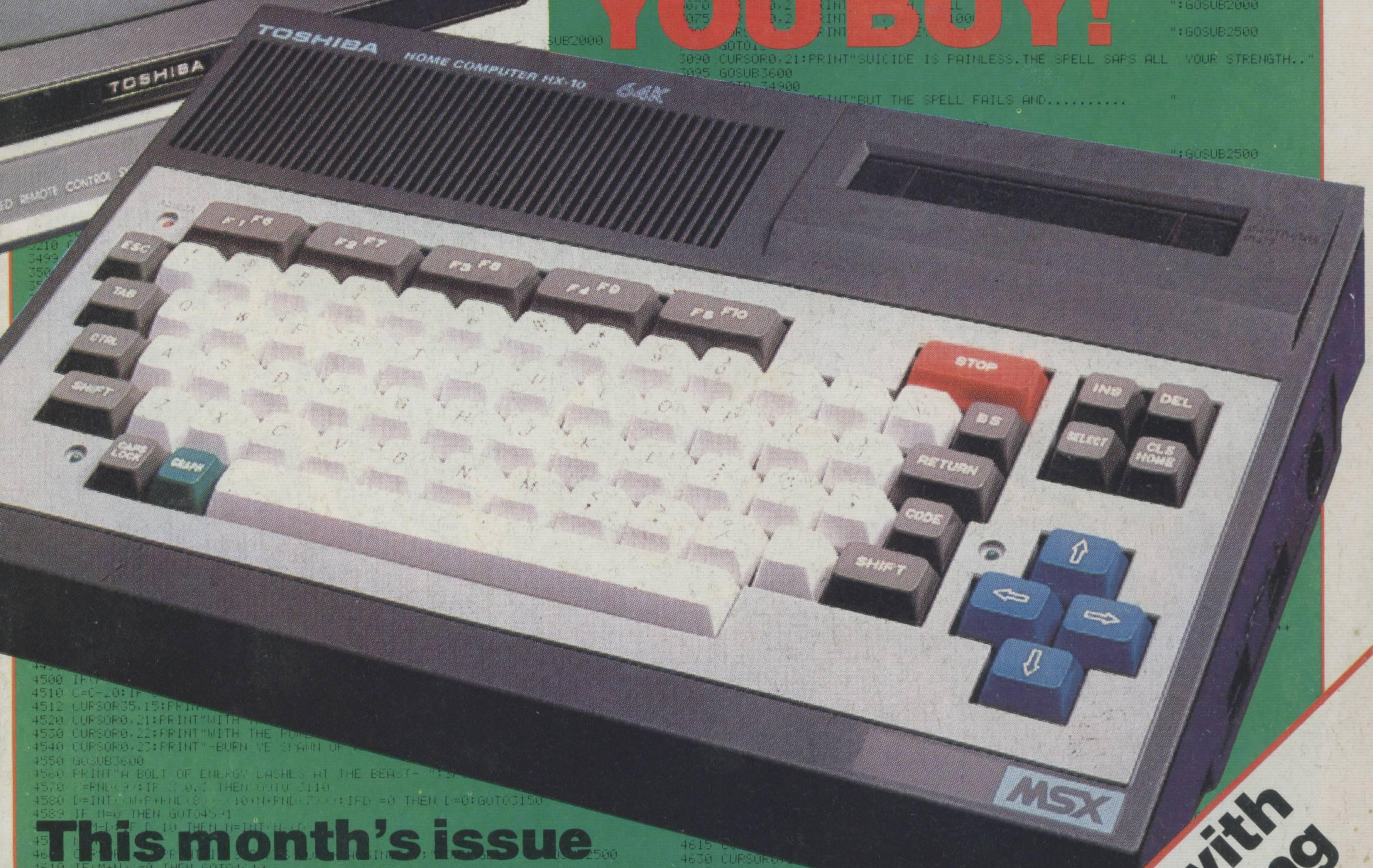


MSX

No. 2

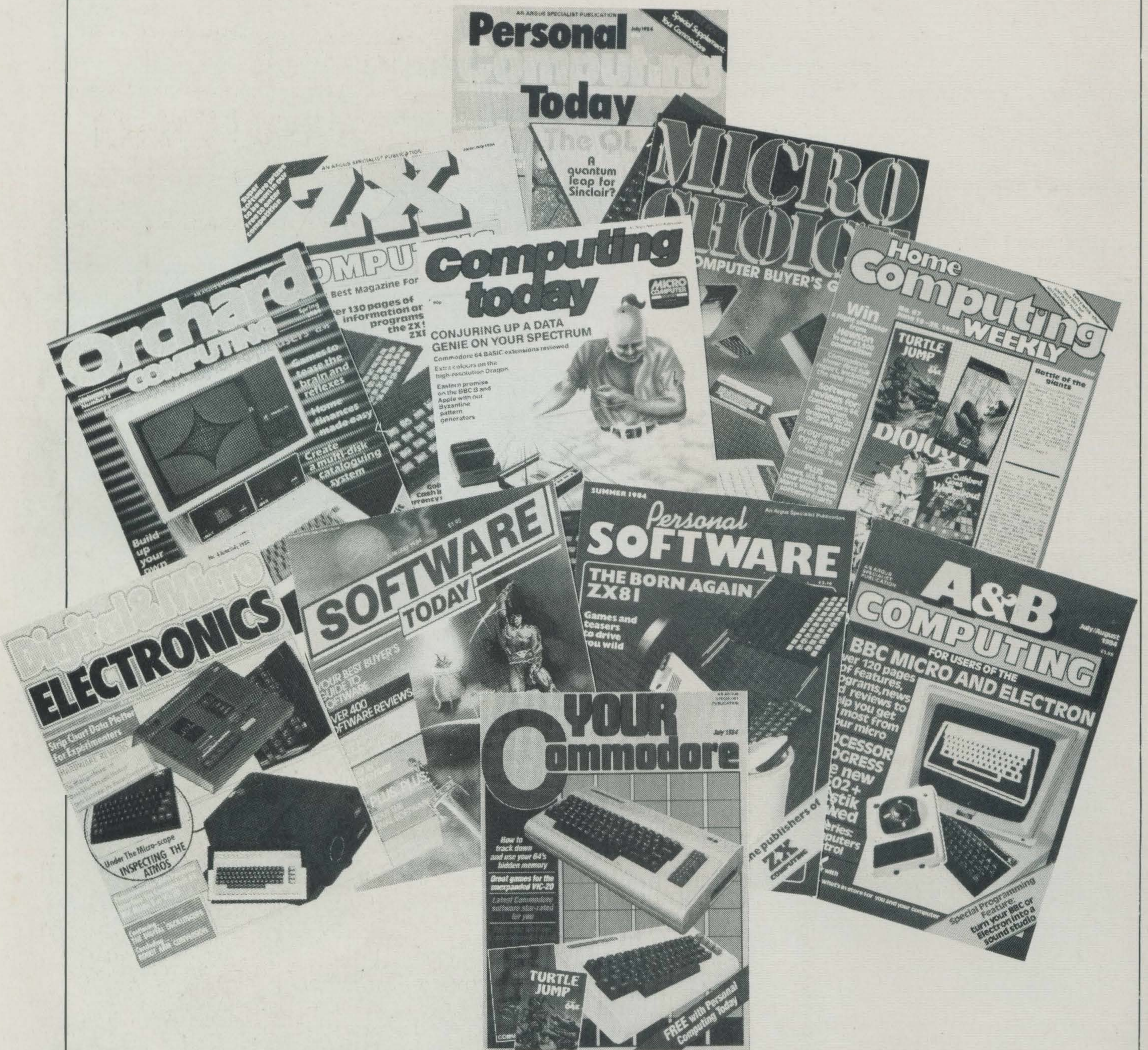
USER TRY BEFORE YOU BUY!



This month's issue contains the technical specification of **MSX BASIC**

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Peter Green

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Manager**
Beverley McNeil

Chief Executive
Jim Connell

**Argus Specialist
Publications Ltd,**
No. 1 Golden Square
London W1R 3AB
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Telex: 8811896

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We give you the rundown on who's planning what for MSX

Yamaha's MSX micro, due here in November, will also be a musical instrument, with its own remote piano-style keyboard.

The system will cost about £600 and will comprise Yamaha's CX5 computer with a built-in sound module and added keyboard.

Jerry Uwins, marketing manager for the company's UK arm, Kemble-Yamaha, said "With 48 preset sounds it can sound like a piano, trumpet, violin... any instrument you care to name.

"Composing is going to be one particular feature.

