SPECTRUM USER

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Possum helps disabled

A SPECIAL version of the Spectrum has been developed for use by disabled people. The basic machine has been adapted so that it can be used by people who cannot cope with the normal keyboard.

The machine is the result of collaboration between Sinclair Research and Possum Controls of Slough, Berkshire which sells a wide range of electronics systems for the severely disabled.

There are three methods available for using the Spectrum — an expanded keyboard, a joystick or footskate, and a scanning system in which the operator stops a scanning light when it reaches the required instruction.

Delays 'are shorter'

CONFIDENCE is growing at Sinclair Research that the worst of its delivery problems are over. A spokeman said at the time of going to press that production is running ahead of new orders and the backlog is being reduced daily.

It was admitted that the previous hopes of everything being back to normal by the end of September were not achieved but it was expected that orders would be on 28 days' delivery during October.

During the last month *Sinclair User* continued to receive many complaints, a selection of which we publish on page iii. One reader telephoned the office following Mrs Thatcher's visit to Japan, during which she presented a Spectrum to the Japanese premier. He said it seemed the only way to obtain one was to be Japanese.

The company spokesman said that delivery of the 16K was less than 10 weeks and improving quickly, and the 48K situation, which had worsened at the beginning of September, was also improving rapidly.

"We have additional output from the Timex factory at Dundee and that is having an impact on the backlog," he said.

He added that the recent revival in sales of the ZX-81 — see page iii — had not been affecting production of Spectrums.

Timex Factory in Dundee where Spectrums are built



Software converter launched

SINCLAIR said that it could not be done but someone has managed to discover a way of loading ZX-81 programs recorded on cassette into the Spectrum.

The device is made by East London Robotics, which says that it will deal with most of the incompatibilities between the two machines.

To load a ZX-81 cassette, the Robotics program must first be loaded into the Spectrum. The ZX-81 program can then be loaded and read into the Spectrum by following the prompts from the Robotics loader program.

There are several incompatibilities between the two computers. They include the SCROLL command and several graphics characters from the ZX-81 and the INVERSE command on the Spectrum. For some of those incompatibilities there are machine code routines which can be called to deal with them but the INVERSE command cannot be dealt with, as there is no similar command on the ZX-81.

A character set similar to that of the ZX-81 is designed by the loader for programs which might require it.

The soft loader is available from East London Robotics, Finlandia House, 14 Darwell Close, East Ham E6 4BT and costs £10.

Schools scheme boost

SINCLAIR RESEARCH has announced a £15 million scheme to increase the use of the Spectrum in schools. The machine has already been chosen as one of three computers in the Department of Industry Micros in Primaries scheme and Sinclair has now said that it will increase the benefits available.

Schools which order a Spectrum under the Government scheme will receive a free ZX printer, a free copy of the Logo computer language and 10 special discount vouchers. The offer is open until the end of 1984.

