912
)+8: LINE(44,132)-(IX,IY),11: LINE(2
17,132)-(IX,IY),11
905 PLAY"l10m1000s14n33"
910 LINE(44,132)-(IX,IY),1: LINE(217
,132)- (IX,IY),1
920 IF PWX-CX)^2+(WX-CY)^2>=R*R THEN
 RETURN
930 IF ABS(IX-WX)<15 AND ABS(IY-WY)<
15 THEN 700
970 RETURN
2000 FOR I=1 TO 100 : PLAY "164m200s
14n23": X1=INT(RND(1)*255): Y1=INT(R
ND(1)*192): X2=INT(RND(1)*255): Y2=I
NT(RND(1)*192): LINE(X1,Y1)- (X2,Y2)
: NEXT
2010 SCREEN 1:PRINT"COLLISION WITH P
LANETOID!!!": PRINT: PRINT: PRINT: P
RINT"PLANETOIDS DESTROYED:";NP
2099 IF INKEY$= "" THEN END ELSE 209
9
10000 DATA 1,2,4,8,16,32,65,131,131,
65,32,16,8,4,2,1,128,64,32,16,8,4,13
0,193,193,130,4,8,16,3d,64,128
10010 DATA 24,10,126,126,60,24,0,0
```

LISTINGS

SPRITE DESIGNER by Graham Bland

The graphics sprites are one of the biggest attractions of MSX BASIC. But they can be a little difficult to design. Having to work out the figures and then try to relate them to shapes can be pretty tricky.

Fortunately, Graham Bland has come to the rescue with this program, which enables you to design sprites simply and then print out the appropriate data. If you haven't got a printer, the sprites can be saved to tape, in which case you will need to incorporate the shorter listing (below) into your own program. This allows the sprites to be loaded back in from the tape. You'll probably want to change the line numbers, but to be on the safe side, don't change the variable names.

The sprite editor program is controlled by moving around an arrow cursor. Simply move it to the part you want, using the cursor keys, and then hit the space bar. A menu panel on the right hand side shows the options and colours available (you can only have one colour at a time in the sprite, but this is no great disadvantage).

Designing a shape

The SHOW command prints the created sprite in the lower panel. NEXT lets you start on the new sprite, although previous ones are still held in memory for saving to tape. SAVE is the tape saving routine. QUIT returns you to BASIC. PRINT sends binary and decimal data on the created sprite to a printer. And finally, MODE allows you to choose between an 8 × 8 or 16 × 16 sprite, with the design grid changing on the screen, depending on your choice.

To actually design a shape, move the arrow to a square in the grid. Pressing SPACE fills in the square. Pressing it again makes the square blank. Just keep doing this until the sprite is complete, using the SHOW command at frequent intervals to see how it's shaping up. Now you can design your own characters, create your own aliens and generally liven up your graphics.

```
10  REM * SPRITE LOADING PROGRAM
20  SCREEN 2,2 : SNO = 0
30  OPEN "CAS:" FOR INPUT AS #1
40  IF EOF (1) THEN
50  INPUT S$
60  SPRITE$(SNO) = S$
70  SNO = SNO + 1
80  IF SNO = 32 THEN
90  GOTO 40
100 CLOSE #1
```

```
8x8 SPRITE
----------

BINARY DATA:

&B11110001
&B10011011
&B10011111
&B11110101
&B00110001
&B00110001
&B00110001
&B11110001

DECIMAL DATA:
 241
 155
 159
 245
 49
 49
 49
 241
```

A sample printout from the program

```
10 REM ************************
20 REM *                      *
30 REM * SIMPLE SPRITE EDITOR *
40 REM *       G.BLAND        *
50 REM *                      *
60 REM ************************
70 REM *
80 REM * INITIALISE
90 REM *
100 GOSUB 2230 : REM User info
110 CLEAR
120 MAXFILES=2
130 COLOR 15,4,15
140 DIM PLOT(8,2)
150 DIM SPTE$(32) : REM OFFSET DATA
160 DIM STBL$(32) : REM SPRITE DATA
170 SNO = 0 : REM SPRITE TABLE INDEX
180 CC=1 : REM CURRENT COLOUR
190 SM=0 : SH=1 : REM MODE INDICATOR
200 REM *
210 REM *   INITIALISE JOYSTICK
OFFSETS
220 REM *
```

```
230 FOR I = 1 TO 8
240 FOR J = 1 TO 2
250 READ PLOT(I,J)
260 NEXT J
270 NEXT I
280 DATA 0,-1,1,-1,1,0,1,1,0,1,-1,1,
-1,0,-1,-1
290 REM *
300 REM * DRAW SCREEN
310 REM *
320 SCREEN 2,2
330 LINE (180,8)-(248,136),15,B
340 LINE (140,8)-(176,136),15,B
350 FOR I = 26 TO 106 STEP 16
360 LINE (180,I)-(248,I),15
370 NEXT I
380 LINE (236,8)-(236,136),15,B
390 LINE (8,144)-(248,186),15,B
400 OPEN "grp:" FOR OUTPUT AS #1
410 PRESET (184,16): PRINT#1,"SHOW"
420 PRESET (184,32): PRINT#1,"NEXT"
430 PRESET (184,48): PRINT#1,"SAVE"
440 PRESET (184,64): PRINT#1,"QUIT"
450 PRESET (184,80): PRINT#1,"PRINT"
```