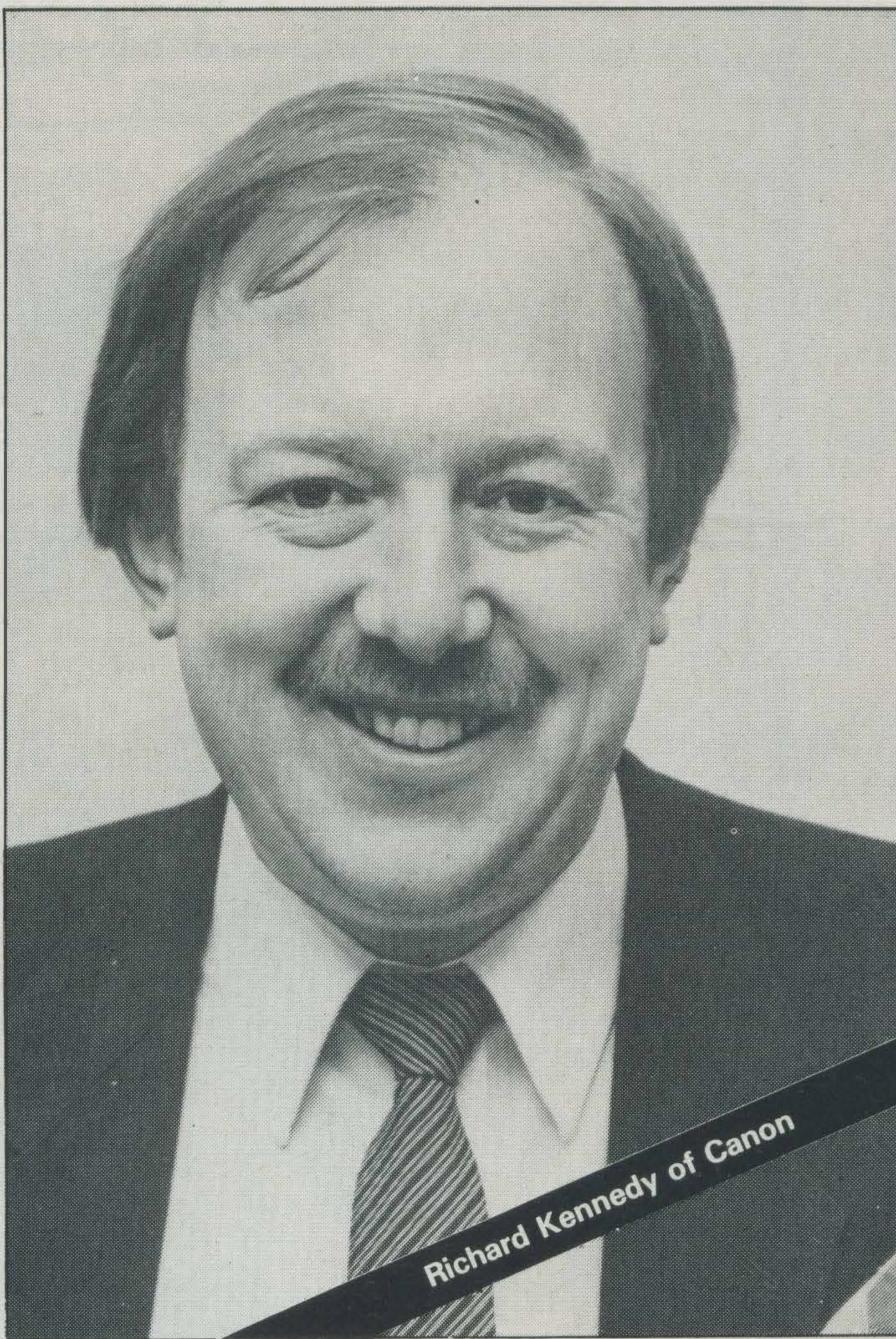
"One of the important points to stress is that the various squeaks and squawks that you get out of Commodore and Sinclair are not in the same league.

"The sound is very similar to our DX9 synthesiser, which is a proper, pedigree musical instrument using proper classical notation."

The MSX computer from Sony will probably be called the Hit Bit.

Sony's new business manager, Mike Margolis, explained: "Until a week before we launched the Walkman we were in two minds about whether to use the name.

MSX USER



Richard Kennedy of Canon

"We thought: 'Why call it a silly name like Walkman... it's ridiculous'. We thought long and hard about it. But it's now part of the language. It has a personality and it's part of a lifestyle.

"A lot of the thinking behind the computer was done by the same people who are behind the Walkman, so we would

expect the same unique approach. The uniqueness of the name has been an advantage to the Walkman and it would be the same for the computer."

Sony's present range of products in the UK include hi-fi, audio, video, TV and broadcasting equipment for both TV and radio.

And Mr Margolis said the computer would be sold through dealers who are currently selling Sony products.

Answering criticisms that the MSX standard could delay computer development, he said: "The way we see home computers is that they have traditionally been developed by boffins, reviewed by boffins and bought by boffins.

"They are people who are interested in computers for their own sakes. We believe there are a lot of people who are interested in home entertainment, not only to do their own programming.

"There is a large number of people who are afraid of buying home computers. They are not sure what to buy and they have a whole list of fears."

The only reason for innovation was to bring benefits to the consumer — which would continue to be done with MSX — but there was no point in putting the latest chip into a home computer to sort 10 megabytes of information more quickly.

Speed of games was important, though. And the format allowed considerable sophistication, not only with discs and the CP/M business operating system to come, but also the possibility of a second processor — increasing speed by two to three times — within about three years.

He stressed, however, that the computers would always be upward-compatible. The companies making them were highly competitive and their only common ground was compatibility.

Mr Margolis said Sony would be bringing out its own

peripherals, like disc drive and joystick, but probably not a standard joystick.

He said: "We pride ourselves on being innovative."

Toshiba expects to have its computer in the shops in September/October. Product manager Chris Greet said: "We're been ahead of the field in Japan, so we will possibly be one of the first in the UK."

UK buyers had the advantage that they would be getting the second generation of MSX computers, advanced on what first went on sale in Japan.

Talking of computer development, he said that the problem with boffins and research staff was that they always wanted to wait for the next advance before bringing out a computer.

He felt that in the beginning there may be some confusion in the minds of buyers about which MSX computer to choose. But this would be cleared up as each manufacturer advertised and promoted its additional features.

He said: "At the end of the day the machines are completely different. Some have cassettes built in, some have got built-in joysticks."

JVC's computer, made in the town of Ewai, 50 miles north of Tokyo, will also have 64K of RAM and cost will be about £250. The company also plans to offer a monitor, 3½in disc drive and a data recorder.

JVC's assistant marketing manager, Stephen Michaelis, said his company was also thinking of introducing a 5¼in drive because that format was quite popular.

be running training courses for dealers before the launch."

There would also be training for service engineers at the same centres, as well as in Scotland and Ireland.

Mr Michaelis said: "I don't see many problems on that side — video recorders are far more complex and our dealer network can service them already. Computers are a piece of cake."

JVC, short for the Japan Victor Company, is the inventor of the VHS video recorder format — which now had a claimed 80 per cent of the market — and makes video recorders, TVs, hi-fi, including compact disc players, as well as other products. It employs 1,200 people worldwide.

Mr Michaelis expected JVC to export its computer to most of Europe, starting with France

The big names behind MSX reveal their plans for their own machines. What sets them apart from each other? Paul Liptrot investigates

He said: "At some stage you have to put something on the marketplace.

"The technology behind the MSX standard is not unique — it uses standard components. But we know the reliability and we know how to develop software for the computers.

"If you look at the problems other computer manufacturers are having you can see the advantages of existing technology. That isn't to say that our computers are absolutely fixed. There's a lot of things coming from Japan."

The general manager of Canon's systems division, Richard Kennedy, expected his company's computer to start arriving in October.

He was cautious, however, saying: "We are taking a very advised view of the market. We are very enthusiastic about the product and the market and we are trying very hard to get it right from the point of view of availability of software. From the past, we know that software can be a little late."

He expected Canon's 64K computer, costing about £250, to get a major marketing push in the spring of next year. By then, he said, it would be on sale in every major high street retailer.

He expected tremendous competition between the makers of MSX computers.

He said: "We are aiming at the audio and video dealer who we are already supplying.

"Some of the dealers, about 10 per cent, are already selling computers and they know a fair bit about them. We have two training centres, in London and in Leeds, and we'll

and Germany next year.

But supplies for the UK would at first be limited. He said: "It's very critical coming into the market in October. This year I don't think we will be able to meet demand because it's coming too late."

What MSX will mean

MSX will cure the major headache for home computer users and dealers: software for one micro won't generally work on another maker's range.

Several Japanese companies have got together to bring out computers which all use the same BASIC and operating system. And European and American computer makers are thinking of doing the same.

It means that all software and peripherals will run on any computer using the same standard, designed by the U.S. company Microsoft. MSX stands for Microsoft Extended.