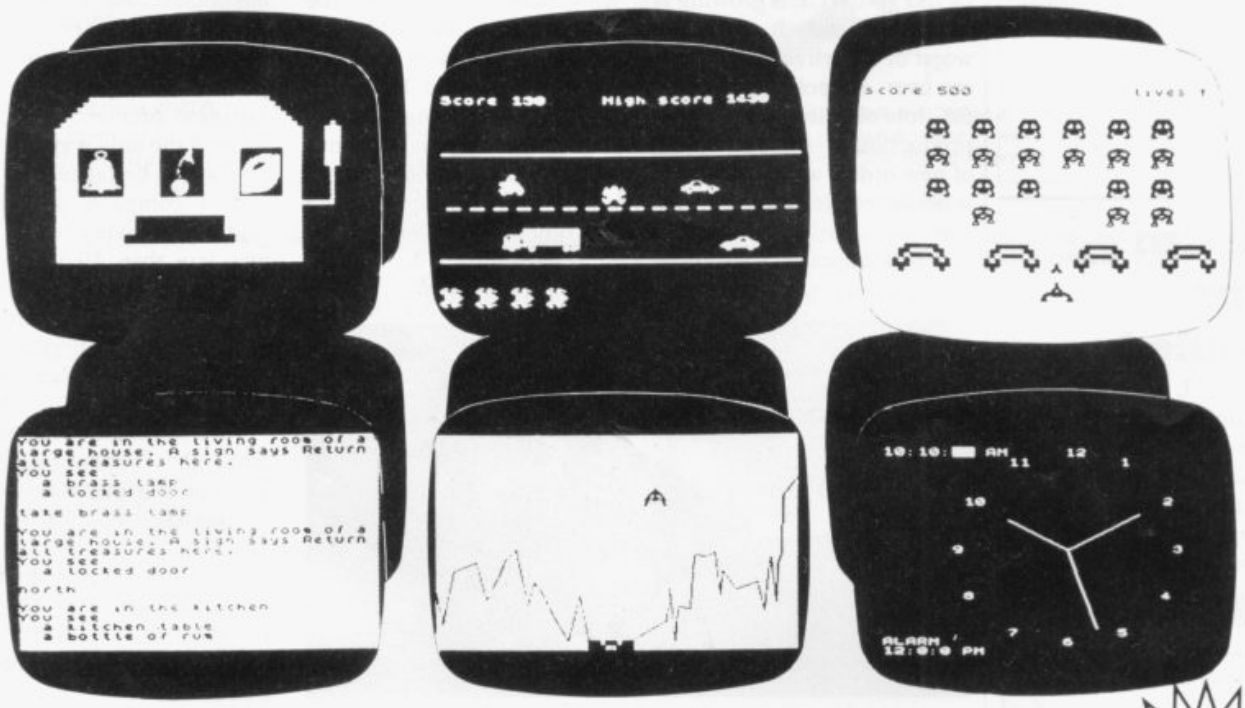
One voucher can be returned with each additional order for a 48K Spectrum to have the price reduced by £45 or to receive another free printer.

Announcing the scheme, Clive Sinclair said: "Believing that one micro per school is inadequate, our school scheme seeks to make computers available at low cost to provide sufficient numbers for all pupils to have practical hands-on experience.

When asked about the possibility of delivery delays, Nigel Searle, head of the computer division, said that by the time orders begin arriving there should be no difficulties.

Logo is a language developed in the U.S. for use in education. A new version has been written for the Spectrum.

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Promises, promises..

DURING the summer months there was a growing tide of anger and bitterness about the delays in delivery of the Spectrum. We have tried to keep readers informed of what has been happening and in return readers have been telling us their experiences.

For a short time in August the flow of complaints eased slightly but throughout September they streamed in again.

Rather than select portions from the letters and telephone messages, we decided it would be better for the readers to tell their stories in their own words.

As we report on page i, Sinclair Research is again confident that such problems as are related will not be experienced by many other people.

CONGRATULATIONS on your expose of the anger which has developed of the promise-with-no-performance by Sinclair about the Spectrum. I ordered mine in May and it had not been delivered by September, a 15-week delay. There had been various promises from time to time indicating that it would be coming shortly but they proved meaningless.

Irritation has been compounded first by the continued advertising promising a 28-day delivery and also by the various statements reported in the computer press saying that things would be normal shortly.

The latest in one paper was that the 28-day delivery would be achieved by the end of September. If they were still on 15 weeks in the first week of that month, this seems somewhat unlikely.

Perhaps the Spectrum might be re-christened the *Mirage*, as it appears to be an illusion?

Martin Bennett,
London W10.

I AM WRITING to express my frustration regarding my attempts to obtain a Spectrum. Whatever information the Sinclair organisation has released to yourselves, it certainly has not given it to one of its customers.

I ordered a 16K Spectrum via Teledata after checking specifically the delivery time at the beginning of June. On June 28 I received a letter from Sinclair informing me of a further six weeks' delay.



SPECTRUM OR SPECTRE is Sinclair's new machine a mirage?

Since then I have heard nothing.

Sinclair does not answer its telephone on 0276 685311, neither will it reply to letters, even though a s.a.e. is enclosed. Individual customers are powerless to obtain any service from it other than to cancel an order, an action Sinclair can safely gamble we will not do.

