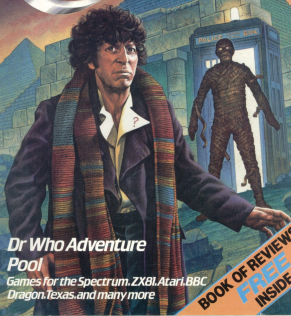


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SPECTRUM DEBATE . . .

Dear Sir,

I would like to make my own comments on the so-called BBC versus Spectrum conflict.

Many people believe that the Spectrum is the greatest computer ever made, in the same way that they thought the ZX81 was a year ago.

In fact the Spectrum is only one of many computers with features that are today regarded as standard.

However, the ZX Spectrum has one advantage over all the rest — its price. It is a cheap computer. A "jack of all trades" and master of none.

Inevitably Sinclair's machine will become the most popular, greatly aided by his adverts that leave the readers with both a good impression of his machine and a bad impression of the rest.

The BBC mouse is a very powerful machine, no matter how much Sinclair and his fans will degrade it. If it was anything less, it would not have been chosen as the BBC's mouse.

Also, the designers of Acorns have taken great care to make sure their machine is not outclassed in the future, and as a long term investment this machine is real value for money.
David McKean,
Donhead,
Tynes and Wrex.

. . . GOES ON AND ON . . .

Dear Sir,

I am writing to you referring to the letter that a Mr. McFaul wrote in your December issue. As far as I can see anyone must be stupid at turning down an offer for a BBC Model A, even when a Sinclair

Spectrum with all its extras is offered as an alternative.

For just 950 extra the Model A can become a Model B and many more peripherals are instantly available.

The Tube allows another processor to be added and so at least doubles processing speeds. Even without the second processor the BBC is the best fastest machine according to bench tests.

Delivery has been stopped up immensely. A friend of mine ordered one only a week ago and it arrived yesterday. I bet Sinclair can't say that about his Spectrum or indeed any of his computers. My conclusion is that the BBC computer will still be in great demand by the year 2000.

As for the Spectrum I expect that will be replaced by the ZX80 next year.

If this letter were to be published I am sure it would give people something to think about.

Tim Allen,
Thorncroft,
Rochinghamshire.

I KNOW WHAT IS BEST!

Dear Sir,

Truly a remarkable breakthrough in computer magazines. I find your magazine fun to read and very entertaining, especially the software reviews. Is the BBC Spectrum the only game to get 10/10 for playability?

I write to you concerning the letter sent in by Mr. Alan McFaul (December 1982) regarding the model A BBC.

As far as I am concerned the Spectrum cannot match the BBC in any respect. It is the quality of the basic that puts it above the competition.

Mr. S. S. Ali,
Fulham,
London.

PRINTER WITH A PROBLEM

Dear Sir,

Having read in many mags that Uncle Clive's production is now on schedule, has compelled me to put a finger or two to keyboard.

It was last August, the 1st actually, last date for my credit cards, that I ordered my Spectrum 48K. It arrived on the 12th November — late the printer.

After a couple of phone calls it arrived about a week later. I'm able to list some of my programmes I thought. Well, it took 30 lines and stopped.

So I sent the lot back. I received a letter asking me what I wanted them to do with the printer. Please return everything in working order I replied.

That was on the 26th November 1982, and I am still waiting.

I can quite understand why Clive has a production problem, obviously repeating more units than he is making.
Kenneth C. Allard,
Sheerness,
Kent.

COLOUR CODE FOR BBC

Dear Sir,

Congratulations on an excellent magazine.

I find the reviews of software a great help in deciding what to spend my money on. I am

particularly looking forward to your "Terminix Empire" competition which I have entered.

I totally agree with M. D. Gabbler's remarks about the ZX Spectrum layout. In my opinion the BBC Model A and certainly the Atari 400 are miles better than the Spectrum — at least the BBC has a decent keyboard.

As for the pathetic sound on the Spectrum being compared to the three channels on the BBC and the four on the Atari I think it's ridiculous!

As you might of guessed I am a BBC owner and I wonder if you might be able to answer a question for me. Are there any Scott Adams adventure games available for the BBC 8?

You may also be interested to know that when using mode 2 graphics on the BBC it is possible to get 255 different shades of colours. The short program below will illustrate this.

```
10 MODE 2
20 GOTO 80000,END(800)
30 GOTO
40 GOTO 10
50 GOTO 100,END(100)
60 GOTO 10
```

The method only works if you have a number over about 30 in the first half of the GOTO statements.

Alan Plummer,
Boscombe,
Dorset.

Editor's reply: Sorry Alan, I'm afraid that as yet none of Scott Adams' popular Adventures are available for the BBC micro.



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MAILBAG



IAN FINDS A FRIEND

Dear Sir,
With reference to your Mailbag column in the January issue, and the request by Ian Bailey of Stevenage, London, I am in the position to be of assistance to him as I own a TRS80 III level II machine and line printer II.
If he wishes to forward the tapes of the programs to me I will list them for him and return them along with the letters.

W. J. Temple,
Chelmsford

Editor's reply: There you are Ian, C&EG readers are a useful bunch to know!

BOMBER BACK ON TARGET

Dear Sir,
With reference to Confessions of a Pac, October 1992, I have the reason why so many people enquired about the errors in the Atari Bomber program printed in September.

Apparently, the program was written on a 400 which probably had only 16K or 32K. Bomber works perfectly for 16K machines, but problems arise when the memory is expanded.

This is because screen RAM is located right at the top of memory and will therefore change when memory changes.

In the program, all screen POKE locations are those for a 16K machine. I have a 32K 800 and the program would not work for me. When I entered one of the 16K RAM packs, it worked perfectly. I therefore give assessments to the program, to allow the program to be run on non-16K machines.
Change 10 GRAPHICS 1 - to: 8 - 1640 to: 12 GRAPHICS 1 - to: 8 RAM-POKE
(760+800*POKE (240)-32: 8-RAM - 32)

The variable RAM now holds the address of the top left-hand corner of the screen.

Now change, in the program, any occurrence of the addresses below to the expression on the right.
1062 - RAM + 239

1042 - RAM + 199
1002 - RAM + 179
1000 - RAM + 2049
1080 - RAM + 321
1076 - RAM + 1
1028 - RAM + 461
1074 - RAM + 20
1012 - RAM + 429
Christopher Brown,
Clevedon,
North Wales.

SHIFTING MEMORIES

Dear Sir,
I am the satisfied owner of a Commodore Vic 20, but after leaving it for some months I feel the need to expand it. However this is causing me some concern as I have read that when memory cartridges are plugged into the Vic the memory shifts. Not only does it just shift when cartridges are inserted, but it just shifts differently when you have 32, 64 or above 64.
Does this mean that programs written for the unexpanded machine will not run on an expanded machine because of the shift? And also programmes that need an expansion of 64 will not run on a machine with a 128 pack even though there is plenty of memory? Jonathan Phillips,
Leeds.

Commodore's Editor's reply: The answer to your first question is not without some programming. In answer to your second question — it would depend on the memory expansion board.

Sorting out the bugs
Dear Sir,
I have found another bug in the Z80 manual. Appendix A, the character set, states "The Z80 character set..."
Is Uncle Gene putting a last one, or is it yet another bug? Andrew Park,
Saxelton,
Co. Durham.

SORTING OUT THE BUGS

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Co. Durham.



QUESTIONS FOR VIC

Dear Sir,
As a reader from the first issue of your great magazine I decided it was time to write to you with a question! Is it possible to connect my VIC-20 to Celine or any other service? If so, how much? Neal Kovac,
Stockington,
Northham

Editor's reply: It is possible to connect most microcomputers to the Prestel videodata service of British Telecom. It is not really feasible to use one of the Celine/Oracle videotext service of BSC/TEL.

The Vic-20, unfortunately, is not the easiest system to interface for Prestel, as it only has 25 columns of the screen whereas Prestel needs 40. B & B computers of Bolton did manufacture a 40-column adapter which could interface with Prestel — unfortunately Realtime, their supplier, has just gone bust. If you contact them though, they may still have some in stock.

SWITCH TO STATESIDE

Dear Sir,
My son has outgrown his Sinclair ZX81 and is looking for another model.

As we may be moving to the States in the next couple of years, are there any computers, besides the Atari, which are dual voltage and compatible with U.S. TV? He is somewhat interested in the BBC micro, but we suspect it is not dual voltage.

I might add that my son enjoys hours of pleasure with your magazine. He hopes to be a TV addict — he's now a computer addict! J. Mansfield,
Clerton,
Newcastle.

Editor's reply: The U.S.A. and Europe use totally different TV systems. The problem of voltage is easily overcome with a transformer. Unfortunately there is also a difference in mains frequency, 60Hz in U.S.A., 50Hz in Europe. Only

a mains frequency converter will overcome this, and their cost is around £100+.

It is possible to bring U.S. equipment to the U.K., and vice-versa if a transformer/frequency converter is used.

You will need to use a multiple standard TV set monitor though. These have both the European PAL colour TV standard and the U.S./Japanese NTSC standard on them. Again they are expensive and will cost about £200-300. Most video/TV shops in London sell them and they are easy to get hold of.

In, come on spending near £1,000 to enable you to move across the Atlantic. It may be cheaper to buy the appropriate system when you arrive!

MISLEADING ADVENTURES?

Dear Sir,
I have recently purchased a BBC model B micro and several commercial games. Some of these games are excellent, Micro Power in particular. However, there are a lot of very boring games advertised that I consider are misrepresented.

One Adventure game says "what can?" interminably and another "what shall I do now?" until you feel like throwing something at the set. There are some very good Adventure games, with humour but a lot are "text buster", especially the "Is. He you are dead?" type.

My chief reason for writing however is the misrepresentation in advertisements as to whether games have graphics and sound. Many imply this but are only word games. They should clearly state that there are no graphics.

Even this is no guarantee as I have just returned a taped game to one of your larger advertisers asking for a refund, for although the advert clearly states that the game has sound and graphics, but it does not. Alan N. Miles,
Gates,
Derby.

Chromasonic Hall of Fame No 10

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TWO PINBALL WINNERS

The Bally pinball competition which we set in our September issue has two winners not one.

All the entries were despatched to the US where Bally's team of top pinball and video game designers sat about judging your entries and thoroughly enjoyed the job too.

The entries were separated into the video game and pinball categories and each was the depth of imagination and careful thought which you had put into your ideas. But it took them far longer than they had thought to come up with a winner.

The result: a winner of each section and several highly commendeds too. Our Pinball winner was Andrew Muir from Grove Road, Norwich with his game Alcazar who wins a Bally pinball machine to take home and set up in his living room.

Our most imaginative video game designer was 13-year-old Ian Griffin of Llyn Way, Haverhill, Woking, with his shark game Jaws. For Ian Bally have got up an extra prize of an Intellivision TV games centre.

Congratulations to these two and CBVG will also be finding something for the entries which came second and third in each category too. Full details of the winning entries will appear next month.

EMPIRES BECKON

If you have already entered our Seventh Empire game, you do not need to re-enter we will include you as soon as possible. But if you are new to CBVG and would like to enter fill in the form below and we will send you a rulebook and fleet starting positions for our next issue.