MSX computers are due in the shops in September from, among other companies, Hitachi, Teleton, Sanyo, Mitsubishi, Sony, Toshiba, Canon and Yamaha.



CHARTBUSTERS

BRITAIN'S SOFTWARE

CHARTS

by the ASP Market Research Group

ARCADE

1 Sabre Wulf	Ultimate	Spectrum (-)
2 Beach Head	US Gold	CBM (2)
3 Loco	Alligata	CBM 64 (3)
4 Psytron	Beyond	Spectrum (5)
5 Omega Race	Commodore	CBM 64 (4)
6 Trashman	Quicksilver	CBM 64 (7)
7 Oblivion	Bug-Byte	Spectrum (6)
8 Son of Blagger	Alligata	CBM 64 (9)
9 Trashman	New Generation	Spectrum (10)
10 Munch Mania	Mastertronic	CBM 64 (-)

NON-ARCADE

1 Mugsy	Melbourne House	Spectrum (1)
3 Flight Path 737	Anlrog	CBM 64 (2)
3 Lords of Midnight	Beyond	Spectrum (4)
4 Sphinx Adventure	Acornsoft	BBC (3)
5 The Inferno	R. Shepherd	Spectrum (6)
6 Mastermind	Commodore	CBM 64 (5)
7 Valhalla	Legend	CBM 64 (7)
8 The Fall of Rome	APS	Spectrum (9)
9 Quizmaster	Commodore	CBM 64 (10)
10 Solo Flight	US Gold	CBM 64 (8)

Compiled with the assistance of Britain's leading software distributors, including: Pinnacle, SDL, PCE, Websters, PCS and Software Centre.

SPECTRUM

1 Sabre Wulf	Ultimate (1)
2 Jet Set Willy	Software Projs (-)
3 Stop the Express	Sinclair (9)
4 Match Point	Sinclair (-)
5 Mugsy	Melbourne Hse (-)
6 Atic Atac	Ultimate (-)
7 Scuba Dive	Martech (-)
8 Fighter Pilot	Digital Integratn (-)
9 Night Gunner	Digital Integratn (-)
10 Manic Miner	Software Projs (-)

COMMODORE 64

1 Manic Miner	Software Projs (-)
2 Beachhead	Centresoft (-)
3 Solo Flight	Centresoft (-)
4 Colossus Chess	COS (-)
5 Chuckle Egg	A & F (-)
6 Snooker	Visions (-)
7 Superpipeline	Tasket (-)
8 Megawarz	Paramount (-)
9 Chinese Juggler	Microsoft (-)
10 Revelation	Softek (-)

DRAGON 32

1 Buzzard Bait	Microdeal (-)
2 Cuthbert in Space	Microdeal (-)
3 Hungry Horace	Melbourne Hse (-)
4 Bug Diver	Mastertronic (-)
5 Dragon Chess	Oasis Software (-)
6 Mr Dig	Microdeal (-)
7 Sprite Magic	Knight (-)
8 Chuckle Egg	A & F (-)
9 Transylvanian Twr	R. Shepherd (-)
10 Hunchback	Ocean (-)

Compiled by W. H. Smith and Websters. Figures in brackets are last week's positions.

VIC-20

1 Computer War	Creative Sparks (-)
2 Tank Commander	Creative Sparks (-)
3 Chariot Race	Microantics (-)
4 Snooker	Visions (-)
5 Flight 015	FerrantiCralg (-)
6 Games Designer	Galactic (-)
7 Wizard and the Princess	Melbourne House (-)
8 Grandmaster Chess	Audiogenic (-)
9 Duck Shoot	Mastertronic (-)
10 Tower of Evil	Creative Sparks (-)

BBC

1 Aviator	Acornsoft (-)
2 JCB Digger	Acornsoft (-)
3 Linkwood French	Acornsoft (-)
4 Linkwood German	Acornsoft (-)
5 Chouls	Micropower (-)
6 Fortress	Pace (-)
7 Snooker	Acornsoft (-)
8 Snooker	Visions (-)
9 Twin Kingdom Valley	Bug-Byte (-)
10 Tree of Knowledge	Acornsoft (-)

ZX81

1 Krypton Ordeal	Novus (4)
2 Black Crystal	Carnell (9)
3 Planet Raider	Novus (8)
4 Walk the Plank	Novus (5)
5 Sabotage	Sinclair (10)
6 Space Raiders	Sinclair (-)
7 Flight Simulation	Sinclair (-)
8 Chess 1K	Sinclair (-)
9 Reversi	Sinclair (-)
10 City Patrol	Sinclair (-)

We take the lid off MSX

Software expert Simon Rockman studies the MSX and comes up with his verdict.

Ever since the early days of microcomputers there have always been problems with incompatibility. If you wanted to swap programs, your friend would have to have the same computer as you. If you upgraded your machine most of your old programs would not run on your new computer, indeed you would be lucky if they loaded. If you bought a new computer from a different manufacturer any compatibility would be a pleasant surprise.

Microsoft set out to do something about this mess and drew up a standard for manufacturers, known as MSX. Previous standards such as CP/M specified little more than the software. MSX specifies almost everything. The BASIC, operating system, disc operating system, chips, shape and wiring of all the ports, even keyboard layout must be standard.

For a standard to succeed, it must be good and the manufacturers must adhere closely to it. The most important feature is that it should be expandable. Future developments of MSX will also be standard. All upgrades must be compatible with previous machines so that software doesn't become obsolete.

Let's go through the main items of the MSX specification one by one. The BASIC is described as an advancement on Microsoft 4.5. Microsoft is quite a common BASIC, used in Commodore, Dragon, Oric, Tandy and other computers. Each manufacturer

bought slightly different versions of BASIC from Microsoft and customised it for their specific machines. If you are used to any of these machines you shouldn't have any problem getting used to MSX BASIC.

However, it lacks some of the features which newer British micros boast. Most notable is the lack of any procedure handling. The Enterprise, Beeb, QL and Amstrad all allow you to have this kind of subroutine, which can be called by name rather than by line number and pass values to the subroutines without specifying variables (this is known as parameter passing). The QL is particularly advanced in this respect and allows you to create your own keywords. Otherwise, the BASIC is more or less standard. There is a very nice full screen editor, similar to the Commodore one but with the bonus of an insert mode.

The graphics commands are quite good although they lack the increasingly popular turtle graphics. The sprite handling is very good, showing what Commodore could have done with the 64. In this respect the hardware lets the BASIC down a little.

The operating system will not affect the user. The documentation is very sparse; it hasn't been designed to support other languages in the way the BBC has, although it can easily do this. There are no built in facilities for networking or multitasking and there are limitations to interrupt processing imposed by the need

to maintain standards. The disc operating system (DOS) doesn't seem to be as well thought out as the rest of the system. There is an MSX standard disc BASIC and disc operating system but no standard for physical disc size, 3, 3.5, 5.25 and 8-inch discs all being catered for. I would prefer only one size, preferably 3 or 3.5 inch. The range of sizes will be a nasty headache for the software houses. I haven't seen any specs for the MSX DOS, but I hope it includes wildcards and defaults.

The current MSX standard is based on the Z80A central processor (as found in the Spectrum and Amstrad), running at a little over 3.5MHz (slow compared to the BBC's new Z80B at 6MHz but on a par with most other micros). The Texas Instruments TMS-9918A graphics chip is specified by the MSX standard. In the UK we get a PAL version of this chip, which has a different number and is set up for our 625 line television, but in all other respects its functions are the same. This does a similar job to the VIC chip in the VIC and 64 and the Antic chip in the Atari. It is used in the Tatung Einstein and the Memotech MTX computers. This is quite good for graphics but cannot cope with more than 40 columns of text. Most MSX manufacturers have plans for an additional 80-column card which will be necessary for serious business use or word processing.

The 32 different sprites are the 9918's trump card. They can be

used to simulate 3D effects; one sprite can hide behind another and all 32 can be on at any one time.

Sound facilities are what you would expect from a home micro. The MSX uses the same sound chip as the Oric, which gives it ample scope for games-type noises but, like all home computers, it is limited when compared to a musical instrument. Yamaha, noted for musical instruments, will be launching an MSX machine with added sound facilities and a piano keyboard.

The use of standard sockets on all machines means that cartridges and printer cables can be interchanged between computers.

The MSX keyboard layout has some nice features. The cluster of cursor keys makes screen editing a joy. It's so much easier to use than shift for left and non-shift for right. None of the MSX machines I have seen use a joystick, which is a pleasant feature of the Spectravideo. The QWERTY layout is American, with the quotes next to the Enter key. I found this very difficult to get used to on my wordprocessor after years of shifting 2, but to the first time user, the most likely person to buy the MSX, this will not matter.

The MSX standard is solid. There is no danger of the manufacturers being unable to supply the chips required because they are mass produced for many other applications. If the MSX invasion takes off there will be no shortage of computers.