May I request that individually or collectively you take some action to move Sinclair from its complacent position? It is a tragedy that its technical achievements are not being supported by its customer service.

John Catherall,
Allestree, Derby.

I FELT I must write to tell you of my experience with Sinclair. I do not know who quoted the delivery claims such as "New orders down to 28 days by the end of September" but by my reckoning my 16K machine ordered at the end of June would arrive after those new orders.

After six weeks of waiting I received an "It will be only another six weeks" letter. Now after telephoning the despatch department I was told "only another six weeks". I telephoned again and was told that delivery would be as per my 12-week letter, i.e., a total of 18 weeks from order date.

Anyway, at the beginning of September, at the opening of a new John Menzies store in Glasgow, I was assured by a Sinclair representative that I would have my machine within a week. What rubbish.

According to Sinclair's reckoning of delivery dates, I would get my machine more rapidly if I were to cancel and re-order at the end of September. I still wait — and wait and wait?

John Tobins,
Glasgow.

I WAS interested in your news item of delays on delivery in the September issue. I believe that my situation is even worse. I placed my order on May 15. I telephoned Sinclair at Camberley today to be told there was a minimum wait of another four weeks. I make that a minimum delivery of 22 weeks.

Do you offer prizes for the slowest delivery?

M R Lee,
Sale, Cheshire.

I HAVE made enquiries about the £10 voucher offered by Sinclair. It appears that the offer does not apply if you go to W H Smith or any other authorised dealers. I asked if I could be sent a printer with the Spectrum if I paid the price, then £10, and I was told I could not change my order, so I have to make a new one. I would not get the £10 off until the Spectrum is delivered.

I wonder what Mr Sinclair is offering. To get a printer or a pack of two rolls of paper costs £2.95 in postage. So the real value to the customer of the £10 is only £7.05.

For all the aggravation the whole affair has caused and the many calls we had to make to discover what is happening, I think we deserve something more. I suggest that the RS232 network interface board would be a more appropriate compensation.

A I Toumazis,
London W2.

SEEING YOUR recent news headline that anger is growing over delays in delivery of the Spectrum prompted me to write. After waiting 15 weeks, not the 12 widely-quoted in the technical press, my Spectrum finally arrived.

It worked very well for four days and suddenly stopped, never to go again. I have returned it to Sinclair at a cost of £2.35 and telephoned to find the turn-round time on repairs. My heart sank when I was told that they are not being repaired but I be will sent a new one, and I will join the queue again waiting for a new one.

Three to four weeks is quoted for delivery, which the company obviously cannot meet and I consider I have done my waiting already.

Needless to say I am furious and would cheerfully give Clive Sinclair a piece of my mind if I could get through to him.

M H Abbott,
Newbury, Berkshire.

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ZX Spectrum — ZX81

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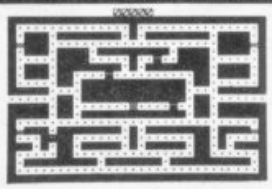
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Stephen Adams shows how to adapt ZX-81 add-ons