Please include me in the Seventh Empire game for April.

I would like to name my tablet the

My name is:

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PUZZLING SOLUTIONS

For those of you still struggling with the Puzzling problems on page 80, the answers are presented here. But please try them first, either in your head or by using a computer program.

Noah's problem with the ark of confused animals can be just as confusing for humans. In order of the first half the specimens are: Amosha, Canary, Porret, Iguana, Lo-sest, Maggie, Oyster, Parrot, Shrimp, Spider, Turkey and a Weasel.

The solution to On the Cards is that Don took the card with "Vices" written on it and Bob wrote "Silly".

Turning the digits in our symbol sum into figures gives the following place of arithmetic:

566
587
587
587
5152

And the correct solution to the Cross number problem is printed right.

The Blooming Problem has been left in your capable hands until next month, by which time 10 of you should be the proud owners of a

1	2	1	4	0	1	3
3	5	7	9	1	1	4
6	1	1	2	2	4	1
6	9	8	7	9	1	
9	7	9	9	1	9	
4	9	5	9	4	8	8
2	3	5	1	3	3	1

Vulkan Electronics Hungarian Ring to puzzle over. Send your entries in by March 12 please.

Finally, congratulations to the winners of our Space Attack problem set in January's Puzzling. A Paper of Grenville, Lancs; I Martin of Southall in Middlesex and G Holden of West Ealing, London, have all won a Computer Games' Galaxy Invader 1000.

Communications to the letters some of whom bounced wrongly or made other illegal moves. The best score was published last month. And thanks for the Gaudy Monster entries. No prizes here but top scorer was Jane Lockett of Shrewsbury with 555.

A BUG CONFESSES ALL . . .

They should have known better than to try and break a book of games past us.

We slipped Snag Jar in there at the last moment to cause a bit of havoc with Kool Alan on the Vic-20. It does not need the 128K of memory suggested in the write up and runs on a normal 3.5K machine.

Several people couldn't get their Red Alan plans to fire mission. A complete rundown on the instructions is:

a—spacecraft goes up
j—spacecraft goes down
P—spacecraft goes left (backwards)
*—spacecraft goes forwards
Pressing shift drops the bombs
Shift and the asterisk **free horizontal missiles

Those of you who called on Fruit Machine were having problems keeping the fruits in their boxes. We tweaked this down to line 1. The final statement in this line reads "EE=3087F".

Dodgers for the BBC Model B

runs on the 1.0 operating system machine and some of the commands in this program will not run on the 0.1 machine.

Texas owners are up in arms about the Pompeii listing which became embroiled in an empty volcano. A call or letter to the CBVG offices will result in the hidden part of listing being made clear.

T. Hitch got to grips with Keith Campbell's Adventure page. The block and line ranges in figure one should have read: Block 1, 10-50; Block 2, 50-150; Block 3, 100-410.

Minle Command suffered from a couple of missing semi-colons but first people seemed to track these down: 218 was the offender. Each C4 in this line should be followed by a semi-colon.

The editor has asked me to apologise for the lack of a Starweb write-up this month due to a space shortage. Also out went Next Month and the promised version of Donkey Kong for the Vic-20, called Logger. This will appear in April.

spectrum

AN APOLOGY from Spectrum UK

It's time to springload the basket of all SPECTRUM channels and its full list of suppliers. Unprecedented demand has caused a serious shortage of home-computing magazines. The situation is likely to continue for a few months, but we advise new readers are available from most SPECTRUM channels. Call the nearest SPECTRUM channel for the nearest SPECTRUM to your home.

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Author's disclosures of potential conflicts of interest and author contributions

[illegible]

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Journal of the American Academy of Child and Adolescent Psychiatry 45:10 (2006), pp 1253–1260

Abstract The purpose of this study was to determine the effect of a 12-week, low-intensity, low-impact, and low-volume exercise program on the physical fitness of sedentary, middle-aged women. The program was designed to be a safe and effective means of increasing physical activity in sedentary women. The program consisted of three sessions per week, each lasting 30 minutes. The sessions included a warm-up, a low-impact aerobic exercise routine, and a cool-down. The program was evaluated using a pre-test and post-test design. The results of the study showed that the program had a positive effect on the physical fitness of the women. The women showed significant improvements in cardiovascular fitness, muscular strength, and flexibility. The program was well-tolerated and the women enjoyed the sessions. The results of this study suggest that a low-intensity, low-impact, and low-volume exercise program can be an effective means of increasing physical activity in sedentary women.

NEW! LYNX



April 1991, an 11-page newspaper in Tbilisi, Georgia, reported that the Georgian Communist Party had been expelled from the country. The newspaper, *Pravda*, was published in Tbilisi. The newspaper reported that the Georgian Communist Party had been expelled from the country. The newspaper reported that the Georgian Communist Party had been expelled from the country.

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Individuals aged at least 17 years ($N = 1,029$) from 1996 to 1999. Almost half and almost three-quarters were employed and/or engaged in the paid labor force, respectively. Subsequent analyses include highly educated adults, gay/lesbian, and those in the non-employment category. **Keywords:** gay/lesbian, employment, life course, life events, well-being. **DOI:** 10.1177/0146167403251291

Methodological note: This study used a cross-sectional design. **Measures:** Employment, gay/lesbian, and life events. **Results:** Employment was related to life events. **Conclusions:** Employment was related to life events. **Keywords:** gay/lesbian, employment, life course, life events, well-being. **DOI:** 10.1177/0146167403251291

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Medical Mission (100, General)	110.0
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Weight Center	10.0
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Project B	2/1/2020	4/30/2020	90
Project C	3/1/2020	5/31/2020	90
Project D	4/1/2020	6/30/2020	90
Project E	5/1/2020	7/31/2020	90
Project F	6/1/2020	8/31/2020	90
Project G	7/1/2020	9/30/2020	90
Project H	8/1/2020	10/31/2020	90
Project I	9/1/2020	11/30/2020	90
Project J	10/1/2020	12/31/2020	90
Project K	11/1/2020	1/31/2021	90
Project L	12/1/2020	2/28/2021	90
Project M	1/1/2021	3/31/2021	90
Project N	2/1/2021	4/30/2021	90
Project O	3/1/2021	5/31/2021	90
Project P	4/1/2021	6/30/2021	90
Project Q	5/1/2021	7/31/2021	90
Project R	6/1/2021	8/31/2021	90
Project S	7/1/2021	9/30/2021	90
Project T	8/1/2021	10/31/2021	90
Project U	9/1/2021	11/30/2021	90
Project V	10/1/2021	12/31/2021	90
Project W	11/1/2021	1/31/2022	90
Project X	12/1/2021	2/28/2022	90
Project Y	1/1/2022	3/31/2022	90
Project Z	2/1/2022	4/30/2022	90

**There's a Spectrum
Centre near you ...**

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NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS N GAMES NEWS

WATCH THE SKIES FOR DROPOUTS!

ALIEN DROPOUT

Alien Dropout sounds like a further jokester, they smacking, heavy music track from the outer reaches of the galaxy.

In fact there is nothing Bohemian about these Dropouts. They pursue a calculated scheme to colonise your planet.

The insect-like aliens sweep into ten columns at the top of the screen — building up their forces for the final attack. Once they fill a column with more than five aliens one of them swoops down — Galaxian style — and explodes on impact with the ground, throwing out deadly debris.

Armed only with a laser beam your task is to shoot the aliens out of the columns before they amass sufficient numbers to swarm towards you.

The Dropouts are controlled by their leader — a giant butterfly-like alien who wages down the screen towards you when things are getting rough for his drone ships.

Alien Dropouts is based on the arcade game Zaxxon and is the



Latest addition to the Superior Software range of games for the BBC model B.

Also new from Superior is a fruit machine simulator with many of the features of the barroom favourites such as hots, nudges, and gambles.

Both games are available now from the Leeds firm at £6.95 in colour.

OUT FOR THE COUNT IN CASTLEMATH

You can't count out the Mad Maths Master of Castle Math!

This is an adventure game where you can only make progress by solving some test for you.

Once inside the castle, a variety of creatures pop up to test mere mortals to be solved and at different intervals. There are also a few surprises to keep your interest.

Castlemath is the latest addition to the AudioLogic range of software for the Vic, and is designed as a fun way of improving your maths.

Also new from AudioLogic this month is a novel game entitled the Pit. You play the part of a beleaguered workman who has to go from one side of the screen to the other picking up money bags — all the time dodging a deadly deluge of hail which is pouring from the sky.

Castlemath is available from the Reading-based firm at £8.95 with The Pit at £7.95.

THOSE LITTLE GREEN FOOTBALLERS!

ALIEN SOCCER

If you are not off taking a holiday to the stars because you would miss that one precious footballing pastime — soccer, then this latest game for the Vic reveals an encouraging discovery about aliens — they play football too.

Alien Soccer is a weird combination of some of the best elements of soccer and pinball.

You control an alien Pat Jennings who moves from right to left trying to stop the ball from crossing the goal line.

Kick the ball up screen and it will rebound around a variety of obstacles matching up points for your team.

Alien Soccer is the latest game for the unexpanded Vic 20 from Radon Software.

Also new from Radon this month are Thrills and Mayhem — space attack games for the unexpanded Vic.

These latest additions to the Radon Confuse Arcade Collection retail at £9.99 from the Thame-based firm.

MAN-EATER GUARDS THE CHALICE

CHALICE OF KALMAR

Your only guide in the quest for the Chalice of Kalmar are the occasional flashes of lightning which illuminate your way as you follow the winding path.

If you go off the path you will be pushed back outside the temple walls.

Just to make things a little more interesting you are also being pursued by a man-eating monster.

The B-side of this cassette has a second game on it called Penguin. This is a straightforward shoot 'em down game involving a penguin.

Chalice of Kalmar and Penguin run on the T8004s and are available from Apex software of Brighton at £3.95.



THIS TOWN 'AINT BIG ENOUGH

WITH NOON

It's high noon and the James gang are terrorising a sleepy western town.

Can you bring 'em low to the streets of your outback town?

With your star of a badge planning in the bright sunlight you step bravely forward.

Who knows what may be lurking behind the shutters of the saloon, the undertakers, and the offices of the stagecoach company.

You'll need a quick finger on your trigger as the desperados appear from behind windows and walls to take pot shots at you.

But shoot straight as the good people of the town are also in hiding and a stray bullet could easily kill any one of them.

High Noon is the latest game from Abbot Software for the Sinclair Spectrum and runs in 16 or 32K.

Also new from Abbot this month is a classic Adventure entitled *Avon Policy* and a robot shoot-out game called *Android Fun*.

All three games are available from the London-based firm at £10.50.

CAN'T KILL A GOOD INVADER!

SPACE INVADERS

There's no getting away from Space Invaders — and a new version is due out this month for the BBC Model B.

Using Mode 5 colour graphics, these Invaders are an accurate copy of the classic arcade game and even feature an auto-play demonstration mode to attract attention when no-one is actually playing it.

Bug-Byte are also converting other arcade-proven games for the BBC micro.