Software houses are very enthusiastic about MSX. It will be a great boon to them if they can write one version of a program and then sell it for many different computers without any extra work. For the novice end-user a standard would cut down the effort and time required to build a system.

MSX machines cannot be differentiated from rival MSX machines because that would disturb the standard, so the Japanese seem to have plans to out-advertise their competitors. This will open up a whole new market and people who previously would never have touched a keyboard will be persuaded into entering the world of microcomputing. There could be a second micro-boom. There will be the need for support, maintenance, books, software and all the other ancillary services.

	approx price	standard memory size (RAM)	max. screen resolution	clock speed/processor	no. of sound channels	max. no colours	notes
MSX	£200-£300	8-1024K	256 x 192	3.5MHz Z80A	3	16	Lots of variations
Atari 800XL	£250	64K	320 x 192	1.9MHz 6502	4	256	Good value for money. Poor BASIC
BBC B	£399	32K	640 x 256	2MHz 6502	3	8 + flash	Very fast. Best BASIC around
Commodore 64	£199	64K	320 x 200	1.2MHz 6510	3	16	Cheap. Poor BASIC
Dragon 32	£175	32K	256 x 192	6809	1	8	Well supported
Electron	£199	32K	540 x 256	2MHz 6502	1	8 + flash	Slow. Uses BBC BASIC
Lynx 96	£299	96K	256 x 240	4MHz Z80A	1	8	Very slow. Limited software
Oric Atmos	£170	48K	240 x 200	1.2MHz 6502A	3	8 + flash	
Spectrum 48K	£130	48K	256 x 176	2MHz Z80A	1	8 + flash & bright	Best software availability
VIC-20	£140	3.5K	160 x 128	1.2MHz 6502	3	16	Screen & memory memory limited
QL	£399	128K	512 x 256	7.5MHz 68008	1	8 + flash & stipple	Limited in supply Includes two Microdrives
Amstrad	£230	64K	640 x 200	4MHz Z80A	3	27	Includes monitor

How they compare

MSX: We're right behind you, say software houses

Software can make or break a computer. In the case of MSX, major software firms are pledging their support. Liz Graham reports

Now that the MSX standard is due to hit the scene, software will be compatible on all MSX machines. That's good news for both the micro user and the software houses, many of whom are welcoming MSX with open arms.

"It's about time someone did something standard," said Jon Day, sales manager at Kuma, breathing a sigh of relief. Virgin's Nick Alexander was also enthusiastic: "The idea of a standard is excellent. I wish there was only one standard." Hewent on to explain: "Our problems are really a microcosm of the public's problems, with regard to compatibility of software."

Software firms believe in the importance of their contribution to the popularity and success of computers. Dr David Potter, managing director of Psion, emphasised the essential role software has to play in a speech.

"In themselves the computers have no intrinsic benefit or worth," he said. Strong words: he went on to back his theory up: "It is software which makes them run and allows them to do such a huge diversity of things which are useful, educational, fun or plain mind boggling."

The future of MSX is assured, according to Dr Potter. Software houses will fall over themselves to support the machine.

"Having a widely based standard such as MSX will ensure a very wide library of software and peripherals. The consumer will therefore benefit."

So the prospective MSX owner can look forward to a wide choice of software, and of a high standard too.

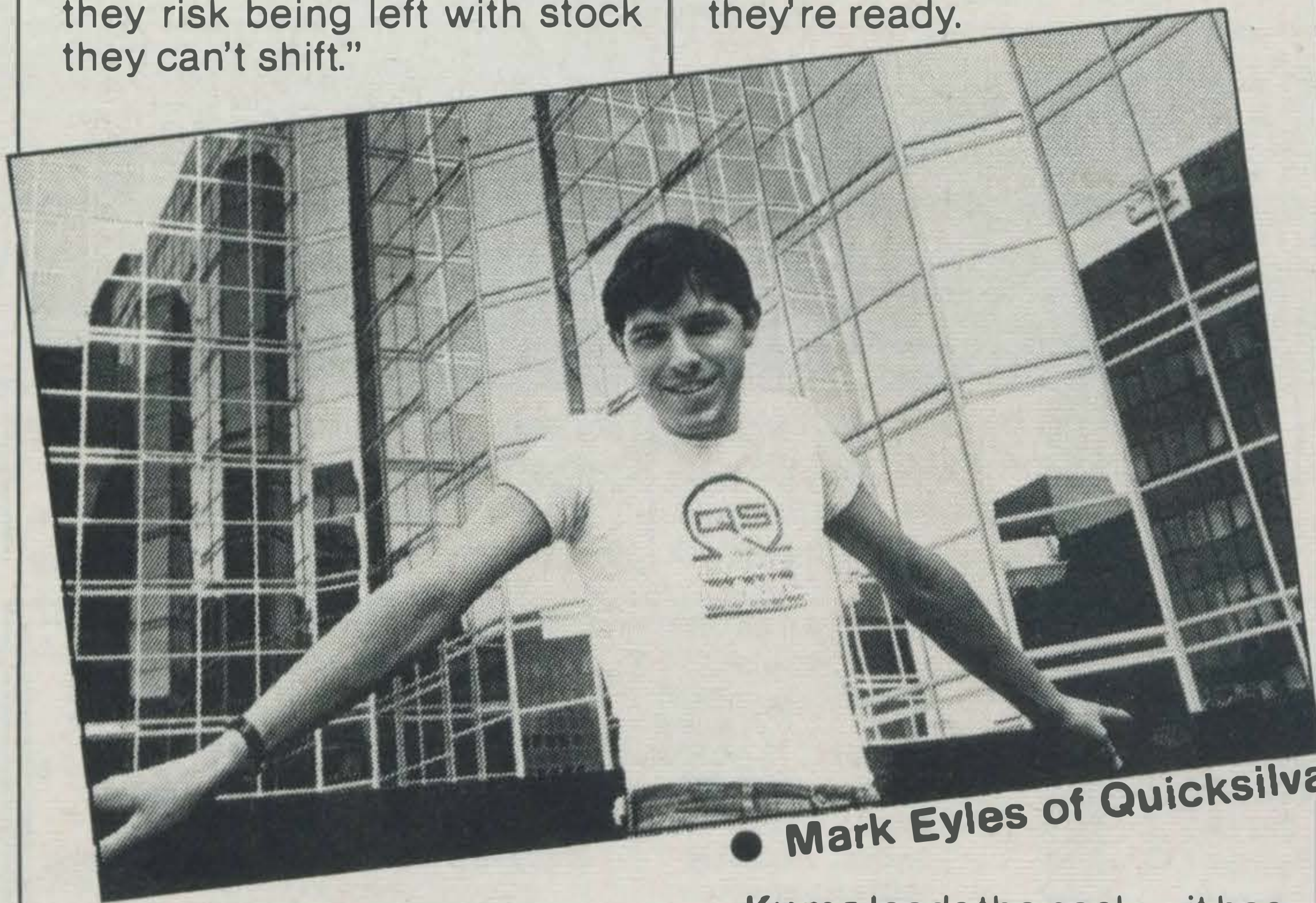
"There is also no doubt whatsoever," stated Dr Potter, "that British software houses, who in this area are probably the most sophisticated in the world, will support MSX and will be among the world leaders in producing home software for this standard. . . MSX is a challenge to software houses to supply state of the art software."

Ocean's chairman, David

Ward, agreed with Dr Potter on the importance of software support. "It's the software that runs the computer," he said. "The Spectrum has tons of cheap software, and that's why so many people have bought it."

David Ward thinks MSX will also be a great boon for retailers. "It's the retailers who shift the goods and really control the market," he said. "The incompatibility of software has affected the dealings of software houses with retailers and chain stores.

"Software trading is very ephemeral and depends on fashion and mood," Mr Ward said. "Large chain stores have to place their orders in bulk, and they risk being left with stock they can't shift."



● Mark Eyles of Quicksilver

"Special arrangements have had to be made," he went on. "Sometimes the cassettes are accepted on a sale or return basis and inventory adjustments have to be made." All this should be eliminated with the arrival of the new standard. David Ward sees this as a definite advantage for the chain stores.

It's good news all round — for home computer users, software companies and retail outlets.

David Potter also sees the advent of MSX as good news for Britain's export figures.

"While this standard in hardware terms will allow trading

across national barriers," he said, "it also provides a very substantial opportunity for British software houses to trade internationally the other way as well. The potential for export sales through such a standard is very substantial indeed."

David Potter, on behalf of Psion, welcomes this opportunity particularly in the international market for Europe, the United States and even Japan.

Once the euphoria has died down, what the the software houses' plans for MSX? Most are being cagey about their projects, no doubt having learned that it doesn't pay to broadcast new releases before they're ready.

think ZEN will be invaluable to users wishing to write and debug efficient assembly code programs.