Updating peripherals

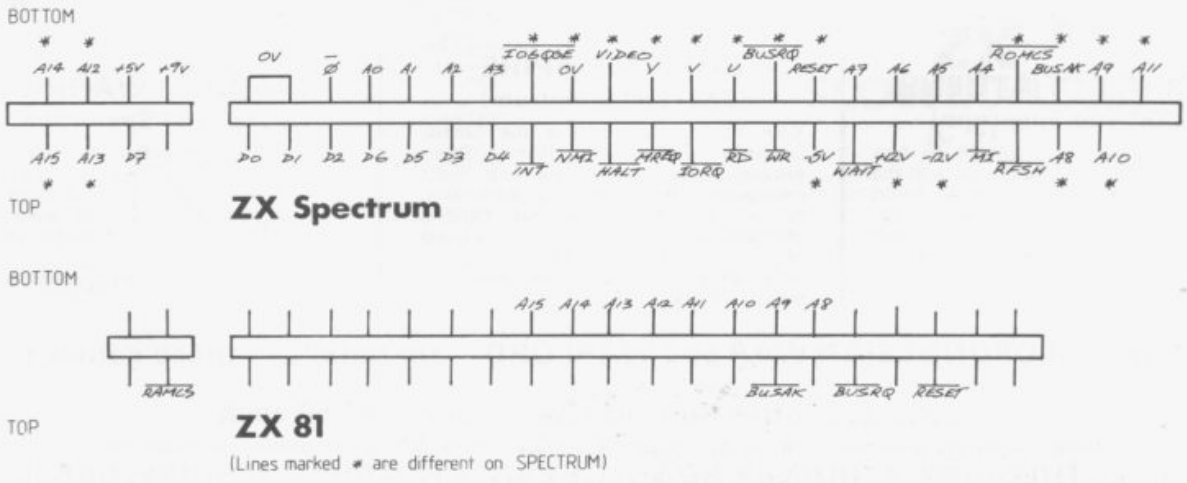
AS THE Spectrum is fairly new and most of the people who are buying one have had a ZX-80 or ZX-81, I thought it would be a good idea if could use my ZX-81 equipment on the Spectrum. That would have two advantages — one, that I would not have to dispense with ZX-81 equipment and buy new and, two, that I would save time waiting for manufacturers to catch up with the new device.

Looking at the expansion port, the big hole at the back of both machines, and its explanation — pages 167 in the ZX-81 manual and page 180 in the Spectrum — I concluded that they were very similar, as only a few lines had been moved out to the edge of the now 28-way long edge connector — the ZX-81 had a 23-way one. Those new lines could be excluded on the ZX-81 side, as they were not essential. If you look at figure one you will see what I mean.

I designed a piece of PCB to move the address lines which were out of position (A8-A15) back to where they were on the ZX-81. To that I connected a Spectrum edge connector and left unconnected all the other lines marked with an asterisk. I left the $\overline{\text{ROMCS}}$ disconnected as it would be turned off by the ZX-81 equipment at the wrong time, it being 16K long.

If you have a 16K Spectrum there is no need to go any further, as the 32K to 64K part of the memory on the Spectrum is

Figure 1.



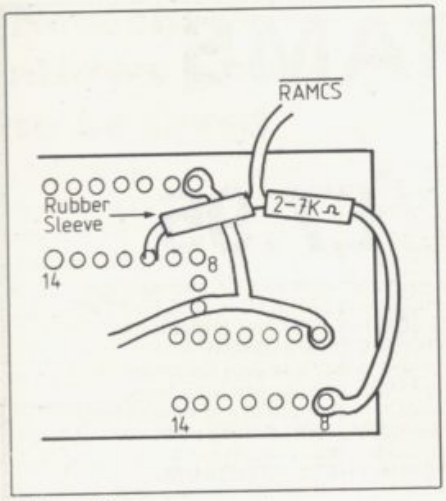


Figure 2.

empty. Any ZX-81 equipment which worked in this space would also work on the Spectrum, so long as it did not use ZX-81 ROM routines.

The Sinclair 16K RAM pack would also work but would be in the same position as the on-board RAM — from 16K to 32K — so would not increase the RAM available. Input/output devices would also work, except if they used the Spectrum clock signal or the address lines A0-A4. The full 64K of addresses would also be available, even with the printer connected — the printer blocks-off 10 of the connections if used direct.

On a 48K Spectrum input/output devices still work but the space in the memory map is now full of RAM. On the ZX-81 this is taken care of by a $\overline{\text{RAMCS}}$ connection which can be used to turn-off all or part of the internal RAM on the computer when another device wants to use the space.

The Spectrum has had this pin left disconnected inside on the edge connector and the next job is to restore this device to it. As there is no provision for a $\overline{\text{RAMCS}}$ on the 32K plug-in RAM board we shall have to make some alteration to the circuit. That involves cutting a metal track on the underside of the board where the components are — see figure three — and connecting a resistor across the break. That is the same way the $\overline{\text{ROMCS}}$ is done on the ZX-81.

The idea is that we can turn-off the RAM by raising the $\overline{\text{RAMCS}}$ connection to + 5V on the input to the gate — see figure four — which will have the effect of preventing the output of the other gate having any effect. That means that any time the address on our ZX-81 device is reached it can put out + 5V and replace the RAM.