```
460 PRESET (184,96): PRINT#1,"MODE"
470 PRESET (16,150) : PRINT#1,"COLOU
R"
480 PRESET (72,150) : PRINT#1,"SPRIT
E"
490 PRESET(120,150):PRINT#1,SNO+1
500 REM *
510 REM * DRAW COLOUR PALETTE
520 REM *
530 C = 1
540 FOR I = 144 TO 160 STEP 16
550 FOR J = 16 TO 112 STEP 16
560 LINE (I,J)-(I+12,J+12),C,BF
570 C = C + 1
580 IF C = 4  THEN C = C + 1
590 NEXT J
600 NEXT I
610 LINE (16,164)-(60,176),CC,BF
620 REM *
630 REM * INITIALISE POINTER SPRITE
640 REM *
650 FOR I = 1 TO 8
660 READ A : S$ = S$ + CHR$(A)
670 NEXT
680 SPRITE$(0) = S$
690 DATA 240,192,160,144,8,4,2,1
700 REM *
710 REM *
720 GOSUB 1560
730 REM *
 740REM * DRAW SPRITE GRID
750 REM *
760 GOSUB 1470
770 REM *
780 REM * CLEAR SPRITE HOLDING ARRAY
790 REM *
 800GOSUB 1720
810 REM *
820 REM * Main Loop
830 REM *
840 REM *
850 REM * SET SPACEBAR INTERRUPT
860 REM *
870 STRIG(0) ON : ON STRIG GOSUB 100
0
880 REM *
890 REM * MOVE POINTER SPRITE
900 REM *
910 PUT SPRITE 0,(X,Y),1,0
920 IF STICK(0) = 0  THEN 920
930 X = X + PLOT(STICK(0),1) : Y = Y
 + PLOT(STICK(0),2)
940 IF X < 10 THEN X = 10
950 IF X > 248 THEN X = 248
960 IF Y > 134 THEN Y = 134
970 IF Y < 10 THEN Y = 10
980 GOTO 910
990 REM *
1000 REM    *    SPACEBAR INTERRUPT
ROUTINE
1010 REM *
1020 IF X < 136 THEN 1100
1030 IF X > 144 AND X < 172 THEN
1200
1040 IF X <236 THEN RETURN
1050 REM *
1060 REM * UPDATE ARRAY
1070 REM *
1080 M = INT ((Y-8)/16)+1
1090 ON M GOSUB 1270,1380,1790,1890,
1960,2160:RETURN
1100 V = INT ((X-8)/MD)
1110 W = INT ((Y-8)/MD)
1120 P = V + 3
1130 ID = W
1140 IF P > 10 THEN ID = ID + 16 : P
 = P-8
1150 IF MID$(SPTE$(ID),P,1)="0" THEN
 MID$(SPTE$(ID),P,1)="1" : LINE ((V*
MD)+10,(W*MD)+10)-((V*MD)+(MD+6),(W*
MD)+(MD+6)),15,BF : RETURN
1160 IF MID$(SPTE$(ID),P,1)="1" THEN
 MID$(SPTE$(ID),P,1)="0" : LINE ((V*
MD)+10,(W*MD)+10)-((V*MD)+(MD+6),(W*
MD)+(MD+6)),4,BF : RETURN
1170 REM *
1180 REM * UPDATE COLOUR INFORMATION
1190 REM *
1200 IF POINT(X,Y)=4 THEN BEEP : RET
URN
1210 CC = POINT (X,Y) : LINE (16,164
)-(60,176),CC,BF
1220 PUT SPRITE 1,(88,164),CC,1
1230 RETURN
1240 REM *
1250 REM * DEFINE SPRITE
1260 REM *
1270 S$=""
1280 FOR I = 0 TO LIM
1290 S$ = S$+CHR$(VAL(SPTE$(I)))
1300 NEXT I
1310 SPRITE$(1)=S$
1320 STBL$(SNO)=S$
1330 PUT SPRITE 1,(88,164),CC,1
1340 RETURN
1350 REM *
1360 REM * MOVE TO NEXT SPRITE
1370 REM *
1380 SNO = SNO + 1
1390 IF SNO = 32 THEN BEEP : RETURN
1400 LINE (8,8)-(136,136),4,BF
1410 LINE(120,150)-(142,158),4,BF
1420 PRESET(120,150):PRINT#1,SNO+1
1430 GOSUB 1270
1440 GOSUB 1720 : GOSUB 1470
1450 RETURN
1460 PRINTM:RETURN
1470 REM *
1480 REM * DRAW SPRITE GRID
1490 REM *
1500 FOR I = 8 TO 136 STEP INC
1510 LINE (I,8)-(I,136),15
1520 LINE (8,I)-(136,I),15
1530 NEXT
1540 RETURN
1550 REM *
1560 REM * 8x8 VARIABLE INIT.
1570 REM *
1580 INC = 16 : REM DEFAULT 8x8 GRID
1590 MD = 16  : REM DEFAULT ABS VALU
E
1600 CC=1     : REM DEFAULT SPT. COL
1610 LIM = 7  : REM DEFAULT LIMIT
1620 X = 128 : Y = 96 : REM CO-ORDS
```

LISTINGS

```
1630 RETURN
1640 REM *
1650 REM * 16x16 VARIABLE INIT.
1660 REM *
1670 INC = 8 : REM DEFAULT 16x16
GRID
1680 MD = 8 : REM DEFAULT ABS VALUE
1690 CC=1      : REM DEFAULT SPT. COL
1700 LIM = 31 : REM DEFAULT LIMIT
1710 RETURN
1720 REM *
1730 REM * CLEAR WORKING AREA
1740 REM *
1750 FOR I = 0 TO 31
1760 SPTE$(I)="&B00000000"
1770 NEXT I
1780 RETURN
1790 REM *
1800 REM * SAVE DATA
1810 REM *
1820 GOSUB 1270
1830 OPEN "CAS:LIB" FOR OUTPUT AS #2
1840 FOR I = 0 TO SNO
1850 PRINT #2,STBL$(SNO)
1860 NEXT
1870 CLOSE#2
1880 RETURN
1890 REM *
1900 REM * QUIT THE PROGRAM
1910 REM *
1920 SCREEN 0
1930 CLEAR
1940 END
1950 RETURN
1960 REM *
1970 REM * PRINT INV. SPRITE DATA
1980 REM *
1990 IF LIM = 7 THEN LPRINT"8x8 SPRI
TE"
2000 IF LIM = 31 THEN LPRINT"16x16 S
PRITE"
2010 LPRINT "-----------"
2020 LPRINT
2030 LPRINT "BINARY DATA:":LPRINT
2040 FOR I = 0 TO LIM
2050 LPRINT SPTE$(I)
2060 NEXT I
2070 LPRINT
2080 LPRINT "DECIMAL DATA:"
2090 FOR I = 0 TO LIM
2100 LPRINT VAL(SPTE$(I))
2110 NEXT I
2120 RETURN
2130 REM *
2140 REM * SWAP MODE (16x16 OR 8x8)
2150 REM *
2160 LINE (8,8)-(136,136),4,BF
2170 SWAP SM,SH
2180 GOSUB 1720
2190 IF SM = 0 THEN GOSUB 1560
2200 IF SM = 1 THEN GOSUB 1640
2210 GOSUB 1470
2220 RETURN
2230 REM *
2240 REM * USER INFO
2250 REM *
2260 CLS : KEY OFF
2270 PRINT "Sprite Editor":PRINT
2280 PRINT "Commands:":PRINT
2290 PRINT "SHOW : Display current s
prite"
2300 PRINT "NEXT : Create next sprit
e"
2310 PRINT"SAVE : Save all sprites t
o tape"
2320 PRINT "QUIT : Exit the program
2330 PRINT"PRINT : List current spri
te data to                printer"
2340 PRINT "MODE : Switch Between 8x
8 & 16x16                 sprites"
2350 PRINT
2360 PRINT "Spacebar :":PRINT
2370 PRINT "Select Colour"
2380 PRINT "Remove/Insert grid eleme
nt"
2390 PRINT "Select Menu Option"
2400 PRINT
2410 PRINT "Press any key to run pro
gram"
2420 A$=INKEY$:IF A$="" THEN 2420
2430 RETURN
```

THE OWL
by Fergus Cronin

This short program by Fergus Cronin shows how much can be done with so little. It uses the circle drawing command to build up a stylised owl's fa cewhich, Fergus believes, is better than that other owl adorning a certain brand of microcomputer! If you want ot vary the effect a little try omitting line 100.