"We're now waiting for the machines to be announced," he continued, "when our software will be ready the same day. One or two of the programs will be conversions but quite a few are new.

"At the moment three books are under way on how to program MSX, and we'll also have interfaces. By mid-July we should have released 12 titles and by August our full range of programs and books will be on the market."

It certainly looks like Kuma's been taking a lesson from the Japanese on preparation and forward planning.

Ocean is also planning to release games as soon as MSX is launched. David Ward said: "We're coding for MSX Hunchback, and Kong, which were both number one hits."

Ocean has made life easier for its programmers by introducing sophisticated equipment. "We've bought a development system which enables our programmers to write in much higher code," said David Ward. "This is then put through an emulator, with the result that programs can be written for MSX and the Spectrum simultaneously."

August is the scheduled launch date for Artic's MSX games. Bear Bover and Mr Wong's Loopy Laundry are first on the list and other games are in the pipeline.

Richard Turner, managing director of Artic, said: "We're looking at chess programs and arcade games. We'll probably be writing new games for both the Spectrum and MSX."

CDS is currently musing over what to do for its MSX range. Carol Howlett said: "First we will release our educational series, to teach yourself French, Spanish, Italian and German. Then in the autumn we'll be bringing out arcade/adventure games and simulations.

"We're working with the han-

dicap that our machine has Japanese keys and our manual's not in English either," she grumbled.

Other software houses will wait for the pre-Christmas boom, when they'll spring their MSX ranges on the public. **Quicksilva** intends to get involved, despite the setback that they too only have Japanese machines.

"We're very keen," said Mark Eyles. "We have plans to back the computer very strongly, both with original titles and with conversions. We want to have our first MSX software out by Christmas. This is when the computers will be really heavily backed and we want to support them."

Bug-Byte is also looking to release MSX software before Christmas. A spokesman for Bug-Byte said: "We'll be converting old programs rather than writing new ones. When we produce new games, they'll be for the whole range of home computers, including MSX."

Silversoft aims to bring out educational and business orientated software, hopefully before Christmas. Director Dougie Bern thinks that it will be Christmas before the computers make a major impact.

Nick Alexander, of **Virgin** thinks it will be much longer before MSX holds a large proportion of the market. "We doubt that the hardware base will be significant before this time next year," he said. "We imagine there will be about a quarter of a million by this time in 1985, which will be worth catering for."

Virgin is working on MSX and is modifying some of its present games. "We aim to convert Falcon patrol and its sequel Falcon Patrol II, which hasn't been released yet, as well as Sorcery, our top-selling game for the Spectrum. We're working on Falcon Patrol now."

So it seems that at the beginning we'll see conversions of old favourites. However, as Dougie Bern, of Silversoft, says, the software industry needs new games ideas if it is to flourish.

"New ideas will have to be generated in the software industry," he said. "We can't just go on with copies of copies. We at Silversoft will be releasing new games."

The challenge to produce state of the art software, thrown down by David Potter, of Psion, may have been taken up by prestigious software houses, but if so nothing is being revealed. All developments are going on behind closed doors.

As for the computers themselves, the top brass at influen-

tial software firms were enthusiastic, but occasionally cautious. As Artic's Richard Turner said: "The advantage is that it will have five times the user base," which other software personalities were quick to emphasise.

The household names behind MSX are also a definite plus. Mark Eyles, of Quicksilva, said: "MSX looks very promising because of the well-known companies who are supporting it. It's sure to do well."

The marketing for MSX is very strong and the Japanese have clearly studied all possibilities before launching their models. Silversoft's Dougie

are exciting and the software included with the package is good.

"MSX is aimed at the over 25s, the less computer literate. The young computer-literate generation may regard it as an introductory computer and look down on it, but it's very good. It's intended for people who don't have much experience with computers and are a bit wary."

Mark Eyles of Quicksilva predicted reasonable market penetration in this country, and Richard Turner of Artic thought MSX looked very promising.

However, the praise has been tempered with some

MSX will be by-passed by broadly and open endedly defined innovation and technology brought by pioneers such as Sinclair and Commodore."

David Potter's thoughts were echoed elsewhere. Nick Alexander expressed concern mentioning that the chips were a year old and looked a bit long in the tooth, so did David Ward of Ocean, who called MSX the Cortina of the industry.

He added: "It seems to me to be a compromise between technical superiority and practicality. I don't think it's the state of the art." He also expressed healthy scepticism about the reality of compatibility. "I'll believe it when I see it," he said.

Dougie Bern, of Silversoft, was looking on the bright side. "I think it will only be a short-term standard," he said. "The Japanese are already working on an upgrade."

"Although not innovative, the technology is proven," he continued. "It's tried and tested. If a machine does what you want it to do then it doesn't matter what's in the box."

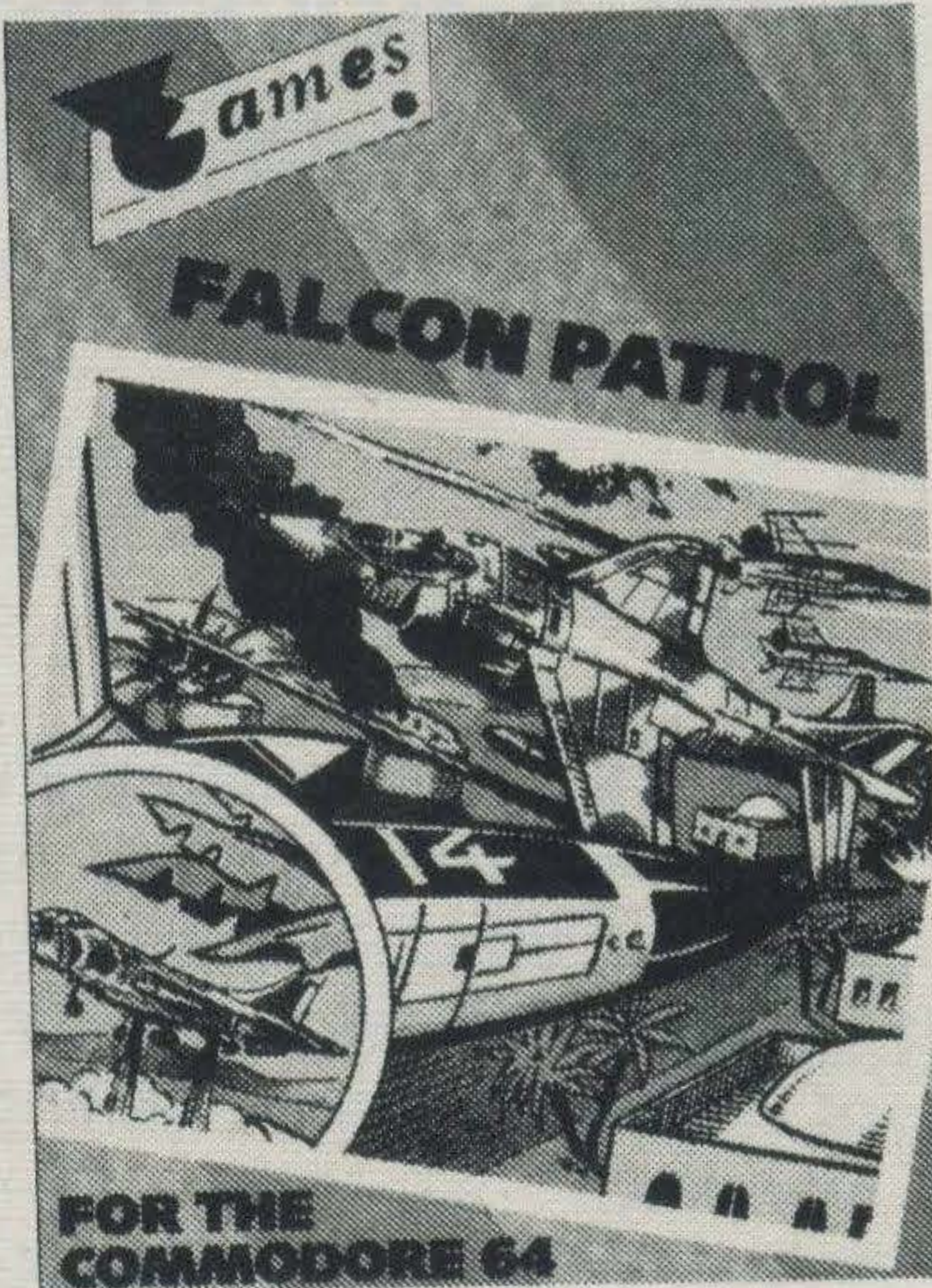
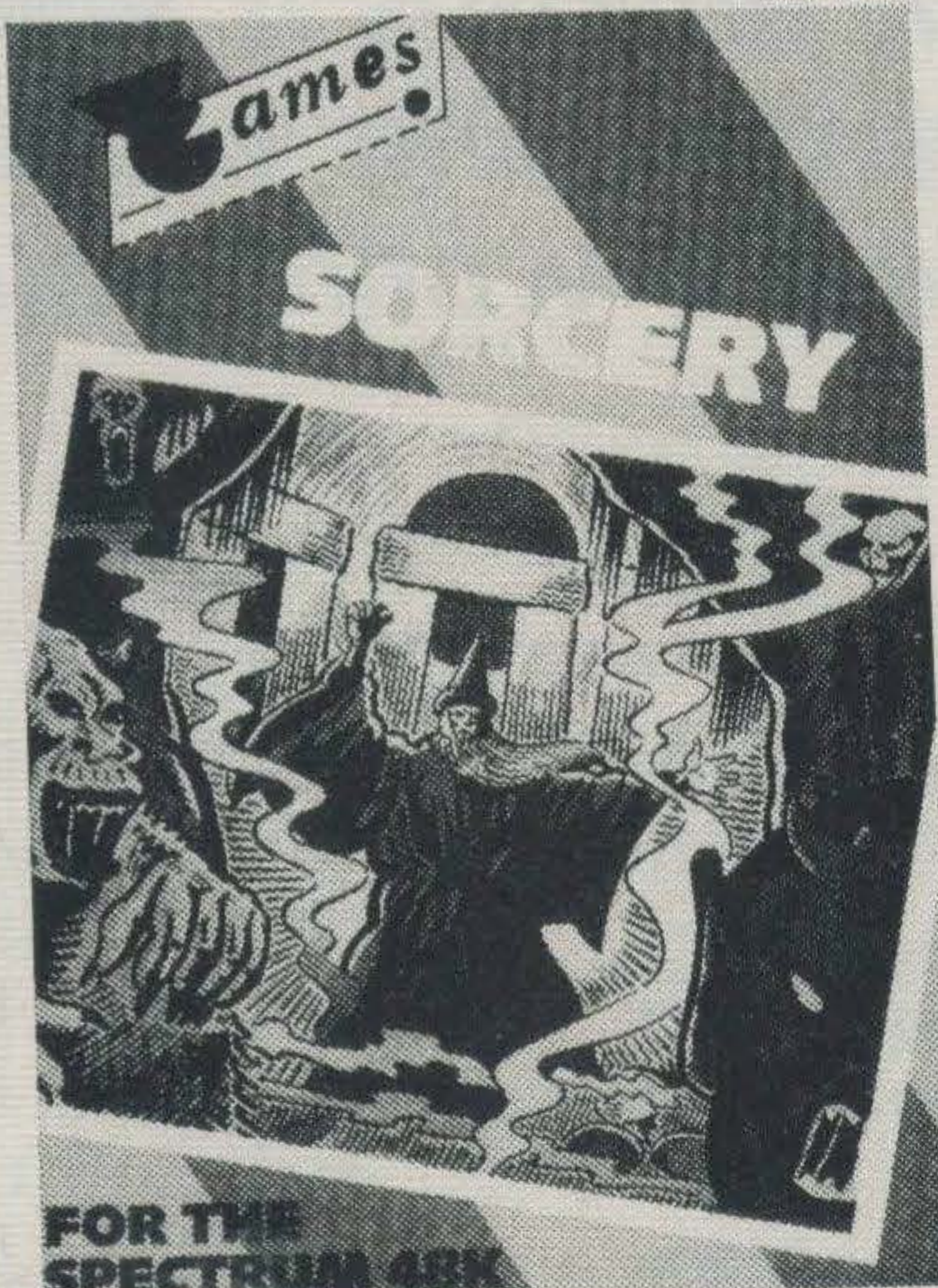
Dougie Bern also foresaw financial benefits from introducing a standard. The market penetration will be high and MSX is an obvious advantage in terms of development cost. It's moving away from the enthusiasts and more to the consumer orientated market."