City Defence recreates the thrills of another arcade



fortune, *Missile Command*.

In this game the skies are not filled with vapour-trails of descending missiles. A cluster of earthbound missiles are headed down towards the cities.

The other difference is that the defence of the cities is undertaken by a steerable racket which is launched by the player. Tactics in this game vary from the player who elects to defend all his cities to those who would rather concentrate on saving one from destruction.

Threshold is a BBC version of the popular Apple game of the same name.

Wave after wave of aliens have invaded the atmosphere and earth's defence is in your hands. The first wave travels left-to-right across the screen with appropriate graphical and sound effects.

If you survive that one a galaxy-type wave heads down the screen towards you. There are 12 waves available, gradually increasing in difficulty.

All the above games run on a BBC Model B and cost approximately £5. They are available from Liverpool-based Bug-Byte.

Bug-Byte also has a *Vic 20* offering due out this month. *Vic Scramble* is faithful to the arcade original and runs on a basic 32K machine for £2.

THE IDENTIKIT ALIENS ON THE RAMPAGE

GLADIATORS

A do-it-yourself alien kit is part of the magic of *Galactic Gladiators*.

This game of alien combat takes place in the deadly corridors of a sealed off gallery known as *The Bubble*.

You take the part of a leader of a troop of aliens who are your warriors. This troop is made up of identikit creatures with attributes like: strength, endurance, weapons, speed and skill.

These are given an identifying and weapons and sent off into combat. The stronger they are the more armour they can wear and weapons they can carry.

The game runs on an Apple II or III and comes from the U.S. company of \$15.50 under the Rapid Fire label. It is available over here from Pete & Pam Computers of Rosemead in Lancs, at a cost of £20.95.

Pete & Pam Computers also have another Rapid Fire Apple game in their warehouse at the moment. *Cytron Master* is set in a galaxy where all disputes are settled by robotic creations

rather than human or alien life forms.

These robotic warriors are known as Cytrons and those who pursue the life of commanding these creations are known as Cytron Masters.

At his command, a Master will have such things as: laser blasting cytrons, mine cytrons, guided missile cytrons and mobile bunker cytrons.

When two Cytron Masters are battling it out, their aim is to destroy their opponents' command centre. Only one top Cytron can survive.

The game is for two players or for one player to try and match the computer's cytron games.

It is a fast and furious action game with three speed levels, so that beginners can learn the tactics. *Cytron Master* retails at £20.95.

EATING OUT DOWN AT THE SWAMP

SWAMP CHOMPERS

Swamp Chompers are not particularly attractive creations. But these mud-splattered inhabitants of the swamps of *Blackholes* are your other-tops in this new £15 game for the Atari computers.

Between your character and its feeding station is a swamp infested with alligators and other terrifying creatures. Once you've left home, you have only 40 seconds in which to reach the feeding station and then return home.

If you make it across the swamp, jump into a flying machine to travel to your food which contains the maps required to turn you into a swamp chomper, a creature capable of eating its former enemies.

The transformation lasts just nine seconds — and special dots emerge who suck the blood from swamp chompers during that time.

Glodes also feature for extra chomping time. There are 13 different swamps to build your score up, each getting more difficult.

It is available from Baltimore-based Commodore on cassette or disc at a price of £21.95.



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3. **ARROW OF DEATH (Pt. 1)** — A light has fallen on your homeland, the Baton has become tarnished and now radiates a malevolent aura of Evil. Your mission is clear — trace the source of this evil and destroy... or to be destroyed. This is the first part of an Epic Adventure although each part can be played as a stand alone scenario.
4. **ARROW OF DEATH (Pt. 2)** — You now have the means to destroy your enemy... but you are far from home and this land is strange to you. Can you cope with the deadly perils which approach you and have you the strength to see your mission through to the final conflict?
5. **ESCAPE FROM PULBARI** — Alone on a gigantic Space-Frigate... The rest of your crew have died horribly at the hands of a mutated Bio-Spiderman. Your only chance of escape is to reach the Frost Shuttlecraft. But the lurking Monster is hungry and you are the only food it has left...

6. **CIRCUS** — Your Car has run out of Petrol on a lonely road miles from habitation. As you huddle miserably down the road in search of help you are suddenly confronted by an amazing sight... In a nearby field is a Huge Circus tent! But this is no ordinary Circus as you will soon discover...

7. **FEASIBILITY EXPERIMENT** — Far across the gulfs of time and space, a dying race of super-intelligent beings search the Universe for a home to save their existence... At length their thoughts turn to planet Earth. You are chosen to be their saviour in a bizarre scenario where death is a mere thought away.

8. **THE WIZARD OF ARMYT** — You are in the Royal Palace. The King beseeches you to rescue his daughter from the evil wizard. If you succeed your reward will be priceless... failure will bring certain death.

9. **PERSEUS AND ANDROMEDA** — Travel into the realms of ancient mythology. Battle with grotesque monsters and supernatural powers as you search for the hidden secrets of myth and legend.

10. **TEN LITTLE ADAMAS** — This mystery begins with a train journey into a strange country. What secrets are held by the strange country monster? What meaning is attached to the strange tale? Maybe you will find out if you live long enough...

* Adventures 1, 6 and 7 require 32K RAM

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NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS GAMES NEWS

BEAT OFF SWARMS OF BUGS

BUG-OFF

There's a whole swarm of the nastiest creepie-crawlies all piled to run anybody's game in the new game Bug-Off.

Your character is armed only with a water gun and he must fend-off the bugs by squirting them.

Using a joystick, you can chase the bugs to any corner of the screen to finish them off.

The game is for a ZX machine or cassette in £48 disc and costs £19.95 for the Atari 400. It comes from U.S. software house, Adventureland and is distributed over here by Calate Computers of Birmingham.

But of the same stable comes Toole Frodo which is a Pacman-type game — but this time without a maze!

Instead of gobbling dem, Toole Frodo challenges you to feed ice-cream and sweets, as you steer clear of the bugs.

Available for the Atari in 16K cassette or 12K disc from Calate, it also costs £19.95.

SECRETS DOWN IN THE DUNGEON

DRAGON LORD

Dungeons and Dragons comes to computerised life on the Dragon in a multi-level adventure from the keyboard of Bob Calate.

There are seven levels of dungeons in the Lord of the Dragon, all filled with some of the nastiest creatures you would expect to find in the dark, dark places — trolls, hobgoblins and warlocks.

It is a combination of text and graphics from Ben Limited, based at Fulmer, Buckinghamshire.

Other offerings from them include a quotation quiz game, Who Said That with some 85 quotes to place.

Mythmors Park has you reeling about in a gloomy city park dodging the horrors and

trying to lead them to their deaths.

And Noah's Ark is another classic computer game converted to the Dragon. The computer is given some questions to ask about certain animals to deduce which one you are currently thinking of. If it gets the answer wrong it questions you on how it might have guessed the animal correctly and learns new animals.

This fascinating program shows simply how a computer can be taught and gives an insight into the most basic artificial intelligence.

All the programs run on the Dragon 32 computer and cost £5.95 except Who Said That which is a little cheaper at £3.95.



A REAL MAN EXPLORES THE JUNGLE

FLOYD

It takes a man of real character to set off on a quest through a jungle infested by dangerous pygmies, hungry crocodiles and man-eating tigers.

Such a man is Floyd of the Jungle and his mission is set among tropical vegetation in the Atari 400. He is tackling the jungle to save his girl from the

pygmies, crocs and tigers in an arcade style romp in the state of Canyon Climb.

Chopper Beaser is a scurrying scramble type game with bombs and missile bases and a helicopter. It is a multi-level game with a series of different challenges.

And Hell-Cat Ace in World War Two action from the cockpit of an American fighter pilot, a flight simulator with plenty of Japanese rivals to tangle with above the Pacific Ocean.

These three games all run on the Atari and come from Micropro Software in the U.S. They all cost £29.95 and are available from Calate Computers in Britain.

Calate has also commissioned a U.K. battle of Britain version of Hell-Cat Ace, called Spitfire Ace which should appeal more to the U.K. audience.

THE MANY ARMED MONSTER . . .

BLACK SQUID

The Black Squid is a game of memory and menace on the sea-shores.

It's a shoot you may never see again as you swim desperately through the rocks and giant crabs, dodging the tap of a black missile on your shoulder.

The rocks are invisible in the murky waters, but everywhere you hit one, that particular rock and all those you have previously hit flash up on the screen for a second.

Remember their position if you can because rocks distract the squid and if you can lead the dark beast into a lot of them, you'll have a better chance of making it to the sea-shore at the top of the screen. The giant



crabs are more dangerous.

The Black Squid needs at least 16K of RAM expansion on the Vic-20 and it costs £39.95 from Pwllheli-based Channel 8 Software.

Also new from Channel 8 is a children's game of I-Spy which is aimed at the learning to read age-group. There are 10 levels in the fast-paced game, from which a child can choose to spy.

Among these are I-Spy at the: zoo, circus, farm, shops and high street. Like the children's game, the computer gives the player a letter and asks it to guess what could be seen beginning with that letter at the given situation.

It costs at £9.95 and runs on the Atari 400 and 500.



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THE SEVEN

OUR TOP COMMANDER

Top space commander for tomorrow is Nicholas Fiaschi, who will be able to plan out future campaigns on a Colson basis.

The Spartans' space force under Michael's control made full use of the Ponder command to notch up big profits of 2,500 points.

The Spanish probes varied routes between Talon and Suay, Widen and Barro, Jóns and Rívers, Sonar and Widen, Widen and Espal to reach the coast on.

(See top 10 scores for the first four years: Nicholas, 1914; Sinclair, 1915; J. Peck, 1916; Cambridge, 1917; D. Mack, Farnborough, 1918; C. Jennings, Tonbridge, 1919; A. House, Leigh-on-Sea, 1920; F. Nevins, Worthington, 1921; S. Jones, Sheffield, 1922; F. Schuster, Hutton, 1923; M. Grant, Morden, 1924; and C. Parker, Corsham, 1925.)

Other players didn't fare as well. But check up your own scores and the following list should show you how you fared: 128 players scored 500+; 34 players were between 400 and 499; 68 between 300-399; 48 between 200-299; 75 between 100-199; 45 between 0-99; and 110 players finished up making scores below 50.

Nicholas takes a Colour Game for his carefully considered Pondering of us poor merchants. The rest of you can lick your wounds and try to improve your scores on this next turn. We have all got a clean sheet to start our March now.

For the March issue's individual winner we will provide three citations of games programs for his matching. He is named winner of December.

Mike Singleton, who wrote the Seventh Empire program, runs his own Play-By-Mail game, Starlord. And he is offering a free rule book and two free turns of Starlord to any Seventh Empire player. Just write to Mike at the address given in the Seventh Empire Rulebook and quote your Seventh Empire code number for an introduction to the galaxy of Starlord.

THE WONDER OF COLECOVISION

If you're a fan of our Video Screens section you'll already have read about the new Caterpillar Video Games system and how its graphics are going to change the face of TV games.

Now, through Seventh Empire we're offering you a chance to see these marvellous Concoction games at first hand in their own home.