```
10  REM "The Owl"
20  REM by Fergus Cronin
30  :
40  SCREEN 2
50  FOR X=1 TO 150
60  CIRCLE(X,96),90,X*10/100
70  CIRCLE(256-X,96),90,X*10/100
80  CIRCLE(128-X,56),28,X*10/100
90  CIRCLE(128+X,56),28,X*10/100
100 PAINT(1,11),1
110 NEXT X
120 GOTO 20
```

SPACE HAZARD
by Tom Sato

The ship moves slowly through space towards the station. Normally it would be an easy run — a smooth cruise on autopilot. But that was before the coming of the dreaded SPACE MEANIES.

Now the solar system is littered with this mechanical flotsam, these mindless, drifting hulks. Your mission, should you decide to accept it, is to guide the ship safely through the meanies to the haven on the space station.

But take care! Your approach must not be too fast. Fortunately you have instruments to help you. The crucial readout is the one which tells you if your speed is OK or too high — don't forget to keep an eye on it!

You have complete control over direction too. The ship is equipped with thrusters pointing down, left to right. To fire them, simply press the appropriate cursor key. But remember — firing the left thruster will start the ship drifting to the right, and vice versa. There is also a joystick option for those with better equipped space ships. Happy landings!

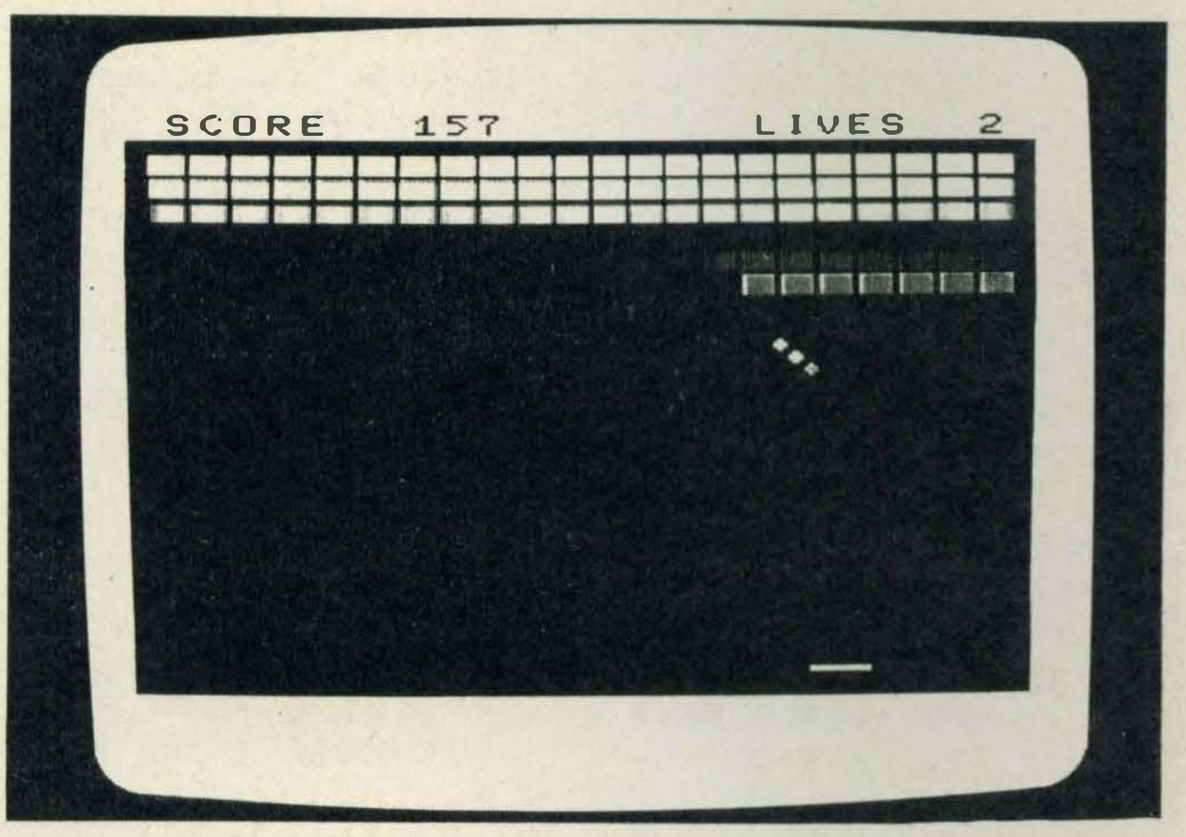
```
10 REM **********************
20 REM *  SPACE HAZZARD     *
30 REM *  MSX COMPUTING     *
40 REM *    BY TOM SATO     *
50 REM * 28 OCTOBER 1984    *
60 REM **********************
70 REM
80 OPEN "GRP:" AS #1
90 ON STOP GOSUB1690
100 STOP ON
110 ON SPRITE GOSUB 690
120 SPRITE ON
130 SCR=0
140 GOSUB 1600
150 COLOR 15,1,1
160 SCREEN 2,2
170 GOSUB 800
180 GOSUB 1290
190 GOSUB 1380
200 GOSUB 1450
210 REM INITIALISE
220 V=2
230 H=0
240 X=125
250 Y=0
260 F=140
270 FOR I=1 TO 4
280 X(I)=INT(200*RND(1)+20)
290 HS(I)=INT(RND(1)*8-4)*2:IF HS(I)
=0 THEN 290
300 NEXT
310 REM MAIN LOOP
320 IF STICK(Q)=3 THEN H=H-1:GOSUB 5
20
330 IF STICK(Q)=7 THEN H=H+1:GOSUB 5
20
340 IF STICK(Q)=5 THEN V=V+3:GOSUB 5
20
350 X=X+H
360 V=V-1
370 Y=Y-V
380 IF Y<-20 OR Y>190 THEN V=-V
390 IF X<-10 OR X>250 THEN H=-H
400 LINE(214,182)-(250,190),7,BF
410 DRAW "BM216,182"
420 IF V<-4 THEN PRINT#1,"HIGH" ELSE
 PRINT#1,"OK"
430 PUT SPRITE 0,(X,Y),10,0
440 FOR I=1 TO 4
450 X(I)=X(I)+HS(I)
460 IF X(I)<10 OR X(I)>240 THEN HS(I
)=-HS(I)
470 PUT SPRITE I,(X(I),I*35),7,4
480 NEXT
490 IF X>185 AND X<197 AND Y>139 AND
 Y<144 THEN 580
500 GOTO 320
510 REM FUEL ROUTINE
520 F=F-1
530 XF=24+INT(F/2)*2
540 DRAW "C7BM=XF;,180D9"
550 IF F<=0 THEN 690
560 RETURN
570 REM LANDING
580 COLOR 15
590 SCR=SCR+F*10
600 DRAW "BM70,70"
610 PRINT#1,"GOOD LANDING"
620 DRAW "BM30,80"
630 PRINT#1,"PRESS SPACE TO CONTINUE
"
640 DRAW "BM55,90"
650 PRINT#1,"YOUR SCORE";SCR
660 IF STRIG(0) THEN 180
670 GOTO 660
680 REM EXPLOSION
690 FOR I=1 TO 10
700 CIRCLE (X+8,Y+8),RND(1)*20,RND(
1)*15,,,,5+RND(1)
710 NEXT I
```

LISTINGS