He had a cynical explanation for the shortage of RAM chips throughout the world. "The Japanese manufacture RAM chips and have been withholding them to stunt the market and create an extra impact for their own computers," he speculated.

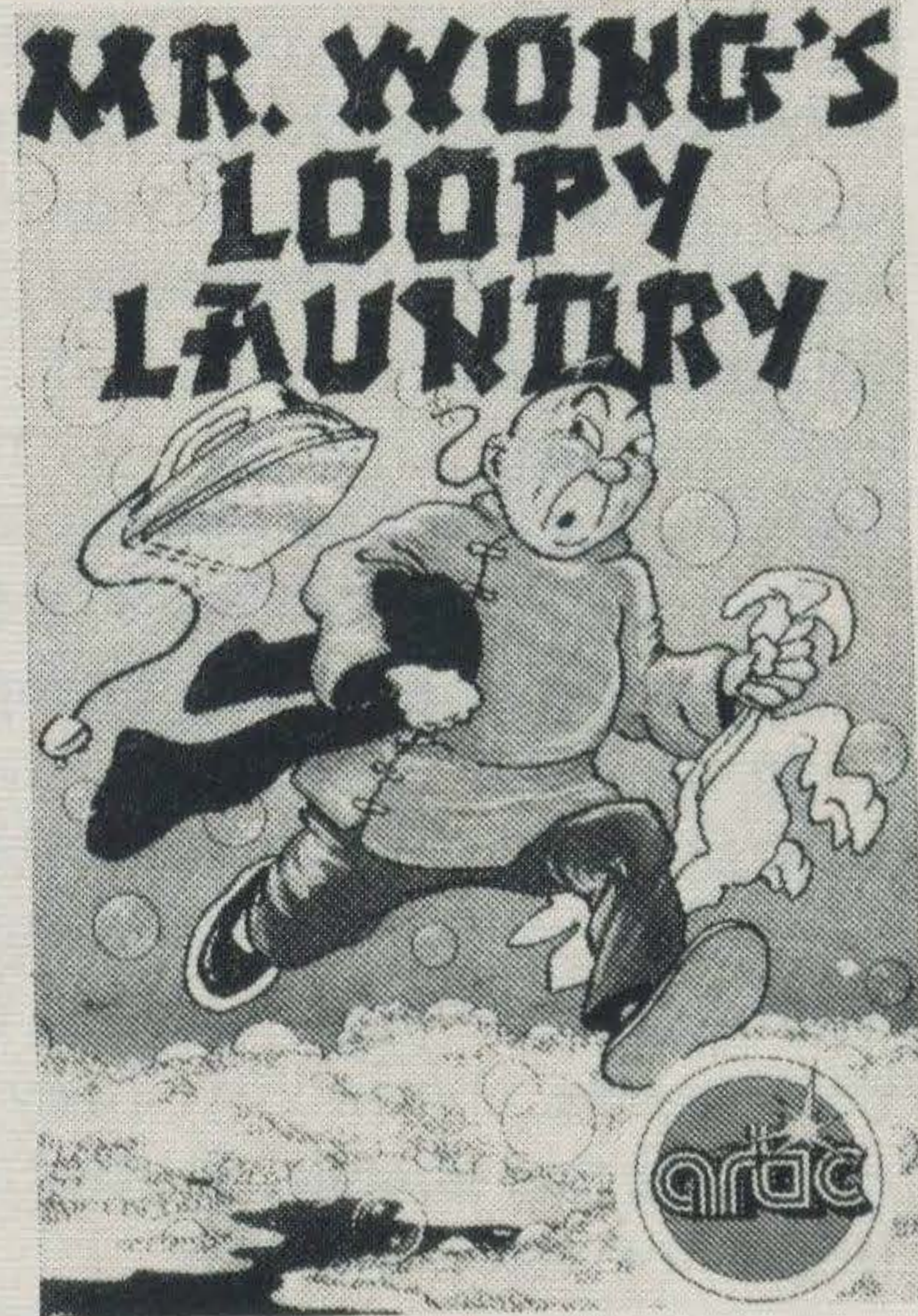
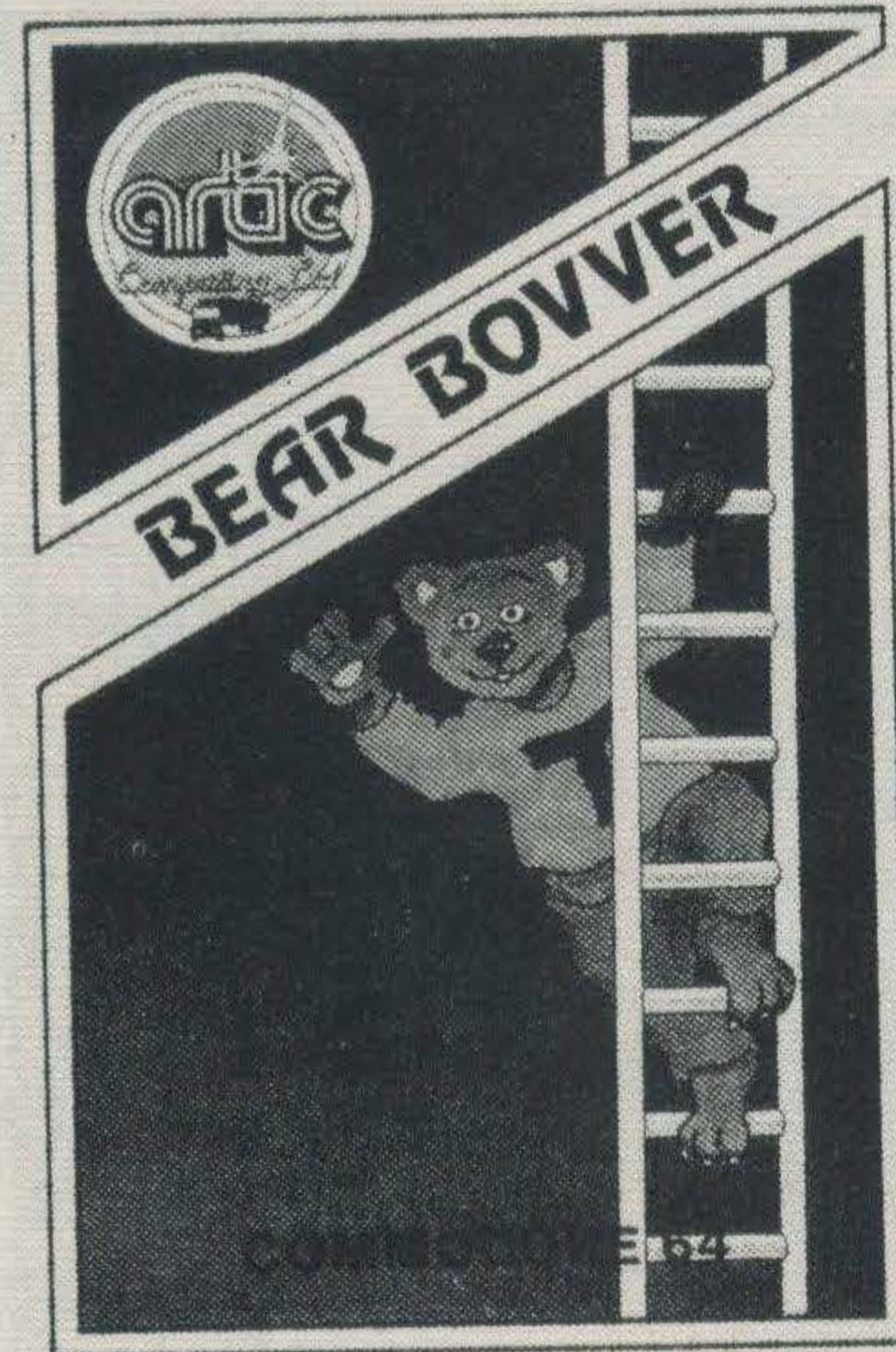
Dougie Bern predicted MSX prices would be slashed by the end of next year, perhaps as low as £70. He explained why. "The MSX is basically composed of three chips; the ZX80, video processor and the sound chip. At the moment they're all separate but the Japanese are working on putting them all on one chip. That should bring the price down dramatically."