A Colocotron plus sufficient is the prize for the overall winner of our Seventh Empire competition. How long the Seventh Empire lasts is CERN's decision.

How popular it is, but if it is still being included in September of this year we'll present the Coliseum to the player who has matched up the most points by then.

As that first turn was really just a chance to get to know the game and for us to check out the running times, the scores from that turn will not be included. So starting from March the computer will add your scores and the top scores by the time our August issue's turn has been processed will have seen a *Competition*.

With 100 of Rose and TRE

them, the Caterwauler is closing the gap between TV games centres and microcomputers. It offers some marvellous detail in the graphics for several already successful arcade games, which is featured in its software catalogue. Its versions of *Donkey Kong*, *Jamona*, *Lady Bug* and *Torin* are listed in the top ten list for the Caterwauler. Venture is not such a well-known arcade game in this country but with its dragons and dragons theme it will also, no doubt, flourish.

CHECKING YOUR ORDERS

Did you enter your Seventh Empire orders correctly? About 10% of you had some testing problems understanding the rules of movement and entered a few invalid moves.

Usually it won't only one or two items that went wrong. But if these stay "lost in space" it will affect your retailer's profit margins each time.

So before you enter your fleet positions for turn 3 check your fleets for turn 1. If you have made any mistakes for a fleet, these will have been converted into day orders, in both Movement Sheets.

Most common problems were those people not checking both orders against the Diplomatic Clearance to see whether they were

at war or at peace with the empire they hoped to attack. Trade or Blockade.

A word of warning about the *Statista* Map this month as it only includes star numbers for players who have had at least one hit. Approximately another 10,000 stars will be added in the March figures randomly, before the next turn is announced.

The **Red Panda** has been
rescued from the IT

And the deadline for orders is Wednesday February 23rd at 11:59pm (PST).

Only one player has an improved SRS this year, Eddie Jaramero.

is in charge of the Clinical Hospital in
Paris, France.

Below is the Gateway Route profits table. The squares printed in white on black are the routes in which Fluendiser made a profit. The black on white squares are routes on which Garga never made a profit. The table should be read by looking up the station you left in the vertical table and checking it against the one you moved to horizontally. The resulting figure tells whether the route was profitable or not.

[illegible]

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Here is the wildest arcade style game yet. Your garden has fallen into a Florida sink hole where weird forces have released a horde of insect bugs. You must destroy them with power sharp graphics and colour and "your weapon OOT" — will you have time?

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Fans of this game — now it's available for the Atari 400 and 800. Pick your Eliminator Craft over alien terrain and fight the hordes of menacing enemy ships. Superstative graphics and realistic sounds make this arcade style game exciting to the end.

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This sensational arcade game of 1981 is now available for use on your home computer system. Fly through a three dimensional star-crafted to attack the fortress and is deadly enemy robot. Survive this battle and earn the ultimate challenge!

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CHESS



WISDOM OF THE MACHINES

Computer chess has long been used by workers in the field of Artificial Intelligence as a testbed for human reasoning and how it can be programmed into a computer. A useful spin-off has been a gain in knowledge and understanding of the game itself.

Work at the Machine Intelligence Research Unit at Edinburgh University is the last few years has focused on the endgame King and Knight against King and Rook (abbreviated to KERN).

Amongst those studying this ending have been two players of master strength — the Hungarian player Imre Németh and U.S. master Danny Kopec.

Unlike most endgames which have been studied by Artificial Intelligence researchers, KERN is genuinely hard even for masters, although fortunately rare in practical play.

Conventional wisdom states that the ending game is in general a fairly straightforward draw, but this turns out not to be true.

As the game goes on both sides must take care to spot any possible traps.

With the Black's side (assumed to be white) to move, only a slight majority of legal positions are drawn. However, it is important for Black to stay in the centre of the board, because the two rooks come with the King in the corner.

Here is an example of a difficult position.



FIG. 1

tion for the defending side with the King in the corner.

White to play by 1. K-N6!

If now 1... N-B4; 2. K-E3, N-N4; 3. K-N6 mate. So Black must play 1... E-N1, whereupon

White wins by 2. K-N6! Now 2... E-N1 allows a lethal pin, (3. N-B4), so Black must play 3... N-B4; with the continuation 3. K-N6 ch, E-N1; 4. E-N7 with a rapid checkmate. Strangely enough, Black can draw if it is his move in figure 1.

After 1... N-B1; White has nothing better than 2. E-N7. Black now has the

astonishing drawing move 2... N-K2!

There must be few masters who would play such a move with confidence.

Now Black's Knight is separated from the King and there are mating threats to contend with. However, there is no way for White to exploit these facts.

For example, if 3. E-N6, E-N1; 4. E-N6ch, E-N1 with a drawn position away from the corner. This example is taken from *Advances in Computer Chess 2* published by Edinburgh University Press in 1980, which contains two lengthy articles on the work of the Edinburgh team.

Although their work had much more ambitious goals concerning how expert knowledge might be represented and stored in a computer, from a chess viewpoint alone it is quite remarkable.



FIG. 2

Here is another of their examples (Black to move).

Most strong players would surely now play 1... N-K2! ch to bring the King and Knight together (for N-B4 subsequently). However, Black's only drawing move is the apparently suicidal 1... N-OB1ch.

Work of this kind calls seriously into question the idea that the endgame is well understood at least by grand masters.

Even for this four-piece endgame there are numerous previously unexplored problems and even such an apparently definitive text as Benbow Fine's *Basic Chess Endings* has clear-cut errors as well as serious omissions.

Figure 3 is an example of the textbook lapsing (Black to move).

This position is a variant of one which was first analysed in the ninth century. White can win in 14 moves. Black's first move is effectively forced: 1... N-N4 ch, with the best play for both sides continuing 1. K-N6, N-N4.

Now the textbook gives 3. K-E3 as an exclamation mark, although K-E3 is best and wins one move sooner. More seriously, Basic Chess Endings rejects 3. E-N7 because of 3... E-N1; 4. E-N6 'drawn'.

This is true but playing 4. E-N6 would

win. After 4. E-N6, Black's reply 3... N-Q1 ch is forced.

The textbook analysis continues 4. E-QM, N-QM; 5. E-QM! The exclamation mark is Benbow Fine's, but in fact it is a sub-optimal move which extends the



FIG. 3

game a further 6 moves than necessary until White's eventual win is reached.

Analysis of this kind shows that the textbook not only occasionally misjudges whether a position is won or drawn but frequently gives a move which is not the best. If this is the case with a four-piece endgame, the reliability of the rest of the textbook must be open to suspicion, to say the least.

The question remains, how is it possible to come with such confidence of the best moves in positions which seem to defy expert analysis?

Certainly the answer is not by analysing the game out to a conclusion each time. There are positions where it takes White 27 moves to win (i.e. 27 White moves plus 26 Black moves).

Assuming that each player has an average of 10 moves in every position, there would be 10 to the power 10 variations to consider before making the first move.

Nevertheless, the KERN ending is now completely solved for every legal starting position. I shall return to this topic next month.



BY MAX BRAMER

TV GAMES CENTRES TV GAMES CENTRES TV GAMES VIDEO SCREEN

STICK-STAND

The Stick-Stand was the cheapest and simplest product we tested. Basically it's a plastic stand into which your standard Atari joystick fits snugly. You also get a little red ball which clips onto the top of the standard stick to improve the grip.

Simple but effective, the wide-bottom base provides a good stable support for the stick — and that little red ball does improve playability — especially when the on-screen action gets fast and furious. Made by the U.S., the Stick-Stand costs £2.95.



TRACKBALL

The Wilex trackball is truly a video games' gourmet controller.

Once you get used to this unusual method of control and develop some speed, it gives you unbelievable responsiveness and adds greatly to playability of any game.

Left and right commands are fairly easy to master but up and down movements are a



little bit more difficult to control. You will have to retrain your Pacman technique accordingly!

Ify one reservation with the trackball was with the fire button. This was particularly heavy and clicked unnecessarily every time you released a missile.

It would also have been an improvement to have a fire button in the top right hand corner as well as the top left for left-handed people.

Getting the right joystick for your TV games centre is becoming as difficult as choosing the right squash racquet or set of golf clubs.

Adverts claim all sorts of things for sticks — that they will increase your scores and turn you into a pro-player.

We have already reported on the latest batch of scouted-up sticks now being imported into this country from the States, and this month the C&EG staff set down at our Atari VCS and played a few games using the sticks — purely for research you'll understand!

Here we bring you the results of our bench-tests on four of the new sticks — plus the novel Wilex Trackball and the simple but effective Byte Stick-Stand.

Our general impression was that these sticks add a great deal to your game and will prove a valuable addition to your games centre.

Most of the sticks we tested were in the £15 - £25 price range — less than one of the top of the range VCS cartridges. Pretty good value in our humble opinion.

We would like to thank Silica Shop, of Sidcup, Kent, who supplied the sticks we tested, and import them from the States.

The trackball does not come cheap. At £40 you would have to forgo one or two games which you have had your eyes on for some time in order to pay for it. But in my opinion this would be well worth it.

DATABASE

If you are the proud owner of an Interton VC4800, Radette, or Acoustic video games centre then you might not be quite so proud of the ever decreasing range of games available.

As these little-known machines have not generated the mass sales of, say the Atari, Phillips or Intellivision machines there is not a large enough water base to support independent software. It also means that the firms who produce the machines do not tend to produce a very wide range of games themselves.

The situation has been improved slightly by the production of an adaptor from Database which enables all software for the Database system to be played on any of the above machines.

The range of games for the Database is probably about the most up to date of these houses.

known machines and includes versions of the popular arcade games Propper and Pacman.

The adaptor plugs into the software ports on the various machines and the Data base software is then inserted into it.

The adaptor is available at £4.50 from the Database, Hertfordshire — based firm.

LE-STICK

Le Stick from Database is a really nice idea. A joystick without a base seems the easiest way to describe it. It works when the player lifts the stick in the direction he wants to move, and a pressure sensitive "switch" inside the stick triggers the action if the player squeezes it gently.

As I've said before it's a really nice idea. However in practice — on a video games centre anyway — it's just not responsive enough. You really need a bit of practice to get it working as well as one of the



regular design sticks.

We tested it on more and space-type games and found it difficult to keep control of the action — which, of course, is all important in the games.

Le Stick, which costs £24.95, may come into its own when it's used for computer games — but unfortunately our testers just couldn't give it the C&EG seal of approval — despite the nice design concept.



STARLIGHTER

Samson's Starlighter is described by its makers as the ultimate joystick. Well, in our opinion, despite the two year warranty that comes with it, the stick fails to come up to this extravagant claim.

The Starlighter stick is short, stubby and difficult to get a good grip on — you'll soon be suffering from Aime fighter thumb or some such affliction that all video game players suffer from time to time.

The fire button is not one of the stick's best features. It's slow and allows three shots to escape too easily.

As you've guessed it's probably the stick's worst feature. It's slow and allows three shots to escape too easily.



WILEX STICKS

The Wilex Command Control range of joy sticks are the best known "gourmet sticks" as they are formed in the U.S., where they are currently the number one sellers.