```
720 COLOR 15
730 DRAW "BM50,100"
740 PRINT#1,"PRESS CTRL STOP THEN F5
"
750 DRAW "BM50,110"
760 PRINT#1,"TO PLAY ANOTHER GAME"
770 IF STRIG(0) THEN RUN
780 GOTO 770
790 REM SPACE SHIP
800 FOR I=1 TO 16
810 READ A$
820 B$=B$+CHR$(VAL("&B"+LEFT$(A$,8))
)
830 C$=C$+CHR$(VAL("&B"+RIGHT$(A$,8)
))
840 NEXT I
850 SPRITE$(0)=B$+C$
860 REM ALIEN UFO
870 FOR I=1 TO 16
880 READ A$
890 D$=D$+CHR$(VAL("&B"+LEFT$(A$,8))
)
900 E$=E$+CHR$(VAL("&B"+RIGHT$(A$,8)
))
910 NEXT I
920 SPRITE$(4)=D$+E$
930 RETURN
940 DATA 1000001001000001
950 DATA 0100011111100010
960 DATA 0010101111010100
970 DATA 0001101001011000
980 DATA 0010101001010100
990 DATA 0110101001010110
1000 DATA 1111101001011111
1010 DATA 0110101111010110
1020 DATA 0010101001010100
1030 DATA 0001101001011000
1040 DATA 0000101111010000
1050 DATA 0000111111110000
1060 DATA 0000111001110000
1070 DATA 0001100000011000
1080 DATA 0011000000001100
1090 DATA 0111000000001110
1100 REM
1110 DATA 1111100000000001
1120 DATA 0011111000000001
1130 DATA 0000111100000011
1140 DATA 0000011110000011
1150 DATA 0000001111000111
1160 DATA 0000011111101110
1170 DATA 0000110001111100
1180 DATA 0001110001111100
1190 DATA 0011110001111000
1200 DATA 0011111111110000
1210 DATA 0111011111000000
1220 DATA 1110011100000000
1230 DATA 1110001111000000
1240 DATA 1100000111100000
1250 DATA 1000000001111100
1260 DATA 1000000000011111
```

```
1270 REM BACKGROUND
1280 REM STAR FIELD
1290 R=RND(-TIME)
1300 CLS
1310 FOR I=1 TO 100
1320 J=256*RND(1)
1330 K=181*RND(1)
1340 PSET (J,K),15
1350 NEXT
1360 RETURN
1370 REM FUEL AND SPEED INDICATORS
1380 LINE(20,178)-(250,191),7,BF
1390 LINE(24,180)-(164,189),6,BF
1400 DRAW "BM170,182"
1410 COLOR 1
1420 PRINT#1,"SPEED"
1430 RETURN
1440 REM SPACE PLATFORM
1450 DRAW"BM200,155"
1460 COLOR 4
1470 A$="R3G1L3E1"
1480 FOR J=0 TO 2 STEP 2
1490 DRAW "A=J;"
1500 GOSUB 1550
1510 NEXT
1520 DRAW "A0"
1530 COLOR 1
1540 RETURN
1550 FOR I=68 TO 4 STEP -8
1560 DRAW "S=I;XA$;"
1570 NEXT
1580 DRAW "S0"
1590 RETURN
1600 CLS
1610 PRINT"SPACE HAZZARD"
1620 PRINT"BY T.S"
1630 PRINT "JOY STICK OR CURSOR KEY"
1640 PRINT"PRESS FIRE BUTTON"
1650 PRINT"OR SPACE BAR"
1660 IF STRIG(1) THEN Q=1:RETURN
1670 IF STRIG(0) THEN Q=0:RETURN
1680 GOTO 1660
1690 COLOR 15,4,7
1700 END
```

BREAKOUT
by Tom Sato



This is a classic game, one of the original video games which fascinated pub punters across the land. The concept might seem a little simple and old-fashioned when compared to something like *Antarctic Adventure.* But it's still fun, and easy to program.

A version of breakout is usually included in the sample tape given away with computers — at least, it is with other micros. But the MSX manufacturers seem to have missed it out. That's where we come in. Our prolific programmer, Tom Sato, has come up with a colourful version that should keep you breaking bricks for hours.

```
10 REM ********************
20 REM *   MSX COMPUTING   *
30 REM *   BREAK OUT       *
40 REM *   22ND OCT. 1984  *
50 REM *   BY T.S          *
60 REM ********************
70 OPEN "GRP:" AS #1
80 LV=5
90 LF=6
100 BR=0
110 SCR=0
120 SCREEN 2,0
130 COLOR 15,1,11
140 CLS
150 GOSUB 1070
160 GOSUB 860
170 GOSUB 960
180 BX=120
190 X=100
200 Y=80
210 HV=4
220 VV=4
230 REM MAIN LOOP
240 ST=STICK(0):IF ST<>0 THEN GOSUB
410
250 HV=HV*2*(.5+(X<=18 OR X>=239))
260 IF Y<=8 THEN VV=-VV
270 IF 176=Y AND X+4>=BX AND X<=BX+1
2 THEN GOSUB 360
280 IF Y>184 THEN 690
290 Y=Y+VV
300 X=X+HV
310 PUT SPRITE 0,(X,Y),15,0
320 C=POINT(X+3,Y+3)
330 IF C>=2 THEN GOSUB480
340 GOTO 230
350 REM HIT BAT
360 VV=-VV
370 IF ABS(HV)=4 AND RND(1)<.5 THEN
HV=SGN(HV)*2
380 IF ABS(HV)=2 AND RND(1)<.5 THEN
HV=SGN(HV)*4
390 RETURN
400 REM MOVE BAT
410 BX=BX+6*((ST=7)-(ST=3))
420 IF BX<=14 THEN BX=14
430 IF BX>=235 THEN BX=235
440 PUT SPRITE 1,(BX,181),11,1
450 PUT SPRITE 2,(BX+8,181),11,1
460 RETURN
470 REM REMOVE BRICK
480 VV=-VV
490 SCR=SCR+C
500 BR=BR+1
510 BEEP
520 TY=INT((Y-3)/8)*8+6
530 TX=INT((X-12)/10)*10+14
540 LINE(TX,TY)-STEP(8,6),1,BF
550 DRAW "BM80,0"
560 LINE -STEP(48,8),11,BF
570 DRAW "BM80,0"
580 PRINT#1,SCR
590 IF BR=LF*22 THEN GOSUB 620
600 RETURN
610 REM MORE BRICKS
620 LF=LF+1
630 GOSUB 960
640 X=100:Y=80
650 HV=4:VV=4
660 PUT SPRITE 0,(X,Y),11,0
670 RETURN
680 REM LOSE ONE LIFE
690 DRAW "BM179,0"
700 LINE -STEP(66,8),11,BF
710 DRAW "BM179,0"
720 COLOR 1
730 LV=LV-1
740 PRINT#1,"LIVES ";LV
750 BX=120
760 PUT SPRITE 1,(BX,181),11,1
770 PUT SPRITE 2,(BX+8,181),11,1
780 IF LV<>0 THEN 180
790 DRAW "BM100,100"
800 COLOR 13
810 PRINT#1,"END OF GAME"
820 DRAW "BM100,110"
830 PRINT#1,"PRESS SPACE"
840 IF INKEY$=" " THEN RUN ELSE 840
850 REM out side wall
860 LINE (0,0)-STEP(18,191),11,BF
870 LINE (14,0)-STEP(236,8),11,BF
880 LINE (248,0)-(255,191),11,BF
890 DRAW "BM179,0"
900 COLOR 1
910 PRINT#1,"LIVES ";LV
```

LISTINGS