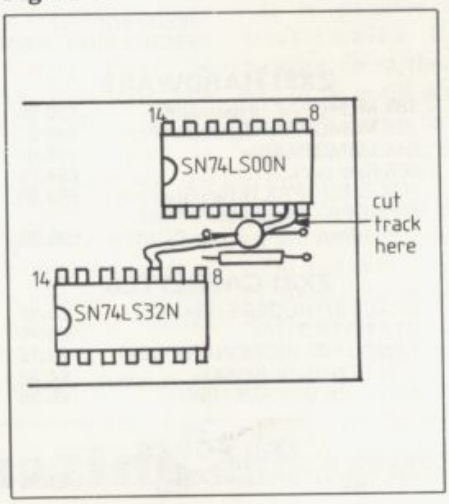
It also means, of course, that you cannot use this RAM at all, as you will always address the device. There is usually + 5V put out by most ports but it does not appear on the $\overline{\text{RAMCS}}$ pin — it appears on the $\overline{\text{ROMCS}}$ pin.

That was because where all the spare space was on the ZX-81, the ROM appeared also. Figure five shows a transistor and resistor circuit to overcome this. A transistor used as the $\overline{\text{ROMCS}}$ on its own is usually not sufficiently powerful to turn-off the $\overline{\text{RAMCS}}$. It should be mounted on the adaptor instead of inside the Spectrum, as the $\overline{\text{ROMCS}}$ pin on the Spectrum is in use.

The transistor is operated like a switch, in that when + 5V is applied to its base (B) it provides a connection from its collector (C) to its emitter (E). That applies + 5V via the 10K ohm resistor to the $\overline{\text{RAMCS}}$ connection on the Spectrum.

This system will work only if the $\overline{\text{ROMCS}}$ of the port, or whatever, turns on the + 5V only when it is addressed. I have seen at least one device which turns off the $\overline{\text{ROMCS}}$ only when the 0-8K

Figure 3.



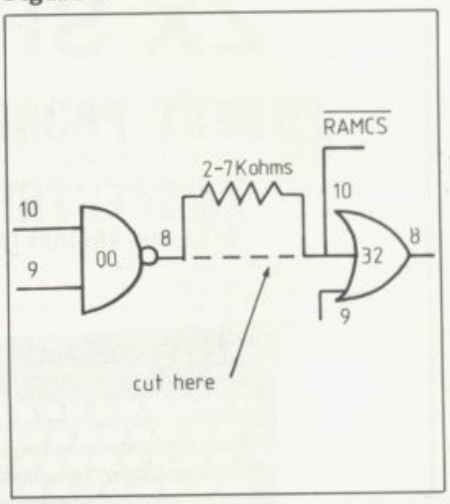
section of memory is requested. That meant that the RAM was permanently turned off. This modification, of course, turns-off only the 32K board RAM and does not affect the bottom 16K of RAM, which is used to hold the screen — see page 165 of the Spectrum manual for the memory map.

When turning-on the Spectrum with a port attached, some loss of RAM must be expected. The amount of RAM lost can be checked by PEEKing the PRTOP variable stored in locations 23732 and 23733. PRINT PEEK23733*256+ PEEK 23732 will give the last piece of RAM available to the Basic.

The lower the port location in memory, the more memory will be lost. That is because the RAM check done by the Spectrum looks for the last piece of continuous memory from 16K upwards. If that is broken in the middle by port, it will be ignored.

So there are now two ways of putting

Figure 4.



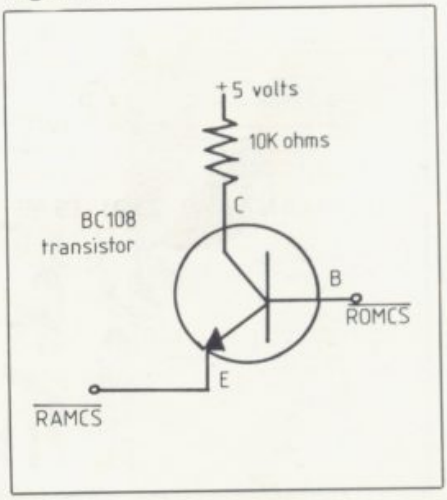
ZX-81 equipment on to the back of a Spectrum. One, by de-selecting some of the top 32K of RAM to put in your device and the other via the I/O map. A memory-mapped device can sometimes be transferred to the I/O map with some success if it fails to decode the bottom five address lines.