There are two sticks in the range — the Red Bull stick and the Extended Lever stick. Both are highly responsive

CENTRES TV GAMES CENTRES VIDEO SCREEN

and offer you a choice of two fire buttons. One is mounted at the top of the joystick itself and the other at the base of the stick — so that you can use the joystick in either a standard or a "shoot and aim" style.

The pad is the standard 27.50. The joystick is the same — was not included.



responsiveness.

Both Atari sticks are compatible with Atari VCS, Atari 400 and 800 and the Commodore VCS.

An advantage of the Atari sticks is that they are designed to be used with the Atari 400 and 800 computers. Atari also makes a joystick for the Commodore VCS.



is useful for those people who like to sit in their armchair and play. It sells for £3.95.

TAKE A MAD GORILLA HOME TODAY!

DONKEY KONG

If Mad Mario, a crazy gorilla and a beautiful blonde mean nothing to you then you have not played Donkey Kong.

This hit arcade game is now available in cartridge form for Atari VCS owners.

A couple of shops who managed to get hold of advance copies of the game before Christmas told us in a matter of days. Copies have promised fresh supplies for March.

For the animated you play the part of Mad Mario who is trying to rescue his girlfriend from the clutches of a gorilla.

To get to your girl you must run along steel girders and up ladders while hopping over barrels and avoiding that the gorilla is throwing down at you.

Donkey Kong is one of a range of well known arcade titles which have been taken out of the arcade and converted to VCS format by the new video games company Coleco.

Also released this month are Gorf — a space attack game.

Wizard of Wor takes you down into the dungeons where you have to defeat and explore the rewards monsters. You have a radar device to help you negoti-

ate the constantly changing maze.

Centinel is a simulation of a foreground shooting gallery. Blast away at the clay pipes, dancing bears and singing ducks.

The Coleco range of VCS games will be available from most major video games stockists at around £25.

Coming soon are Zenon, Turbo, Lady Bug and Cosmic Avenger.

Most of Coleco's titles will shortly be available for the Intellivision machine and also for Commodore's own machine which will be launched in the Spring.

This year hundreds of cartridges for TV games centres will go on sale. Not just new and original games but new versions of old favourites.

The Atari VCS will continue to get the majority of the new releases as more people own Atari centres than any other machine and therefore there are greater potential sales.

To help you make the best choice when buying a new game C&VG will be reviewing similar games in one batch and picking the best one.

GO WHERE OTHERS FEAR TO FLY

STAR RAIDERS, STARMASTER, STAR VOYAGER

Nowhere is the competition for sales tougher than deep in space. You can do battle with the Kyriens of Star Raiders, Zarkons of Star Voyager, and the Starfighters of Starmaster.

These 50 space games from the big three VCS manufacturers Activision, Image and Atari are based on the same idea.

You pilot a craft hurtling through space at breakneck speed. Your mission is to seek out the enemy ships and destroy them while avoiding their fire and protecting your Star-

Raiders. You fly through the galaxy at great speed to the space sector you have selected on the galactic map.

The most beautiful add-on controls a tracking computer and protective force field, which you must learn to use selectively as they draw heavily on your fuel supply.

Star Raiders is a most playable game. Difficult but addictive. At first it requires a lot of effort to

Star Voyager does have one unique feature. Every so often you get an audible signal telling you a star portal is in close proximity.

You must fit your sights on this and fly towards it.

As you get nearer the tiny square will grow larger and larger till it fills the screen which then flashes through a sequence of colours. When this is done you have then passed safely through

a star portal.

Activision's Starmaster is the closest to the Atari original with a galactic map and an excellent eye-speed simulation.

Starmaster has the best attack computer display of the three games. As you



master all the controls.

Image's Star Voyager is much easier to get the hang of.

Apart from the incoming aliens there are only three other controls to be watched — radar screen, energy level, and the number of enemy hits.

Star Voyager is also easier because the aliens come at you in a uniform cardswallow movement as opposed to the random clodping of Starmaster and Star Raiders.

By into a sector occupied by enemy ships the control panel turns red. If the enemy cause the screen to flash red. Yellow flashes mean the enemy has scored a direct hit on your craft.

Starmaster and Star Voyager both retail at around £25.00.

For game presentation and sheer game play Star Raiders at £25.00 is the best of the bunch. Although Starmaster gives the toughest fight.

ARCADE

PIGGIES IN THE MIDDLE

The secret of success at most chase games is knowing what to expect of your pursuers.

In the two screens of *Amidar*, the chasing warriors and piglike boys are more predictable than most arcade pursuers — one goes around the outside of the rectangle filled screen (the tracker) and the other four like *Amidar* run each time they come to a corner.

Amidar is a game of screen filling. A network of staggered rectangles provide the lines for your penis to travel on and each time you point around a square it fills in, adding to your score.

The first screen *Amidar* are warriors and your best tactic is to go to the bottom left-hand corner and clear that area. At this point all the *Amidar* are on fixed routes and remain so until you reach your next objective, the top right corner, which they all begin to follow you as best they can.

Fill this corner while the tracker is at the top of the screen and follow it around the edge closely. Then *Amidar* won't cut in between you and the tracker.

It will lead you to the top left-hand corner. Clear that area and head for the screen centre to do the same there, before moving to the final corner.

Leave the square in this corner until the *Amidar* are surrounding you, then complete it. This will have the same effect as

TIPS ON AMIDAR

entering a Pac-Man eatgaper — the *Amidar* will turn blue and turn tail and can be eaten for bonus points.

Don't blindly follow them, they are not any slower but you'll meet them head on. A dead *Amidar* falls to the bottom of the screen and if it hits you on the way you'll lose a life.

You have now earned a bonus screen, consisting of a rough maze connecting a female *Amidar*, pink, piglike chubby too, at the top of the screen and a bunch of bananas at the bottom. Press the "jump" button so the pig reaches the entrance that leads to the bananas, for a 5,000 point bonus.

Amidar's second screen proper turns you into a point collector. The *Amidar* and tracker are all pink pigs and you can only get points for squares connected to one another.

Start by going right up the middle of the screen for 2,740 points. You can then go to the four corners to turn the pigs yellow and chop up a bonus.

If the tracker comes off the outside loop during this screen, however, any second she is going to slip right onto your tail and stay there. Every time you clear all three screens, you get a 2,000



point bonus, then it's back to the first screen with an extra *Amidar*.

The "jump" button causes the *Amidar* to spin for a second and you can then pass through them. Press it only when right next to one, on a collision course and don't hold the button down, it repeats.

You only get so many jumps each screen and you cannot afford to waste any of them. So, be positive.

Extra lives come at 50,000, 75,000 and every 100,000.

A DRAGON AT THE END OF THE TUNNEL

SUPER ZAXXON

Super Zaxxon takes the graphics of its predecessor and improves the game.

You still have to attack the blue space fortress, watching your shadow and altimeter to gauge position and height above the depleted of arcade batteries. Missile's, turret guns, tracking antennas and force fields for your way and there's a small tunnel which must be entered low in the centre of the screen.

This is made more outward by having a missile launching just just before the tunnel entrance. The tunnel is a new *Zaxxon* feature which inhibits your altitude and makes the player fight his way past planes, flying minecrawlers, self-destructing robot spacecraft and indestructible mines.

The final challenge is with a larger-than-life fire-breathing dragon. Only six hits into his fire mouth can kill the dragon which dwarfs your attack vehicle.

The most useful thing you can do in *Super Zaxxon* is to help check your altitude and it still suffers from looking better than it plays.

BLINK AND DON'T MISS

If you don't like being watched, you're in for a nervous time when you play *Eyes* — because they're everywhere!

Small eyes haunt the screen more, while their larger counterparts roam at will and if they blink, you may well have looked your last upon this life.

You also resemble an eye-like creature in this game and your task is to eat as many of the smaller eyes (Phosmen) as you can while travelling around the maze and clear the screen.

When confronted by a larger specimen, your options are to fire quickly before it can turn to look in your direction or dodge out of its line of sight.

Moves from the eyes travel in a straight line. And while they do travel faster than you can run,

EYES

death is hardly instantaneous. It is possible to dodge around a corner and watch a pass harmlessly by.

The secret of survival is not to get caught on a long corridor a few inches away from the nearest exit and not to be tempted to fire at an eye in the mistaken belief that its death will stop the incoming bullet... it won't.

The only safe way to fire at eyes, is before they have fully turned a corner.

The game is played at a leisurely pace and appears a lot easier than it actually is. Killed eyes return to hunt a few brief seconds later and materialize on the outside corridors — so keep an eye out for them.



ACTION



The year of the mutant - Ball's what 1980 is turning out to be. Pinball manufacturers are plundering the video world for game themes and some strange hybrids are appearing.

Williams have gone to that all-time arcade winner, Defender, for a theme. Their latest pinball shown at the recent Amusement Trade Exhibition - has mutants, swimmers and smart bombs built in to the game. And a complicated pin it is too.

To start off with the machine has four buttons - one pin to operate the flippers, the other two with different functions.

The second button on the right-hand side of the machine operates a lane change feature. The left hand button works a "kick-back" device - similar to a feature on early Bally games - which saves a ball destined for oblivion down the gut chute. You have to earn points to use it of course!

There's also a mysterious Smart Bomb feature which our reviewers, Gary Flower of the Pinball Owners Association didn't have time to fathom. It's also a multi-ball game which adds to the excitement. All in all a challenging and different pin.

THE RECORDS TUMBLE

The competition on high scores is really heating up with some records changing hands almost daily.

Tom Hayward's Pacman score has been the main victim of the feat of new record scores. It has now been doubled.

Tony Eaton found his way into the focal paper with a 1,674,500 score. He justified his way through 128 screens and it took him two and a half hours. That beat most of the claimants for the Pacman record.

But he was recently bettered by David Ross, a veteran of our

HAVE A BALL DOWN BELOW

MR GO

The joys of tunnelling are fully explored in the surrealistic world of Mr Go.

Go-Go first tempted gamesters below the surface, but Mr Go takes the lead from that game theme and improves on it.

Mr Go is a poke-like creature with a magic ball who spends his time below ground being chased by some small bumpy critters called drossers. He runs through varying tunnels and can create new ones, only more slowly.

The drossers can also dig new passage-ways but prefer to chase you through tunnels of your own making.

Large golden apples lie buried in this subterranean world and these act like the video in Dig.



Go. Tunnelling up underneath makes them rather shaky and a split second later they plummet down on top of anything following you.

When the drossers get too close you can spin around and fire your magic ball at them. This bounces through the passage way and can knockout a whole herd of pursuing creatures if it hits the leading one. But they are only KO-ed briefly and your magic ball disappears for a number of seconds.

AN ISLE SO NEAR...

SWIMMER

Is waiting for you at the end of the third screen.

Small green fish crabs swim close in, fast and bumpy and it's time to hit the dive button, hold your breath and swim under your adversaries.

If you aim for a golden ring floating amongst the enemies, it can turn your swimmer into a superhero, invulnerable to your enemies, but only for so long.

Back to more mortal and there are sly water spiders and vicious piranhas in the sea.

The aim is to defeat the host of predators and find the sanctuary of treasure island.