```
920 DRAW "BM29,0"
930 PRINT#1,"SCORE ";SCR
940 RETURN
950 REM BRICKS: SET LF BEFORE ENTERI
NG
960 RESTORE 970
970 DATA 7,5,4,12,2,3,11,10,9,8,6,13
,4,5,7,14,15
980 FOR A= 1 TO LF
990 READ C
1000 FOR B= 1 TO 22
1010 X=B*10+14
1020 Y=A*8+6
1030 LINE (X,Y)-STEP(8,6),C,BF
1040 NEXT B,A
1050 RETURN
1060 REM BALL SPRITE
1070 RESTORE 1140
1080 FOR I=1 TO 8
```

```
1090 READ A$
1100 S$=S$+CHR$(VAL("&B"+A$))
1110 NEXT
1120 SPRITE$(0)=S$
1130 R=RND(-TIME)
1140 DATA 00000000
1150 DATA 00000000
1160 DATA 00011000
1170 DATA 00111100
1180 DATA 00111100
1190 DATA 00011000
1200 DATA 00000000
1210 DATA 00000000
1220 REM BAT SPRITE
1230 SPRITE$(1)=CHR$(255)+CHR$(255)+
STRING$(0,CHR$(0))
1240 RETURN
```

HOME FILING by Vince Apps

Is your address book in a muddle? Do you lose telephone numbers? Forget birthdays? This versatile filing system should help you sort yourself out. It will allow you to create and update files, e.g. list of names and telephone numbers, birthdays and dates, recipes and ingredients, etc., as well as accessing those files to search for a particular entry or list the entire file.

The program will display a menu to select one of the eight sections.

1. Input new records — this is used to start a new file or add new records to an existing file.
2. Amend record — change an existing record name or information, add new information or delete the entire record.
3. Display records on screen — lists out the entire file.
4. List records on printer — as above but to a line printer.
5. Search records — this powerful facility will enable you to access and display a record by name and, more usefully, search through the records for a particular 'string' — this can be any word or sequence of letters or numbers. Forgotten whose birthday it was today? Just type in the date and the program will search right through the records and print up the name.
6. Sort records alphabetically — a lot easier and faster than doing it by hand!
7. Load from tape — loads the file of records previously stored on cassette tape.
8. Save to tape — always use this section before turning the computer off!

THE PROGRAM

Lines	
160	Allocate space for string storage
180	Dimension arrays to hold records and record names
220- 340	Print menu
360- 390	Get and validate selection
400	Jump to corresponding part of program
420- 590	New record
610-1190	Amend record
630- 730	Find record name
740- 780	Check for correct record
800- 920	What shall we do with it?
940-1030	Delete it
1050-1080	Change its name
1100-1130	Change the record
1150-1190	Add new information
1210-1310	Display records on screen
1300-1430	List records on line printer
1450-1840	Search records
1450-1550	Name or string?
1560-1680	Look for name and display record if found
1700-1840	Look for string
1860-1960	Sort records alphabetically
1980-2100	Load file from tape
2120-2270	Save file to tape
2290-2300	Delay subroutine
2320-2360	Key press subroutine

This program is taken from 'The MSX Computer Program Book', written by Vince Apps, which is being published by Phoenix Publishing Associates in mid-December. This book contains useful routines and listings and will cost £5.95.

```
100 REM ************************
110 REM *                      *
120 REM * HOME FILING SYSTEM   *
130 REM *                      *
140 REM ************************
150 REM
160 CLEAR 3000
170 REM DIMENSION ARRAYS TO HOLD
      RECORDS AND RECORD NAMES
180 DIM R$(500),N$(500)
190 COLOR 1,15
200 CLS
```

```
210 REM PRINT MENU
220 LOCATE 9,1
230 PRINT "HOME FILING SYSTEM"
240 LOCATE 0,4
250 PRINT "1. Input new records" :
PRINT
260 PRINT "2. Amend record":PRINT
270 PRINT "3. Display records on scre
en":PRINT
280 PRINT "4. List records on printer
":PRINT
290 PRINT "5. Search records":PRINT
```

```
300 PRINT "6. Sort records":PRINT
310 PRINT "7. Load from tape":PRINT
320 PRINT "8. Save to tape":PRINT
330 LOCATE 0,21
340 PRINT "Select option number..."
350 REM GET AND VALIDATE RESPONSE
360 A$=INKEY$
370 IF A$="" THEN 360
380 BEEP
390 IF A$<"1" OR A$>"8" THEN 370
400 ON VAL(A$) GOTO 420,610,1210,1330
,1440,1860,1980,2120
410 REM NEW RECORD
420 CLS
430 LOCATE 0,6
440 INPUT "Is this a new file";Q$
450 IF LEFT$(Q$,1)="y" OR LEFT$(Q$,1)
="Y" THEN J=1 ELSE J=J+1
460 CLS
470 LOCATE 0,3
480 PRINT "Enter your records - type
`END' to  finish"
490 PRINT:PRINT
500 LINE INPUT "Record name? ";N$(J)
510 IF N$(J)="END" OR N$(J)="end" THE
N 580
520 PRINT
530 LINE INPUT "Information? ";R$(J)
540 IF R$(J)="END" OR R$(J)="end" THE
N 580
550 PRINT:PRINT
560 J=J+1
570 GOTO 500
580 J=J-1
590 GOTO 200
600 REM AMEND RECORD
610 CLS
620 N=0
630 LOCATE 0,3
640 INPUT "Record name";T$
650 PRINT:PRINT
660 M=1
670 IF T$=N$(M) THEN N=M:GOTO 740
680 M=M+1
690 IF M<>J THEN 670
700 IF N<>0 THEN 720
710 PRINT "Record name ";T$;" not fou
nd"
720 GOSUB 2290
730 GOTO 200
740 PRINT N$(N):PRINT
750 PRINT R$(N):PRINT
760 INPUT "This record";Q$
770 IF LEFT$(Q$,1)="Y" OR LEFT$(Q$,1)
="y" THEN 800
780 GOTO 680
790 REM AMEND RECORD MENU
800 CLS
810 LOCATE 0,4
820 PRINT "1. Delete record":PRINT
830 PRINT "2. Amend record name" :
PRINT
840 PRINT "3. Amend information" :
PRINT
850 PRINT "4. Add information":PRINT
860 LOCATE 0,14
870 PRINT "Select option...":PRINT
880 A$=INKEY$
890 IF A$="" THEN 880
900 BEEP
910 IF A$<"1" OR A$>"4" THEN 880
920 ON VAL(A$) GOTO 940,1050,1100,
1150
930 REM DELETE RECORD
940 FOR M=N TO J
950 N$(M)=N$(M+1)
960 R$(M)=R$(M+1)
970 NEXT M
980 N$(J)=""
990 R$(J)=""
1000 J=J-1
1010 PRINT "Record deleted"
1020 GOSUB 2290
1030 GOTO 200
1040 REM AMEND NAME
1050 INPUT "New name";N$(N)
1060 PRINT:PRINT"Name changed"
1070 GOSUB 2290
1080 GOTO 200
1090 REM AMEND INFORMATION
1100 INPUT "New information";R$(N)
1110 PRINT:PRINT"Information changed"
1120 GOSUB 2290
1130 GOTO 200
1140 REM ADD INFORMATION
1150 INPUT "New information";T$
1160 R$(N)=R$(N)+" - "+T$
1170 PRINT : PRINT "New information a
dded"
1180 GOSUB 2290
1190 GOTO 200
1200 REM DISPLAY RECORDS
1210 CLS
1220 D$=STRING$(36,219)
1230 FOR M=1 TO J
1240 PRINT:PRINT"Record name:";N$(M)
1250 PRINT:PRINT R$(M)
1260 PRINT:PRINT D$
1270 FOR DE=1 TO 100:NEXT DE
1280 GOSUB 2320
1290 NEXT M
1300 GOSUB 2290
1310 GOTO 200
1320 REM LIST RECORDS TO PRINTER
1330 CLS
1340 LOCATE 0,6
1350 LINE INPUT "Press enter when pri
nter ready";NU$
1360 FOR M=1 TO J
1370 LPRINT
1380 LPRINT "Record name:";N$(M)
1390 LPRINT
1400 LPRINT R$(M)
1410 LPRINT
1420 NEXT M
1430 GOTO 200
1440 REM SEARCH RECORDS
1450 CLS
1460 LOCATE 0,6
1470 PRINT "1. Record by name":PRINT
1480 PRINT "2. Information string" :
PRINT
1490 LOCATE 0,12
1500 PRINT "Select option...":PRINT
1510 A$=INKEY$
1520 IF A$="" THEN 1510
```

LISTINGS