The only physical change which needs to be made is to cut the track on the device going to MREQ and connect to the next pin on the right (IORQ) — see diagram one.

All the addressing will then have to done via IN and OUT instructions in Basic instead of PEEK and POKE.

The author can supply an adaptor to make use of the 16K RAM pack or other devices which need decoding. Contact him at 1 Leswin Road, London N16 7NL, enclosing a SAE if it is an enquiry.

Figure 5.



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New chess allows games to be saved

ONE OF the first companies to produce a chess program for the ZX-81 was Artic Computing. Now Artic has beaten even Sinclair and Psion to writing a chess game for the Spectrum. It can be used only with the 48K Spectrum but it gives options which were not possible on the ZX-81. On first loading, the program asks whether the player wants to play, analyse, or load.

Taking the play option first, there are seven levels of play with response times ranging from two seconds to five minutes. The board is represented in high resolution at the right-hand side of the screen and the moves made by player and computer are printed on the left.

The players are represented using user-defined graphics but are a little too small for our liking. It would have been better to have a larger board with bigger characters on it.

Using the analyse option, it is possible to set up the board to allow the computer to analyse a position with which the player may have had difficulty or has found in one of the many chess magazines and books under the heading of chess problems. The instructions for the game also say that this option is ideal for end-game analysis.

The main difference between ZX-81 and Spectrum chess is the ability to save games you have not completed. You can then load the unfinished game into the machine and resume where you finished. It is irritating on the ZX-81 when it is necessary to complete a whole game which could take as long as an hour, or not finish the game. Now that problem has been overcome and it takes only seconds to re-load a game.

Spectrum Chess is from Artic Computing, 396 James Reckitt Avenue, Hull, HU8 0JA and costs £9.95.



Making Britain great in 48K

IN Great Britain Limited, a game for the 48K Spectrum, the player inherits the problems of the British economy. You have a choice of becoming Conservative, Labour, Liberal or SDP Prime Minister, with a five-year term of office which would give ulcers to any hardened Minister.

The purpose is to manipulate the yearly budget to keep inflation and unemployment at the lowest possible level. That may be difficult one way or another because you may have to raise company taxes to bring down inflation. If you do so, however, people will be made redundant, because bosses cannot afford to retain them. As a result of the tax increases, the dole queues will grow longer.

On top of the mass unemployment, soaring inflation rate, increases in prices and taxes, you may have to deal with riots and general public disquiet.

Every five years you will have to face a General Election and perhaps suffer a humiliating defeat. It is easier to lose in this game than to win. Inflation and unemployment seem to escalate for no reason at all. The game may enlighten a few to the problems of Government but it is a game, not a simulation. It costs £4.95.

Great Britain Limited is available from S W Hessel, 15 Lytham Court, Cardwell Cres., Sunninghill, Berkshire.

Debugging monitor

THE SPECTRUM Monitor is a new machine code entry and debugging program for the Spectrum 16K and 48K. The program is written in machine code and allows free interchange between it and Basic. The monitor occupies slightly more than 4K of user memory, leaving plenty of space for machine code programming and debugging.

Access to any part of memory is allowed and the monitor contains a disassembler which uses the standard Z-80 mnemonics. It is possible to change memory locations and move around blocks of memory.

One major advantage of the Spectrum Monitor is that it will display the contents of the CPU registers. That will help users to identify bugs in machine code programs.

Another useful addition is a hex/decimal converter.

It is possible to put a disassembled listing of memory on to the printer as well as on to the screen. That is a very useful facility, as it will allow the user to scan programs in a leisurely fashion.

The Spectrum Monitor is an attractively-presented program and easy to use. It costs £7.50 and is available from Picturesque, 6 Corkscrew Hill, West Wickham, Kent, BR4 8BB.