After a while the drossers split up and start coming at you from different angles. When things get too close for comfort and even your magic ball can't keep them all at bay, then there is another answer.

A flashing prize in the centre of the screen can be collected by Mr Go and this has the effect of disabling the drossers. But instead a whole herd of new blue monsters with gnashing teeth appear at the top of the screen and come after you.

These can also be KO-ed by the magic ball and will also fire in their chase and eventually give up to be replaced by the drossers again.

The maze is dotted with tempting red cherries which Mr Go must eat. Once all these have been cleared he is free to go onto the next screen full of yet more cherries, apples and drossers but with a different maze.



SCRAMBLE
2,332,128
James Thomas

TEENPIST
1,586,000
Paul Mitchell

GOLF
975,320
Gary Miller

GALAXA
1,223,590
Carl Worthington

FAST FISHBONE
1,279,118
John Grogger

PROBBER
110,110
Richard George

999-999
999,999
Tasha Zanol

DONKEY KONG
429,330
John Ball

GR
261,878
Sarah-Jane Singh

CROUCH ROLLER
471,520
Alan Cavaler

PEACMAN
2,534,470
David Ross

SWIMMER
182,810
John Tyn

ROBOTRON
527,400
David Ross

PENGU
12,870
Tony Pratt

PRISONER
889,120
Marilyn Monaghan

[illegible]

```

1190 CALL SCAMPER-C:SET:
1200 A=STEP:GET:ST:
1210 A=AA:100:
1220 IF A=0 THEN 1200
1230 IF A=1 THEN 1200
1240 CALL SCAMPER-C:SET:ST:
1250 GOTO 1200
1260 IF STEP THEN 1200
1270 B=0:
1280 CALL SCAMPER-C:SET:
1290 IF GET:GET THEN 1410
1300 B=B+1
1310 B=0:
1320 GOTO 1200
1330 RESTORE 1200
1340 FOR I=1 TO 20
1350 READ NOTE
1360 CALL SOUND-00000000:
1370 NEXT I
1380 RETURN
1390 DATA 000:000:000:000:000:000:
1400 DATA 000:000:000:000:000:000:
1410 DATA 000:000:000:000:000:000:
1420 DATA 000:000:000:000:000:000:
1430 DATA 000:000:000:000:000:000:
1440 DATA 000:000:000:000:000:000:
1450 DATA 000:000:000:000:000:000:
1460 DATA 000:000:000:000:000:000:
1470 DATA 000:000:000:000:000:000:
1480 DATA 000:000:000:000:000:000:
1490 DATA 000:000:000:000:000:000:
1500 DATA 000:000:000:000:000:000:
1510 DATA 000:000:000:000:000:000:
1520 DATA 000:000:000:000:000:000:
1530 DATA 000:000:000:000:000:000:
1540 DATA 000:000:000:000:000:000:
1550 DATA 000:000:000:000:000:000:
1560 DATA 000:000:000:000:000:000:
1570 DATA 000:000:000:000:000:000:
1580 DATA 000:000:000:000:000:000:
1590 DATA 000:000:000:000:000:000:
1600 DATA 000:000:000:000:000:000:
1610 DATA 000:000:000:000:000:000:
1620 DATA 000:000:000:000:000:000:
1630 DATA 000:000:000:000:000:000:
1640 DATA 000:000:000:000:000:000:
1650 DATA 000:000:000:000:000:000:
1660 DATA 000:000:000:000:000:000:
1670 DATA 000:000:000:000:000:000:
1680 DATA 000:000:000:000:000:000:
1690 DATA 000:000:000:000:000:000:
1700 DATA 000:000:000:000:000:000:
1710 DATA 000:000:000:000:000:000:
1720 DATA 000:000:000:000:000:000:
1730 DATA 000:000:000:000:000:000:
1740 DATA 000:000:000:000:000:000:
1750 DATA 000:000:000:000:000:000:
1760 DATA 000:000:000:000:000:000:
1770 DATA 000:000:000:000:000:000:
1780 DATA 000:000:000:000:000:000:
1790 DATA 000:000:000:000:000:000:
1800 DATA 000:000:000:000:000:000:
1810 DATA 000:000:000:000:000:000:
1820 DATA 000:000:000:000:000:000:
1830 DATA 000:000:000:000:000:000:
1840 DATA 000:000:000:000:000:000:
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1860 DATA 000:000:000:000:000:000:
1870 DATA 000:000:000:000:000:000:
1880 DATA 000:000:000:000:000:000:
1890 DATA 000:000:000:000:000:000:
1900 DATA 000:000:000:000:000:000:
1910 DATA 000:000:000:000:000:000:
1920 DATA 000:000:000:000:000:000:
1930 DATA 000:000:000:000:000:000:
1940 DATA 000:000:000:000:000:000:
1950 DATA 000:000:000:000:000:000:
1960 DATA 000:000:000:000:000:000:
1970 DATA 000:000:000:000:000:000:
1980 DATA 000:000:000:000:000:000:
1990 DATA 000:000:000:000:000:000:
2000 DATA 000:000:000:000:000:000:

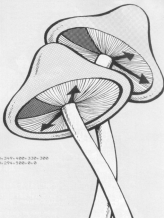
```




```

1500 FOR B=1 TO 50
1510 NEXT B
1520 NEXT I
1530 CALL COLOR(1+2+1)
1540 CALL COLOR(1+2+1)
1550 CALL COLOR(1+1+1)
1560 IF B=1+125 THEN 1580
1570 CALL COLOR(1+4+1)
1580 GOSUB 1730
1590 CALL CLEAR
1600 CALL COLOR(1+2+1)
1610 CALL COLOR(1+2+1)
1620 PRINT " YOU RAN OVER YOUR TRAIL"
1630 PRINT " YOU HAVE LOST"
1640 PRINT :
1650 PRINT "WOULD YOU LIKE TO TRY AGAIN?"
1660 PRINT "YES OR NO?"
1670 N=0
1680 INPUT M
1690 IF B=1+1+1+1 THEN 1700
1700 IF B=1+1+1+1 THEN 1720
1710 GOTO 1680
1720 STOP
1730 REM FUNERAL MARCH
1740 RESTORE 1880
1750 READ NOTE+DUR
1760 IF NOTE=0+1+1+1 THEN 1770
1770 CALL SOUND(DUR,NOTE,0)
1780 GOTO 1750
1790 RETURN
1800 DATA 294+600+294+300+294+240+294+300+294+400+300+300
1810 DATA 330+330+294+300+294+300+277+300+294+300+4+0
1820 REM WRONG REACTION
1830 FOR I=1 TO 20 STEP 2
1840 CALL SOUND(1+1000+1+1)
1850 FCOLOR=(F+FCOLOR)
1860 CALL SCREEN(FCOLOR)
1870 NEXT I
1880 CALL SCREEN(1)
1890 GOSUB 1730
1900 CALL CLEAR
1910 CALL SCREEN(1)
1920 CALL COLOR(1+2+1)
1930 CALL COLOR(1+2+1)
1940 PRINT "YOU DEFUSED THEM IN THE"
1950 PRINT " WOODS ORDER"
1960 PRINT "THEY ALL BLEW UP"
1970 PRINT "YOU WERE KILLED!"
1980 GOTO 1680
1990 REM SUCCESS.....
2000 GOSUB 1330
2010 CALL CLEAR
2020 PRINT " CONGRATULATIONS"
2030 CALL COLOR(1+2+1)
2040 CALL COLOR(1+2+1)
2050 N=0
2060 PRINT :
2070 PRINT "WELL DONE...YOU JUST SAVED"
2080 PRINT "THE WORLD"
2090 PRINT :
2100 GOTO 1680
2110 REM INSTRUCTIONS
2120 FOR I=1 TO 8
2130 CALL COLOR(1+1+1)
2140 NEXT I
2150 CALL SCREEN(1)
2160 CALL CLEAR
2170 N=1
2170 N="DEFUSE"
2180 GOSUB 2340
2190 N=2
2200 N="REACTORS"
2210 GOSUB 2340
2220 N=4
2230 N="DEFUSE THE NUCLEAR REACTORS"
2240 GOSUB 2340
2250 N=5
2260 N="EACH ONE IS ABOUT TO EXPLODE"

```



```

2270 GOSUB 2340
2280 N=3
2290 N="THEY ARE DEFUSED BY MOVING"
2300 GOSUB 2340
2310 N=6
2320 N="UP BETWEEN THE REACTORS LEGS"
2330 GOSUB 2340
2340 N=8
2350 N="THEY MUST BE DEFUSED IN THE"
2360 GOSUB 2340
2370 N=11
2380 N="CORRECT ORDER"
2390 GOSUB 2340
2400 N=14
2410 N="BEHIND OF THE RADIATION TRAIL"
2420 GOSUB 2340
2430 N=15
2440 N="WHICH YOU LEAVE BEHIND"
2450 GOSUB 2340
2460 N=17
2470 N="USE THE FOUR ARROW KEYS"
2480 GOSUB 2340
2490 N=20
2500 N="PRESS ANY KEY TO PLAY DEFUSE"
2510 GOSUB 2340
2520 CALL KEY(0+0)
2530 IF 0=0 THEN 2520
2540 N=0
2550 REM MESSAGE DISPLAY
2560 GOSUB 2340
2570 FOR B=1 TO 4000+1
2580 CALL COLOR(1+2+1)
2590 CALL COLOR(1+2+1)
2600 RETURN

```



```

10  PRINT 7: CLS : BORDER 7: IN
20  PRINT AT 2.0: "Welcome to Re
30  PRINT AT 2.0: "The Mountain Road
40  PRINT AT 2.0: "Instructions:
50  PRINT AT 2.0: "1. Press the
60  PRINT AT 2.0: "2. Press the
70  PRINT AT 2.0: "3. Press the
80  PRINT AT 2.0: "4. Press the
90  PRINT AT 2.0: "5. Press the
100 PRINT AT 2.0: "6. Press the
110 PRINT AT 2.0: "7. Press the
120 PRINT AT 2.0: "8. Press the
130 PRINT AT 2.0: "9. Press the
140 PRINT AT 2.0: "10. Press the
150 PRINT AT 2.0: "11. Press the
160 PRINT AT 2.0: "12. Press the
170 PRINT AT 2.0: "13. Press the
180 PRINT AT 2.0: "14. Press the
190 PRINT AT 2.0: "15. Press the
200 PRINT AT 2.0: "16. Press the
210 PRINT AT 2.0: "17. Press the
220 PRINT AT 2.0: "18. Press the
230 PRINT AT 2.0: "19. Press the
240 PRINT AT 2.0: "20. Press the
250 PRINT AT 2.0: "21. Press the
260 PRINT AT 2.0: "22. Press the
270 PRINT AT 2.0: "23. Press the
280 PRINT AT 2.0: "24. Press the
290 PRINT AT 2.0: "25. Press the
300 PRINT AT 2.0: "26. Press the
310 PRINT AT 2.0: "27. Press the
320 PRINT AT 2.0: "28. Press the
330 PRINT AT 2.0: "29. Press the
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360 PRINT AT 2.0: "32. Press the
370 PRINT AT 2.0: "33. Press the
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400 PRINT AT 2.0: "36. Press the
410 PRINT AT 2.0: "37. Press the
420 PRINT AT 2.0: "38. Press the
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760 PRINT AT 2.0: "72. Press the
770 PRINT AT 2.0: "73. Press the
780 PRINT AT 2.0: "74. Press the
790 PRINT AT 2.0: "75. Press the
800 PRINT AT 2.0: "76. Press the
810 PRINT AT 2.0: "77. Press the
820 PRINT AT 2.0: "78. Press the
830 PRINT AT 2.0: "79. Press the
840 PRINT AT 2.0: "80. Press the
850 PRINT AT 2.0: "81. Press the
860 PRINT AT 2.0: "82. Press the
870 PRINT AT 2.0: "83. Press the
880 PRINT AT 2.0: "84. Press the
890 PRINT AT 2.0: "85. Press the
900 PRINT AT 2.0: "86. Press the
910 PRINT AT 2.0: "87. Press the
920 PRINT AT 2.0: "88. Press the
930 PRINT AT 2.0: "89. Press the
940 PRINT AT 2.0: "90. Press the
950 PRINT AT 2.0: "91. Press the
960 PRINT AT 2.0: "92. Press the
970 PRINT AT 2.0: "93. Press the
980 PRINT AT 2.0: "94. Press the
990 PRINT AT 2.0: "95. Press the

```

[illegible]

POOL

BY JOHNATHAN YEOMANS

RUNS ON A SPECTRUM IN 48K

Fancy yourself as a bit of a pool-room teacher? Well, chalk-up your cue and get ready to put a few balls on your Spectrum sets out to sharpen-up your skills.