```
1530 BEEP
1540 IF A$<"1" OR A$>"2" THEN 1510
1550 ON VAL(A$) GOTO 1560,1700
1560 INPUT "Record name";T$
1570 PRINT
1580 F=0
1590 FOR M=1 TO J
1600 IF N$(M)<>T$ THEN 1640
1610 PRINT "Record name:";N$(M)
1620 PRINT:PRINT R$(M)
1630 F=1
1640 NEXT M
1650 IF F=1 THEN 1670
1660 PRINT:PRINT"Record not found"
1670 GOSUB 2290
1680 GOTO 200
1690 REM STRING
1700 INPUT "String to search for";T$
1710 F=0
1720 FOR M=1 TO J
1730 X=INSTR(N$(M),T$)
1740 IF X<>0 THEN 1770
1750 X=INSTR(R$(M),T$)
1760 IF X=0 THEN 1800
1770 PRINT:PRINT"Record name:";N$(M)
1780 PRINT:PRINTR$(M):PRINT
1790 F=1
1800 NEXT M
1810 IF F=1 THEN 1830
1820 PRINT:PRINT"Record not found"
1830 GOSUB 2290
1840 GOTO 200
1850 REM SORT RECORDS
1860 CLS
1870 LOCATE 0,6
1880 PRINT "Sorting..."
1890 M=1
1900 IF N$(M)<N$(M+1) THEN 1940
1910 SWAP N$(M),N$(M+1)
1920 SWAP R$(M),R$(M+1)
1930 GOTO 1890
1940 M=M+1
1950 IF M<>J THEN 1900
1960 GOTO 200
1970 REM LOAD FROM TAPE
1980 CLS
1990 LOCATE 0,6
2000 PRINT "Load from tape":PRINT
2010 LINE INPUT "Press enter when cas
sette ready";NU$
2020 PRINT:PRINT "Loading..."
2030 OPEN "CAS:FILE" FOR INPUT AS 1
2040 INPUT #1,J
2050 FOR M=1 TO J
2060 INPUT#1,N$(M)
2070 INPUT #1,R$(M)
2080 NEXT M
2090 CLOSE
2100 GOTO 200
2110 REM SAVE TO TAPE
2120 CLS
2130 LOCATE 0,6
2140 PRINT "Save to tape":PRINT
2150 LINE INPUT "Press enter when cas
sette ready";NU$
2160 PRINT:PRINT"Saving..."
2170 MOTOR ON
2180 GOSUB 2290
2190 MOTOR OFF
2200 OPEN "CAS:FILE" FOR OUTPUT AS 1
2210 PRINT#1,J
2220 FOR M=1 TO J
2230 PRINT#1,N$(M)
2240 PRINT#1,R$(M)
2250 NEXT M
2260 CLOSE
2270 GOTO 200
2280 REM DELAY SUBROUTINE
2290 FOR DE=1 TO 2500:NEXT DE
2300 RETURN
2310 REM KEY PRESS SUBROUTINE
2320 Z$=INKEY$
2330 IF Z$="" THEN 2360
2340 Z$=INKEY$
2350 IF Z$="" THEN 2340
2360 RETURN
```

MSX ART
by Chris Ratcliffe

This program turns your monitor into a canvas and your computer into a brush. If you've ever fancied yourself as an electronic Picasso, now's your chance to prove it.

MSX ART allows you to draw and fill shapes on the screen. You have a choice of multi-colour or high resolution modes, and in the colourful one you can change the ink and paper colours at any time. Full on-screen instructions are included in the program, so there's no need to go into them here. In any case, the program is very easy to use.

The main program is quite compact, and is a good demonstration of the speed possible by using the ON . . . GOTO structure as opposed to the series of IF . . . THEN statements many programs consist of. So start expressing yourself, and one day your VDU may hang in the Tate.

```
10 REM msx art
20 REM by Chris Ratcliffe
30 REM october 1984
40 REM initialise for text
50 COLOR 11,0,0
60 SCREEN 0
70 KEY OFF
80 REM print up intructions
90 LOCATE 5,0
100 PRINT"msx  d.i.y. art  program"
110 LOCATE 5,1
120 PRINT"WWWWWWWWWWWWWWWWWWWWWWWWWW"
130 PRINT:PRINT"Use the cursor keys (
or joystick) to"
140 PRINT:PRINT" move the brush in an
y of the eight"
150 LOCATE 13,7
160 PRINT"directions."
170 PRINT:PRINT"Use the space bar (fi
re on joystick)"
```

```
180 PRINT:PRINT" to change the curren
t brush colour."
190 PRINT:PRINT"The function keys do
the following :-"
200 PRINT"F1 - changes background col
our"
210 PRINT"F2 - sets paint colour to b
ackground"
220 PRINT"F3 - clears the screen"
230 PRINT"F4 - returns the brush to t
op left"
240 PRINT"F5 - fills at the brush pos
ition"
250 PRINT:PRINT"    press any key to
continue"
260 REM wait for key press
270 IF INKEY$=""THEN270
280 REM print up text for mode input
290 CLS
291 COLOR 7
300 LOCATE 6,9
310 PRINT "which screen mode do you"
320 LOCATE 9,11
330 PRINT"want to work in ?"
340 LOCATE 7,14
350 PRINT"press 'H' for Hi-res mode"
360 LOCATE 5,16
370 PRINT "or 'M' for Multicolour mod
e"
380 REM wait for valid key press
390 A$=INKEY$
400 IF A$="h"ORA$="H"THENS=2:GOTO440
410 IF A$="m"ORA$="M"THENS=3:GOTO440
420 GOTO 390
430 REM print text for control input
440 CLS
444 COLOR 13
450 LOCATE 3,10
460 PRINT "do you wish to use a joyst
ick ?"
470 LOCATE 3,12
480 PRINT"press 'Y' for Yes or 'N' fo
r No"
490 A$=INKEY$:IF A$="n" OR A$="N"THEN
D=0:GOTO530
500 IF A$="y" OR A$="Y"THEN D=1 : GOT
O 530
510 GOTO 490
520 REM initialise for main program
530 SCREEN S:REM set selected mode
```