His words echoed those of David Potter, who said: "What seems likely is that because of the standard and the volumes MSX can achieve, we will see custom MSX chips produced and manufactured, bringing lower and lower prices on the one hand and greater functionality of the standard in years to come."

The future looks very rosy for both software houses and MSX owners. As David Potter said: "Home computers have come of age."



● Some of the Virgin games to be converted for MSX



● Two Artic games out soon on MSX

Bern commented: "the force of marketing is much more sophisticated than is seen in the home computing field at present and servicing, back-up and support will all be excellent."

Nick Alexander of Virgin, added "The Japanese manufacturers have seen the size of the UK market and have the marketing experience and financial muscle to back them."

He was full of praise for MSX. "We think MSX will be one of the systems which succeeds. The BASIC MSX software isn't too advanced, but the graphics

hesitancy and criticism. The standard isn't innovative and doesn't cross any new thresholds. Some critics feel it will hamper the progress of microtechnology. David Potter, of Psion, expressed these fears in his talk at the MSX conference.

"The disadvantages of a standard are clear," he began. "It inhibits change. Microprocessors and microcomputer technology are still developing and will continue to do so. I believe their potential to develop very rapidly over the next five years is huge. The question remains as to whether

WHY YOU SHOULD START LEARNING MSX BASIC NOW

How important is MSX? Our software expert, Simon Rockman, reckons it's so important that you should start teaching yourself MSX BASIC now. Here's where you start...

MSX is set to conquer the world. The companies behind it are so large and powerful that it is bound to catch on. Many companies with existing ranges of computers are looking into the standard.

You won't be able to buy an MSX computer until September, but that is no reason to stop you preparing for it.

Many professional programmers start writing their programs while waiting for the computer to arrive. Andrew Glaister did this with the best-selling Orbiter game while waiting for his Spectrum.

All you need to know is the list of commands the MSX computer has built in and you can write little subroutines to simulate them. Obviously this will be much slower than the real thing — some things like the sprite handling may be too complex for BASIC if your computer does not have sprites.

MSX is important. It allows true "portability". This means programs can be moved from one computer to another. Before MSX came along you had to write a BASIC program in such a small subset of the language that you were greatly limited as to what you could write that would still run on another machine.

Once you had written a hangman, guess the number or some other simple compatible program the only way to get it into your friend's machine was to print it out and then retype the whole lot. Saving to tape would only work if your friend had

the same computer, and in at least one case the same amount of memory.

Within the MSX world all this changes, if you like playing with sound you can buy a Yamaha MSX computer but a friend who wants a portable computer can buy the Hitachi but a zap-em-up aliens game will run on both.

This makes the software retailers life much easier. He need only stock one range of software for the whole gamut of MSX machines. Of course, for those people without MSX computers life will still involve a lot of retyping. As MSX is compatible no-one will miss out on software. If you buy a MSX computer which is later taken off the market, through company mergers, fierce competition or any of the other things which can affect the company but is no fault of the product, your computer will still be supported by the weight of the other manufacturers. This is the reason that loads of manufacturers have jumped on the IBM PC bandwagon. Standardisation sells and the customer benefits.

Software piracy will be a huge problem. Copying tapes is difficult enough to top when you are working on a variety of different formats but when everyone has the same computer the pirate's life is also easier. Fortunately the cartridge slot is the same on all MSX machines because it is part of the standard. Commodore has found that using



cartridges that are cheap (£10) and contain top quality software (International Soccer is brilliant) reduces piracy to the extent that it is not a real problem.

Software houses have been slow to reap these benefits on the CBM 64. Hopefully, MSX will persuade them of the benefits. The different features on the different MSX computers may have the effect of confusing the purchaser.

How useful is a light pen, do you need two cartridge slots, will I want to add a synthesiser? These are the things that will help you to decide which machine to buy.

Manufacturers are allowed to produce add-ons which only work with one machine but these are not called MSX add-ons. It is in this area that the firms will probably aim to compete and outsell their rivals.

Whatever happens the money behind MSX is bound to pull it through.

Here's a complete list of commands, statements and functions — and what they do — so you can start learning MSX BASIC ready for when you get your MSX computer.

A description of version 4.5 Microsoft BASIC is followed by the expanded statements and functions for MSX computers.

The standard was developed by the Microsoft Corporation, writers of what has become the industry-standard BASIC.

AUTO

Generates line numbers automatically after every carriage return

CONT

Continues program execution after BREAK or STOP in execution.

DELETE

Deletes program lines from memory.

LIST

Lists all or part of a program.

LLIST

Lists all or part of the program to the printer.

NEW

Deletes the entire program from memory and resets all the variables.

RENUM

Renumbers the program lines.

RUN

Executes the program.

TRON

Turns on the tracing of execution of program statements. An aid to debugging.

TROFF

Turns off trace function.

CLEAR

Sets all numeric variables to zero, all string variables to null, closes all open files, and optionally sets the end of memory.

DATA

Stores the numeric and string constants that are accessed by the program's READ statements.

DIM

Specifies the maximum values for array variable subscripts and allocates storage accordingly.

DEFINT

Declares variable type as integer.

DEFSNG

Declares variable type as single precision.

DEFDBL

Declares variable type as double precision.

DEFSTR

Declares variable type as string.

DEF FN

Defines and names a function that is written by the user.

DEFUSR

Specifies the starting address of an assembly language subroutine.

ERASE

Eliminates specified arrays from program and reclaims the memory.

END

Terminates program execution, closes all files and returns to command level.

ERROR

Simulates the occurrence of an error, or allows error codes to be defined by the user.