The computer sets the balls rolling by playing the break for you. Then you have to attempt to pot the balls by inputting the strength and direction of the cue ball. Once this is done you simply press Return and sit back and watch. Will your shot be on target? The computer keeps score throughout the game and tells you how many balls are left.

The game puts all the colour and sound facilities of the Spectrum to good use — and provides pool players with the ideal way to practice those difficult shots.

For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

Further education for everyone.

Creative Graphics, which includes the book 'Creative Graphics on the BBC Microcomputer' (price £12.45), provides 36 programs on cassette producing a spectacular range of pictures and patterns in full colour, including animated pictures, recursively-defined curves and three dimensional shapes.

Word Sequencing (price £11.90) contains three word sequencing programs on cassette. Each program presents a series of jumbled words which must be arranged on screen to form

either a proverb, nursery rhyme title or a sensible sentence.

Learn more languages.

LISP (price £24.35) is the fundamental language of artificial intelligence research.



It consists of 5.5K of machine code interpreter, plus 2K of initialised LISP work-space containing utilities and constants. It comes complete with a book that introduces you to programming in LISP, as well as some fascinating applications.

FORTH (price £24.35) is a complete implementation of the FORTH language to the 1979 standard specification for the BBC Microcomputer Model B. This much acclaimed programming language is also accompanied by a specially written book explaining all you need to know.

Mind-boggling games.

Philosopher's Quest (price £9.95) is an advanced adventure in which you tell the computer what you want to do and it





describes back in plain English your progress through a fascinating world of fiendish puzzles to be solved.

Snapper (price £9.95) is a colourful game where you guide your 'snapper' through the maze, eating dots and fruit and avoiding the creatures that chase you. Complete with full sound effects, score and a ladder of high scores.

Rocket Raid (price £9.95) sends you on a mission to raid a heavily guarded Martian fuel depot. You must fly your rocket over mountains and through caverns, avoiding enemy missiles and dodging convoys of deadly fixers.

Increase your business acumen.

Desk Diary (price £9.95) is an indispensable program that can hold a file of several hundred names, addresses and telephone numbers.

And View, a program that enables your machine, together with a printer, to operate as a fully operational word processor (The program is in ROM, but can easily be fitted to most BBC Micros by your local dealer) you can find out



more by sending for our free catalogue.

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Alternatively, you can buy the cassettes directly by sending off the order form below to Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL. Also use this form if you would like to receive the current free Acornsoft catalogue.

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VIEWII	£14.95			(£14.95) (£14.95)
Philosopher's Quest	£9.95			(£9.95)
Snapper	£9.95			(£9.95)
Rocket Raid	£9.95			(£9.95)
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BY NICK ALEXANDER

BY NICK ALEXANDER

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 0.20 0.005-0.01
 0.10 0.002-0.005
 0.05 0.001-0.002

2002

BY KEITH MOON

RUNS ON A VIDEO GENIE

ON TRS-80 LEVEL II IN 16K

This is a simple game for those and anyone who can distinguish between numbers 1 to 9 can play it! The idea is to pit your wits against the computer and try to place four of your markers in such a way that they form a line either horizontally, vertically or diagonally.

This version contains a sound routine that is poked into memory and converted to machine language.

There is no need to protect any memory when you run the game as I have used 16478 onwards which is not used by the interpreter after power up. This saves memory as this location resides within the part of memory that is normally saved by the Basic interpreter.

It is a bit to note is that any short language subroutines can be poked here.

If you don't require sound delete lines 1015 through to 1016 then delete all the V-BASIC calls.

To use this sound routine you must have the Video Genie conversion kit installed or through the external cassette socket by taking the plug which normally fits into the auxiliary socket of the recorder and reconnecting it to an external amplifier. Tandy 100-00 users should have no problem.

```
1015 GOTO 1000
1016 GOTO 1000
1017 GOTO 1000
1018 GOTO 1000
1019 GOTO 1000
1020 GOTO 1000
1021 GOTO 1000
1022 GOTO 1000
1023 GOTO 1000
1024 GOTO 1000
1025 GOTO 1000
1026 GOTO 1000
1027 GOTO 1000
1028 GOTO 1000
1029 GOTO 1000
1030 GOTO 1000
1031 GOTO 1000
1032 GOTO 1000
1033 GOTO 1000
1034 GOTO 1000
1035 GOTO 1000
1036 GOTO 1000
1037 GOTO 1000
1038 GOTO 1000
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1078 GOTO 1000
1079 GOTO 1000
1080 GOTO 1000
1081 GOTO 1000
1082 GOTO 1000
1083 GOTO 1000
1084 GOTO 1000
1085 GOTO 1000
1086 GOTO 1000
1087 GOTO 1000
1088 GOTO 1000
1089 GOTO 1000
1090 GOTO 1000
1091 GOTO 1000
1092 GOTO 1000
1093 GOTO 1000
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1096 GOTO 1000
1097 GOTO 1000
1098 GOTO 1000
1099 GOTO 1000
1100 GOTO 1000
```

CONNECT 4

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1015 GOTO 1000
1016 GOTO 1000
1017 GOTO 1000
1018 GOTO 1000
1019 GOTO 1000
1020 GOTO 1000
1021 GOTO 1000
1022 GOTO 1000
1023 GOTO 1000
1024 GOTO 1000
1025 GOTO 1000
1026 GOTO 1000
1027 GOTO 1000
1028 GOTO 1000
1029 GOTO 1000
1030 GOTO 1000
1031 GOTO 1000
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1034 GOTO 1000
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1036 GOTO 1000
1037 GOTO 1000
1038 GOTO 1000
1039 GOTO 1000
1040 GOTO 1000
1041 GOTO 1000
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1043 GOTO 1000
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1079 GOTO 1000
1080 GOTO 1000
1081 GOTO 1000
1082 GOTO 1000
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1097 GOTO 1000
1098 GOTO 1000
1099 GOTO 1000
1100 GOTO 1000
```


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ATARI 1050	MSX 800/801

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Program notes:

Lines 2544-2545: Contain a dummy string G23 and the spaces between the quotation marks must add up to 64. This short routine is used to convert the dummy string and fill it with graphic characters that are then used to render; rather than make or set, and is far quicker.

Also, no case statement is required for this string and does not need to be taken into account at the beginning of the programme.

Control: if you want to ex-

periment with the computer's game try changing the first six values in line 1545. Lines 1545-1545 contain the graphic strings for human player and the computer, and G23 clears the print line instead of using "you win, streaks," which seems a rather long-winded way of doing things.

The computer takes anything from 10 secs to 1 min to think about its move, especially at the beginning of the game because it has to calculate each position in the G2 (3,8) array.

```

1120 PRINT "LEGAL MOVE: "; G2(3,8); G2(4,8); G2(5,8); G2(6,8); G2(7,8); G2(8,8)
1130 GOTO 1135
1140 GOTO 1135
1150 GOTO 1135
1160 GOTO 1135
1170 GOTO 1135
1180 GOTO 1135
1190 GOTO 1135
1200 GOTO 1135
1210 GOTO 1135
1220 GOTO 1135
1230 GOTO 1135
1240 GOTO 1135
1250 GOTO 1135
1260 GOTO 1135
1270 GOTO 1135
1280 GOTO 1135
1290 GOTO 1135
1300 GOTO 1135
1310 GOTO 1135
1320 GOTO 1135
1330 GOTO 1135
1340 GOTO 1135
1350 GOTO 1135
1360 GOTO 1135
1370 GOTO 1135
1380 GOTO 1135
1390 GOTO 1135
1400 GOTO 1135
1410 GOTO 1135
1420 GOTO 1135
1430 GOTO 1135
1440 GOTO 1135
1450 GOTO 1135
1460 GOTO 1135
1470 GOTO 1135
1480 GOTO 1135
1490 GOTO 1135
1500 GOTO 1135
1510 GOTO 1135
1520 GOTO 1135
1530 GOTO 1135
1540 GOTO 1135
1550 GOTO 1135
1560 GOTO 1135
1570 GOTO 1135
1580 GOTO 1135
1590 GOTO 1135
1600 GOTO 1135
1610 GOTO 1135
1620 GOTO 1135
1630 GOTO 1135
1640 GOTO 1135
1650 GOTO 1135
1660 GOTO 1135
1670 GOTO 1135
1680 GOTO 1135
1690 GOTO 1135
1700 GOTO 1135
1710 GOTO 1135
1720 GOTO 1135
1730 GOTO 1135
1740 GOTO 1135
1750 GOTO 1135
1760 GOTO 1135
1770 GOTO 1135
1780 GOTO 1135
1790 GOTO 1135
1800 GOTO 1135
1810 GOTO 1135
1820 GOTO 1135
1830 GOTO 1135
1840 GOTO 1135
1850 GOTO 1135
1860 GOTO 1135
1870 GOTO 1135
1880 GOTO 1135
1890 GOTO 1135
1900 GOTO 1135
1910 GOTO 1135
1920 GOTO 1135
1930 GOTO 1135
1940 GOTO 1135
1950 GOTO 1135
1960 GOTO 1135
1970 GOTO 1135
1980 GOTO 1135
1990 GOTO 1135

```


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SCHIZO

[illegible]

Figure 1. The proposed research model.

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...the name of the game

...the name of the game

...the name of the game



WACKY
WAITERS

...the name
of the game



LISTING 1

10 NEW DOCTOR WHO ADVENTURE INSTRUCTIONS