```
540 X=9:Y=1:I=11:C=1
550 STRIG(D) ON: REM arm fire button
560 ON STRIG GOSUB 750 ,750
570 REM arm function keys
580 FOR T= 1 TO 5
590 KEY (T) ON
600 NEXT
610 ON KEY GOSUB 790,830,860,880,920
620 REM *****main program loop*****
630 PSET(X,Y),I:REM set point
640 REM code to move brush
650 ON(STICK (D)+1)GOTO650,660,670,68
0,690,700,710,720,730
660 IFY>0THENY=Y-1:GOTO630ELSE650
670 IFY>0ANDX<255THENY=Y-1:X=X+1:GOTO
630ELSE650
680 IFX<255THENX=X+1:GOTO630ELSE650
690 IFY<190ANDX<255THENY=Y+1:X=X+1:GO
TO630ELSE 650
700 IFY<190THENY=Y+1:GOTO630ELSE650
710 IFY<190ANDX>8THENY=Y+1:X=X-1:GOTO
630ELSE 650
720 IFX>8THENX=X-1:GOTO630ELSE650
730 IFY>0ANDX>8THENY=Y-1:X=X-1:GOTO63
0ELSE650
740 REM change the brush colour
750 I=(I)MOD 15 +1
760 PSET(X,Y),I
770 RETURN
780 REM change the background colour
790 C=(C MOD 15)+1
800 COLOR 2,C,C
810 RETURN
820 REM make brush invisible
830 I=C
840 RETURN
850 REM clear screen
860 CLS
870 REM return cursor to home
880 X=9:Y=1
890 PSET(X,Y),I
900 RETURN
910 REM paint at brush position
920 PSET(X,Y),C
930 PAINT(X,Y),I
940 RETURN
```

This action packed section will appear in every issue of *MSX Computing*, crammed full of games and utility listings for MSX micros. Each program is listed straight on to a printer from a working version. So as long as your typing's OK, everything should work perfectly.

If you have a problem, don't hesitate to *write* to us. Unfortunately, we can't answer telephone queries as we're usually too busy putting together the next issue. In any case, the original programmer is rarely on hand to answer your questions. If you send us a letter, we'll be in a better position to sort out your problem.

As you grow more familiar with your micro, and become confident that you can produce a game or program of Interest to 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 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.

ADVERTISERS INDEX

General advice to readers concerning advertisements

When replying to advertisements in this issue, you should note the following points:

1. Always clarify the exact nature of any guarantee being offered.
2. Never send cash — always a cheque, Postal or Money Order.
3. Insist on a written receipt.
4. Clearly state the equipment you seek, and detail any acceptable alternatives.
5. Request an immediate statement of how and when the goods are to be delivered and whether the delivery will be split.
6. Check by telephone the latest prices and availability of goods you are ordering.
7. Cases of non-supply or wrong supply of goods should initially be taken up directly and as soon as possible with the supplier.