Amazing escapes in 3D

YOU ARE trapped in a maze which looks slightly like Hampton Court maze. There are several hungry monsters on the prowl waiting for you to give them a quick snack to satisfy their meaner instincts. If you bump into one of the creatures from the prehistoric age while running around the maze your life will not be worth two flint axeheads. That is how a new game for the 16K Spectrum, **Escape,** begins.

The most amazing thing about the game is the graphics. The screen shows a three-dimensional overview of a maze. You must control the little man at the bottom right-hand corner of the screen with the cursor control keys. The purpose is to wander around the maze to find and pick up an axe. Once you have found the axe you can break down the door of the maze and escape. To do that you must also keep out of the jaws of the monsters.

The maze is generated randomly at the beginning of each game.

The game was written by the author of the J K Greye **3D Monster Maze** and is one of the best and most original games we have seen for the Spectrum so far.

Escape is available from New Generation Software, 16 Brendon Close, Oldland Common, Bristol, BS15 6QE.



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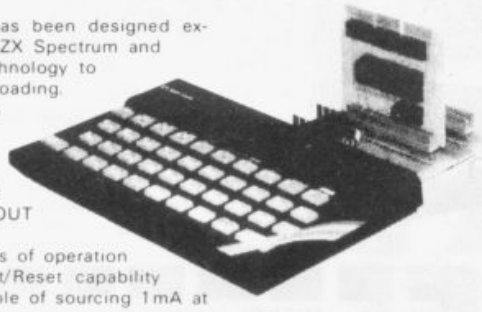
I think your game is fabulous since starting with Port Vale in the 4th Division, being promoted, winning the F.A. Cup, and being promoted again to the 2nd Division.—
C. DICKENSON, CANTERBURY

I recently bought your F.M. program and was very pleased indeed. I found it very good value for money and played it all day the day it arrived — I own a ZX81 which is now only used for F.M.—
Yours addicted, M. FRAMPTON, CANVEY ISLAND

I felt that I had to write and congratulate you on your program F.M. I found the game very compelling and exciting, really just like the real thing — keep up the good work and standard.—
N. LAWRENCE, FULHAM

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24 line programmable Input/Output Port



This new port has been designed exclusively for the ZX Spectrum and utilises MOS technology to minimise bus loading. The main features are:

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- 3 basic modes of operation
- Direct Bit Set/Reset capability
- Outputs capable of sourcing 1mA at 1.5 volts
- Access via 3 x 16 pin DIL sockets **and** 28 way edge connector

The port is available fully built together with a set of detailed instructions and suggested control applications. The port can either be used with our new Motherboard thus allowing a further card to be used, or with a stackable connector. Either way, it means that Micro-Drives, Printers etc. will run happily with the port.

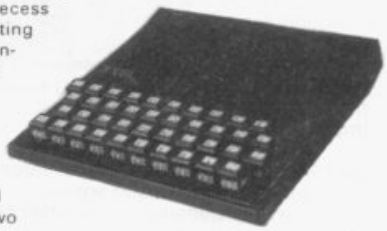
ZX Spectrum PPI Port £16.50
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ZX Stackable Connector £5.50

The prices are inclusive of VAT but postage must be added at 70 pence for a single item (100 pence for 2 or more items).

Please note that we shall continue to support the ZX81 and that we also offer a 16 bit port for the 81 based on a Z80A PIO at £15.50 inc.

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ZX81 Klik-Keyboard



This is a full, forty key, moving keyboard which fits into the recess left after peeling off the existing 'touch-sensitive' keypad. Consider the following advantages:

- Positive feedback from keys
- Fits onto the ZX81
- No trailing wires
- No special case needed
- Elegant design with two colour legends

The fully built keyboard requires *absolutely no soldering* since two flexible connectors plug into the ZX81 sockets. Alternatively, the keyboard is available as an easy to build kit at a considerable saving. Other ZX81 products available include a two-tone keyboard bleeper (fits inside the case) at £8.95 built, and a Repeat key kit at £3.95. Now available with 41 keys, the extra key can be used to give a repeat or reset facility £26.50 (built) £23.00 (kit).

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