FOR..NEXT..STEP

Allows a series of instructions to be performed in a loop a given number of times.

GOSUB

Branches to a subroutine.

GOTO

Branches unconditionally out of the normal program sequence to a specified line number.

IF..THEN..ELSE

Makes a decision regarding the program flow based on the result returned by an expression.

INPUT

Allows input from the keyboard during program execution.

LINE INPUT

Allows an entire line (up to 254 characters) to be input to a string variable, without the use of delimiters.

LET

Assigns the value of an expression to a variable. Optional.

LPRINT

LPRINT USING

Prints data on a line printer.

MID\$

Replaces a portion of one string with another string.

ON ERROR GOTO

Enables error trapping and specifies the first line of the error handling subroutine.

ON..GOTO
ON..GOSUB

Branches to one of several specified line numbers, depending on the value returned when an expression is evaluated.

POKE

Writes a byte into a memory location.

PRINT

Outputs data to the console.

PRINT USING

Prints strings or numerics using a specified format.

READ

Reads values from a DATA statement and assigns them to variables.

REM

Allows explanatory remarks to be inserted into a program.

RESTORE

Allows DATA statements to be reread from a specified line.

RESUME

Continues program execution after an error recovery procedure has been performed.

RETURN

Returns from a subroutine.

STOP

Terminates program execution and returns to command level.

SWAP

Exchanges the value of two variables.

FUNCTIONS

ABS(X)

Returns the absolute value of the expression X.

ASC(X\$)

Returns a numerical value that is the ASCII code of the first character of the string X\$.

ATN(X)

Returns the arctangent of X in radians.

BIN\$(n)

Returns a string which represents the binary value of the decimal argument.

CDBL(X)

Converts X to a double precision number.

CHRS(I)

Returns a string whose one element is the ASCII code for I.

CINT(X)

Converts X to an integer number by truncating the fractional portion.

COS(X)

Returns the cosine of X in radians.

CSNG(X)

Converts X to a single precision number.

CSRLIN

Returns the vertical coordinate of the cursor.

ERL/ERR

When an error handling subroutine is entered, the variable ERR contains the error code for the error, and ERL contains the line number of the line in which the error was detected.

EXP(X)

Returns e to the power of X. X must be less than 145.06286085862.

INT(X)

Returns the integer part of X (fraction truncated). FIX(X) is equivalent to SGN(X)*INT(ABS(X)).

FRE(0)
FRE''''

Arguments to FRE are dummy arguments. FRE returns the number of bytes in memory not being used by BASIC. The first version gives the memory available for program text etc. The second gives the bytes available for string space.

HEX\$(X)

Returns a string which represents the hexadecimal value of the decimal argument.

INKEY\$

Returns either a one-character string containing a character read from the keyboard or a null string if no key is pressed.

INPUT\$(X)

Returns a string of X characters, read from the keyboard.

INSTR([I,] X\$, Y\$)

Searches for the first occurrence of string Y\$ in X\$ and returns the position at which the match is found. Optional offset I sets the position for starting the search.

INT(X)

Returns the largest integer less than or equal to X.

LEFTS(X\$,I)

Returns a string comprising the leftmost I characters of X\$.

LEN(X\$)

Returns the number of characters in the string. Non-printing characters and blanks are counted.

LOG(X)

Returns the natural logarithm of X.

LPOS(X)

Returns the current position of the line printer print head within the screen line buffer.

MID\$(X\$,I[,J])

Returns a string of length J characters from the string beginning with the Ith character.

OCT\$(n)

Returns a string which represents the octal value of the decimal argument.

PEEK(I)

Returns the byte (decimal integer in the range 0 to 255) read from memory location I. PEEK is the complementary function to the POKE statement.

POS(I)

Returns the current cursor position. The leftmost position is zero.

RIGHT\$(X\$,I)

Returns the rightmost I characters from the string.

RND(X)

Returns a random number between 0 and 1. The same sequence of random numbers is generated each time the program is run. If X is less than zero, the random generator is re-seeded for any given X.

SGN(X)

Returns a 1 if X is greater than zero, a zero for X equal to zero, and -1 for X less than zero.

SIN(X)

Returns the sine of X.

SPACE\$(X)

Returns the string of spaces of length X.

SPC(I)

Prints blanks on the screen. SPC may

only be used with PRINT and LPRINT statements.

SQR(X)

Returns the square root of X. X must be positive.

STR\$(X)

Returns a string representation of the value of a numeric.

**STRING\$(I,J)
STRING\$(I,X\$)**

Returns a string of length I whose characters all have the ASCII code J or the first character of the string X\$.

TAB(I)

Spaces to position I on the console.

TAN(X)

Returns the tangent of X.

USR [(digit) (X)]

Calls the user's assembly language subroutine with argument X. The digit defines which DEFUSR is called.

VAL(X\$)

Returns the numerical value of the string.

**VARPTR(variable name)
VARPTR(# file number)**

Returns the address of the first byte of data identified with the variable, or the starting address of the file control block.

EXPANDED STATEMENTS**SCREEN[mode] [,sprite size]
[,key click switch] [,cassette
baud rate] [,printer option]**

Assigns the screen mode, sprite size, key click, cassette baud rate and printer option.

WIDTH

Sets the width of the display in text mode.

CLS

Clears the screen. Valid in all screen modes.

LOCATE

Locates the character position for PRINT.

COLOR

Defines the foreground, background and border colours.

PUT SPRITE

Sets up the sprite attributes.

CIRCLE

Draws an ellipse with specified centre and radius. A segment may also be drawn.

DRAW

Draws a figure according to the graphics macro language (commands contained in a string).

LINE

Draws a line connecting two specified coordinates.

PAINT

Fills an arbitrary graphics figure with colour.

PSET PRESET

Sets or resets the specified coordinate.

KEY

Sets a string to a specified function key.

KEY LIST

Lists the contents of all function keys.

KEY ON/OFF

Turns the function key display on the 24th display line on or off.

ON KEY GOSUB

Sets up a group of line numbers for BASIC to trap to when the function keys are pressed.

KEY(fn key) ON/OFF/STOP

Activates or deactivates the trapping of the specified function key in a BASIC program.

ON STRIG GOSUB

Sets up a group of line numbers for BASIC to trap to when the trigger button is pressed.

STRIG(n) ON/OFF/STOP

To activate or deactivate the trapping of trigger buttons of joysticks in a BASIC program.

ON STOP GOSUB

Sets up a line number for BASIC to trap to when the Ctrl-STOP key is pressed.

STOP ON/OFF/STOP

To activate or deactivate the trapping of a Ctrl-STOP.

ON SPRITE GOSUB

Sets up a line number for BASIC to trap to when the sprites coincide.

SPRITE ON/OFF/STOP

To activate or deactivate the trapping of a sprite in a BASIC program.

ON INTERVAL GOSUB

Sets up a line number for BASIC to trap to on a time interval.

INTERVAL ON/OFF/STOP

To activate or deactivate the trapping of time intervals in a BASIC program.

VPOKE

POKEs a value to the specified location of video RAM.

BEEP

Generates a beep sound.

MOTOR

Changes the status of the cassette motor switch.

SOUND

Writes a value directly to the sound generator registers.

PLAY

Plays music according to the music macro language.

MAXFILES

Specifies the maximum number of files that can open at one time.

OPEN

Allocates a buffer for I/O and sets the mode that will be used with that buffer.

PRINT#

PRINT# USING

Writes data to the specified channel.

INPUT#

Reads data items from the specified channel and assigns them to program variables.

LINE INPUT

Reads an entire line, up to 254 characters, without a delimiter.

INPUT\$

Returns a string of characters read from a file.

CLOSE

Closes the specified channel and releases the buffer associated with it.

SAVE

Saves a BASIC program file to a specified device.

LOAD

Loads a BASIC program file from the specified device.

MERGE

Merges the lines from an ASCII program file into the program currently in memory.

BSAVE

Saves a memory image at the specified memory location to the device currently cassette only).

BLOAD

Loads a machine language program from the specified device (currently only cassette).

FUNCTIONS

POINT

Returns colour of a specified pixel.

VPEEK

Returns the value in the video RAM location specified.

STICK

Returns the direction of a joystick.

STRIG

Returns the status of a trigger button of a joystick.

PDL

Returns the value of a paddle.

PAD

Returns the status of the touch pad.

PLAY

Returns the status of a music queue.

EOF

Returns -1 if the end of a sequential file has been reached. Otherwise returns a value of zero.

SPECIAL VARIABLES

TIME

The system interval timer. It is incremented by 1 every 60th of a second provided the interrupts are enabled.

SPRITE\$

The pattern of a sprite.

VDP

Specifies either the current value of the video display processor's write only register, or the read only status register.

BASE

Current base address for each table in the video display processor.

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