8. Because of fluctuations in prices and discounts, it is advisable to ensure that you reply only to advertisements published in current issues.

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If you order goods from mail order advertisers in this magazine and pay by post in advance of delivery, this publication ('MSX Computing') will consider you for compensation if the advertiser should become insolvent or bankrupt, provided:

1. **You have not received the goods or had your money returned; and**
2. **You write to the publisher of this publication ('MSX Computing') explaining the position not earlier than 28 days from the day you sent your order and not later than 2 months from that day.**

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claim and what evidence of payment is required.

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This guarantee covers only advance payments sent in *direct* response to an advertisement in this magazine (not, for example, payments made in response to catalogues etc, received as a result of answering such advertisements). Classified advertisements are excluded.

Note: The sums referred to are annual amounts available for compensation and they will be divided equally amongst all valid claims received.

MSX

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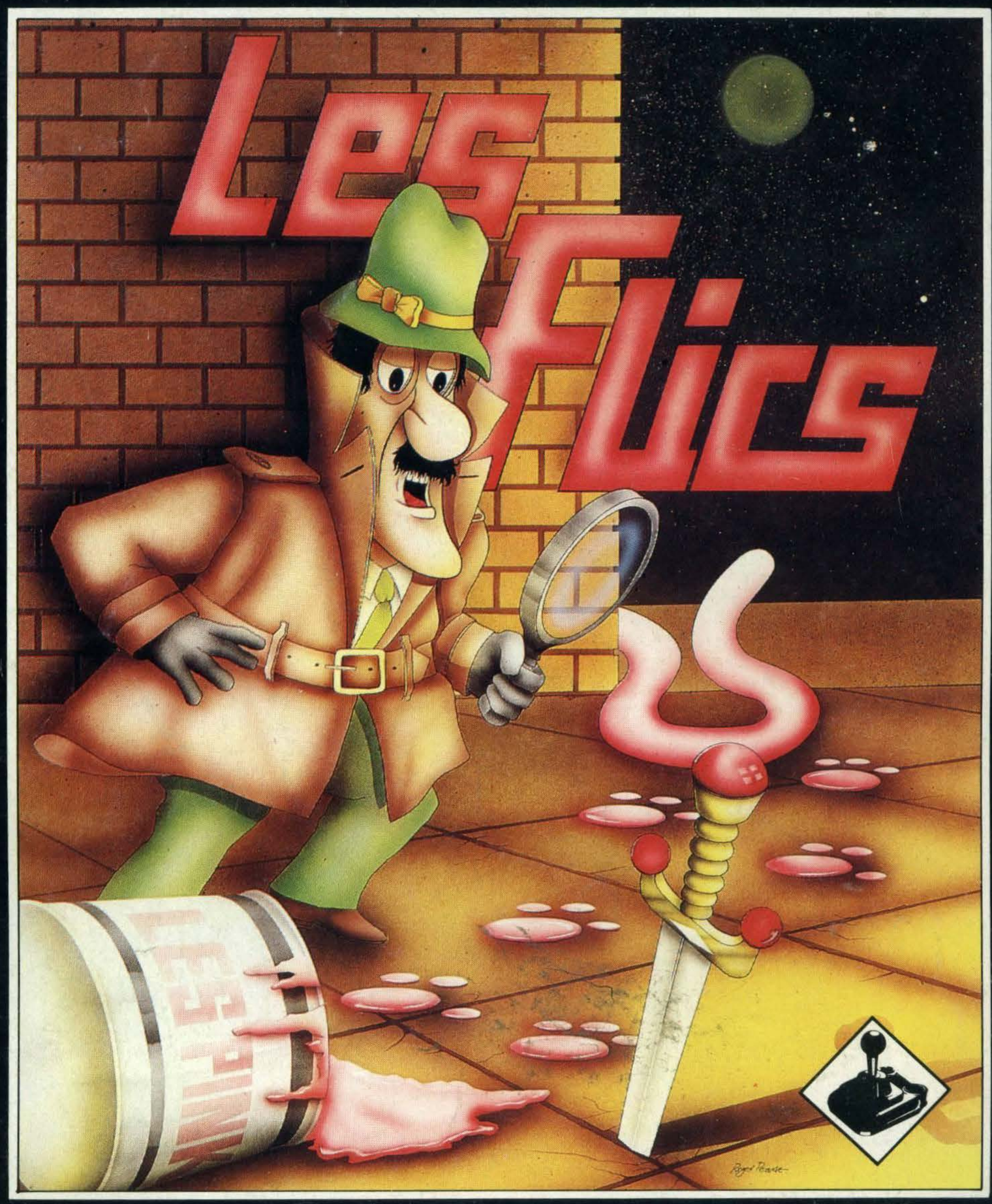


Allo? Ah ahm Unspecteur Cleudeau of the Sureté....

ah neu eggsactley weut yew are eup tew, beceuse that ees mei jeub.

Ah neu yew are geuing tew trah en steal a gem steun in mei care ..... beut eet weel naught be eezee mei frend, eau neau, mei and mei treusty servant Kaolin weel be tryin to steup yew.

Not eaunly zat, beut Les Flics, the treu gend'armerie eunder mei commant weel be out en force, so, you foel, you 'ave neo chance aggenst Cleudeau.....

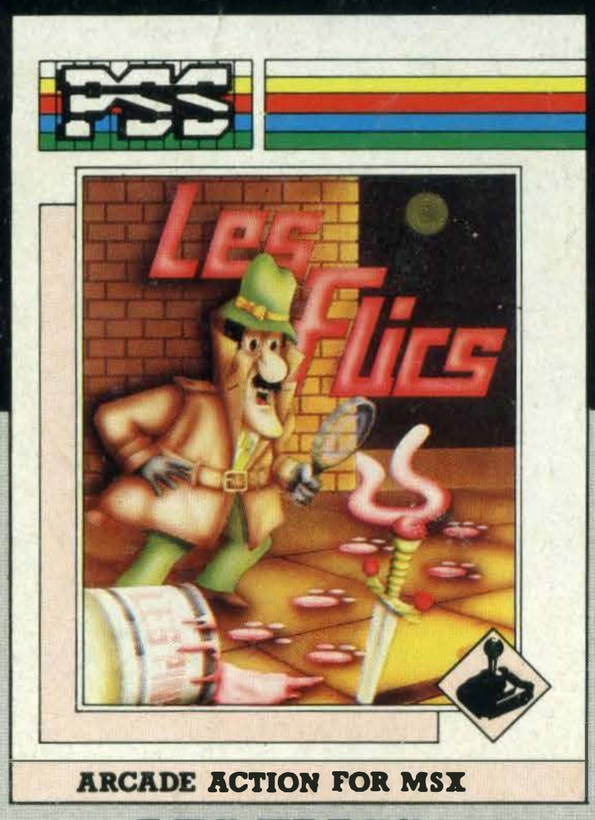
You control that Pink character with the tail in your quest for the Purple Puma, a priceless gemstone, avoid the Police cars and enter the buildings, evading Gendarme Kaolin (disguised as a chef) and of course Cleudeau himself.

Pick up the items as you find them, we leave you to find out what they do!

Bon Chance .....

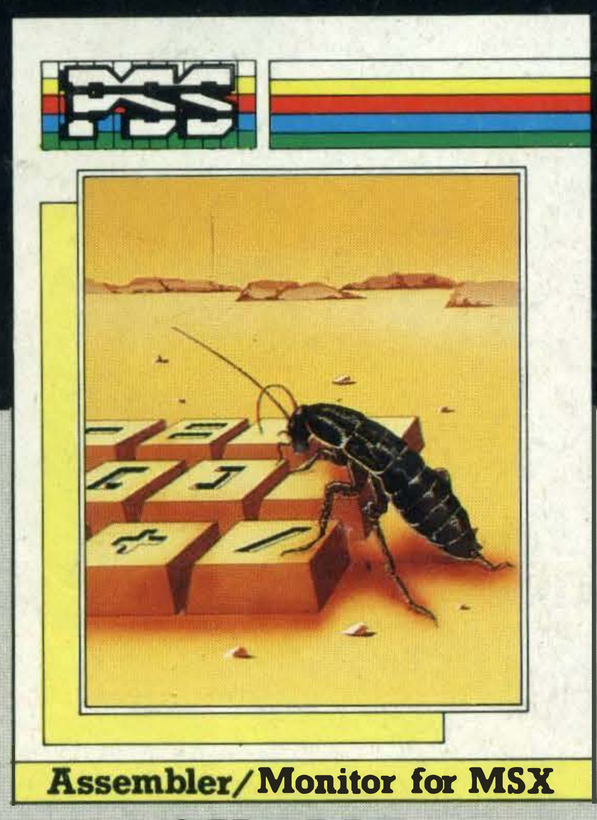
Dagger
Bag
Spanner
Knife & Fork
Key
Money
Disguise
Mask
Diamond

Send cheque or P.O. to: PSS, 452 Stoney Stanton Road, Coventry CV6 5DG. Tel: Coventry (0203) 667556



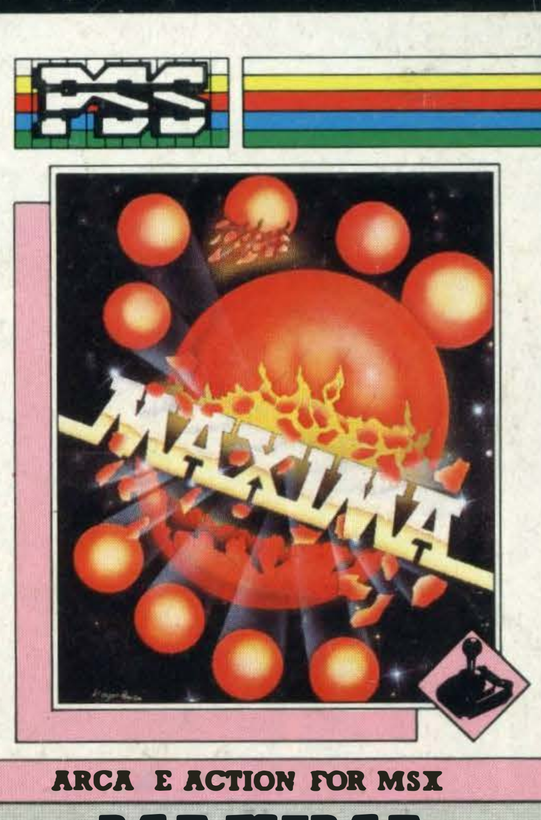
ARCADE ACTION FOR MSX

LES FLICS



Assembler/Monitor for MSX

CHAMP



ARCA E ACTION FOR MSX

MAXIMA

ARCA E ACTION FOR MSX

TIME BANDITS