```
20 DATA 20,0,30,62,92,20,30,30
30 DATA 0,0,0,224,192,224,3,0
40 DATA 0,0,0,64,200,64,0,0
50 DATA 0,0,0,64,160,64,0,0
60 DATA 0,0,0,224,160,224,10,0
70 DATA 0,0,64,112,120,0,0,0
80 DATA 0,0,32,60,240,0,0,0
90 DATA 0,0,72,62,20,20,20,20
100 DATA 0,224,32,32,30,34,34,60
110 DATA 0,0,64,176,60,60,60,0
120 DATA 0,127,127,127,0,247,247,247
130 DATA 192,316,316,316,34,314,314,314
140 DATA 3,27,27,27,24,27,27,27
150 DATA 220,220,220,220,220,220,220,220
160 DATA 3,4,12,34,40,96,192,120
170 DATA 126,90,102,104,114,90,90,120
180 DATA 24,36,24,24,24,24,60,120
190 DATA 126,90,6,60,96,96,102,120
200 DATA 120,102,0,20,0,0,102,120
210 DATA 124,100,100,100,126,12,12,12
220 DATA 126,64,64,124,0,102,102,60
230 DATA 60,102,96,124,102,102,102,60
240 DATA 126,90,90,12,24,24,24,24
250 DATA 60,102,102,60,102,102,60
260 DATA 62,90,90,90,62,0,0,0
```

```
270 DATA 240,240,240,240,240,240,240,240
280 DATA 10,10,10,10,10,10,10,10
290 DATA 24,60,120,120,60,60,120,120
300 DATA 0,0,120,0,0,120,0,0
310 DATA 90,40,24,32,24,40,96,0
320 DATA 120,102,0,20,24,24,0,24
330 DATA 60,90,102,190,190,140,90,60
340 DATA 0,60,102,102,120,102,102,0
350 DATA 0,124,102,120,102,102,124,0
360 DATA 0,60,102,96,96,102,60,0
370 DATA 0,124,04,60,90,04,120,0
380 DATA 0,120,90,120,90,102,120,0
390 DATA 0,120,04,40,24,40,40,0
400 DATA 0,62,102,96,110,90,60,0
410 DATA 0,102,102,120,102,102,102,0
420 DATA 0,120,24,24,24,24,120,0
430 DATA 0,120,12,32,70,100,30,0
440 DATA 0,102,100,120,100,102,102,0
450 DATA 0,40,40,40,40,114,120,0
460 DATA 0,99,119,127,107,99,99,0
470 DATA 0,102,110,120,110,102,102,0
480 DATA 0,60,102,102,102,102,60,0
490 DATA 0,120,24,24,124,40,40,0
500 DATA 0,60,90,90,100,100,50,0
510 DATA 0,120,04,04,124,04,04,0
520 DATA 0,62,96,60,0,102,60,0
530 DATA 0,120,90,24,24,24,24,0
540 DATA 0,102,102,102,102,102,60,0
550 DATA 0,90,90,100,120,110,102,0
560 DATA 0,102,102,20,20,102,102,0
570 DATA 0,102,102,60,0,102,60,0
580 DATA 0,120,32,24,40,102,120,0
590 DATA 0,112,90,90,90,90,112,0
610 DATA 192,90,40,24,32,0,3,1
620 DATA 0,30,0,0,0,0,30,0
630 DATA 60,120,220,220,220,220,220,220
640 DATA 0,0,3,60,192,0,0,0
700 FOR I=0 TO 500:READ A:POKE 14056+I,A
```

```
NEXT I
1000 GRAPHICS 17:POKE 750,50:POKE 700,20
1100 FOR I=0 TO 500:POKE 710,140:POKE 711,25:IF
1200 GOTO 712,20:POKE 712,1
1310 ? 001? 001?*****DOCT
1400 ADVENTURE*****
1500 ? 001",L-1:GOTO 1291:*****DOCTOR
1600 ,I-1
1700 ? 001",M-1:GOTO 1291:*****DOCT,M
1800 -1
1900 ? 001",S-1:GOTO 1291:*****DOCTOR,S
2000 -1
2100 ? 001",E-1:GOTO 1401:*****DOCTOR,E
2200 -1
2300 ? 001",F-1:GOTO 1401:*****DOCTOR,F
2400 -1
2500 ? 001",U-1:GOTO 1401:*****DOCT,U
2600 -1
2700 ? 001",C-1:GOTO 1701:*****TIME DRIVE,C
2800 -1
2900 ? 001",S-1:GOTO 1401:*****MURPHY CASE,
3000 -1
3100 ? 000",I-1:GOTO 1401:*****MURPHY,
3200 I-1
3310 ? 000",O-1:GOTO 1371:*****SARAH
3400 ,O-1
3500 ? 000",H-1:GOTO 1421:*****SPHINX,
3600 H-1
3700 ? 000",G-1:GOTO 1431:*****MASTER
3800 -1
3900 ? 000?*****By J.Penny
4000 BugBaiter!
4100 ? 001?*****Coding M
4200 Air PuffBlower*****
2000 POKE 704,12:CLOSE
```


Dr Who Adventure

BY JEREMY GUGGENHEIM

Another time, another place... the Doctor is on the move again and this time you can become one of his traveling companions.

This graphics adventure is based on the classic sixth TV series Dr Who. In it the good Doctor is trapped on the planet TARDIS III in a pyramid built by his arch-enemy, the Master.

The Master plans to destroy the planet — and the Doctor — with a time bomb. He has stolen the Doctor's time drive unit from the TARDIS — and without this the Doctor cannot escape the doomed planet. He must get it back — but he can only do this by killing the Master.

You take the role of the Doctor — everything else is controlled by the computer. There are 12 rooms within the pyramid which you must explore in your attempt to escape.

Some of the rooms contain things you will need to escape — some contain hazards which you must avoid.

Objects you need are hidden in mummy cases — but be careful, some of the cases contain angry mummies who do not want to be disturbed! The position of mummies and mummy cases differs each time you play the game.

You can drop an object you are carrying in an empty room by pressing the fire button on the joystick which you also use to control your movements. These objects are replaced in mummy cases when you leave the room.

The time left before the bomb explodes and the number of the room you are in are shown at the bottom of the screen.

Objects you will need in your escape led are the key to the Master's TARDIS, which is contained in a mummy case somewhere in the pyramid, a sword from the High Priest's temple which will protect you against snakes and the Sphinx, a magic ring, which protects you against its fiery thunderbolts, a rope,

which will come in useful if you fall into any pits, a ray gun, which you will find in a pit, and your time drive which is in the Master's TARDIS.

Deadly dangers which you must avoid or defeat if you are to survive include mummies and snakes. And don't leave the key in the Master's TARDIS — you'll never get back of **LOADING AND CLOSING**

Because this program includes instructions which are

shown while the other program is loading the loading and saving procedures are slightly different from normal. To load the program type: RUN "C:" (and press RETURN)

The program will load and when ready will say "READY" You should then type "RUN" and the program will run.

To save the instruction program either load it off the tape by typing "LOAD" instead of "RUN" or when it is ready

type "SAVE" or, or write out the listing and type "SAVE" or.

When the instructions have been saved using "SAVE" or you can save the main program. You do this by either writing out the listing of loading the program from tape and then, DIRECTLY after the instruction program, use "SAVE" the program in the normal way.

Now, when you RUN "C:" the instruction program, the program will immediately run without having to type anything. This line 2000 tells the computer to load the main program will still keep the instructions on the screen.

There are two main advantages of having the two different programs. The first is that the instructions can be read in plenty of time while you are waiting for the main program to load.

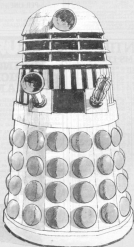
The second is that the method saves about 8K of memory and a lot of time. This is because it creates a whole new custom character set before printing the instructions. The new set is kept in memory until you load the new program (even NEW does not affect it).

The memory used for the character set and instructions is cleared when the other program loads but the character set stays intact. Also the comparatively tedious time it takes to build a new set is forgotten as this is done automatically when the instructions load.

However, there is a problem with the program, and this is that after 15-20 games depending on their length the character generation starts to get over written by RAM.

This seems impossible to solve. There may be a way but I do not know one perhaps someone out there can solve it.

The character set RAM is held as high up in memory so I can get it without upsetting the BASIC list. The only thing to do when this happens is to reload the whole program.



10

Table 1

[illegible][illegible]

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Account Number:

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```

5 CLG
10 DIM R(12),S(12),X(25),Y(25)
20 DATA 110,0,1110,0,1010,0,0000,1,101,0
   ,111,0,1110
30 DATA 0,1000,4,1,2,1,7,11,0,1000,0,1,1
   ,1,1,1,0,0,0,-1,1,0,-1,-1,0,0,0,0,1,0,
   ,1,0,0
40 FOR N=1 TO 12:READ A,B,C,D:GOTO 50:N=N+1:GOTO 40
50 NEXT N:FOR M=1 TO 12:READ A,B,C,D:GOTO 60:M=M+1:GOTO 50
60 NEXT M
70 TL=0:R=0:Y=10:YR=0:G=0:SR=1:BL=1:PL=
   1:NT=0:FOR T=1 TO 4:GOSUB 95:READ A,B,C(1)
   :A=INT A/50:GOTO 300
80 Y=1-(R/50+G/75+1/5)*D:R(1)=0 THEN RETURN
90 GOTO 95:DATA 10,11,14,15
100 POSITION 0,22:?" * * * * *
110 TIME LEFT="
120 POSITION 17,22:?" * * * * * TIME LEFT="
130 RETURN
140 IF A AND Y=0 THEN YR=YR-1:Y=0:GOTO 300
150 IF B AND R=10 THEN YR=YR+1:R=1:GOTO 300
160 IF C AND Y=21 THEN YR=YR-1:Y=1:GOTO 300
170 IF D AND R=0 THEN YR=YR-4:R=1:GOTO 300
180 RETURN
190 TL=TL-A,B(1):POSITION 13,22:?" * * * * *
200 TL=(NT/TL) THEN TL=TL-0.4:IF TL=0
   1 THEN GOTO 300
210 RETURN
220 POSITION 1,Y:?" * * * * *
230 POSITION 1,Y:?" * * * * *
240 GOSUB 100:GOTO 300
250 GOSUB 100:GOTO 300
260 GOSUB 100:GOTO 300
270 GOSUB 100:GOTO 300
280 GOSUB 100:GOTO 300
290 GOSUB 100:GOTO 300
300 GOSUB 100:GOTO 300
310 GOSUB 100:GOTO 300
320 GOSUB 100:GOTO 300
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990 GOSUB 100:GOTO 300
1000 GOSUB 100:GOTO 300

```


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This is a version of that addictive arcade game where you control a high-powered sports car and attempt to elude traffic coming at you along the track.

The car is controlled by the dragon's "m" and "n" keys. The longer you survive on the road the more points you earn. The authors high score stands at 825 — can anyone beat it?

Variables:

H: high score, CR: 4025

code for road background

FF: width of road, 45

difficulty level (1-5), 15

your car, 0: your position,

3: position of next, 0:

variable to move road left,

right or middle

```

10 REMARKS: S2K
20 CLS
30 KEY: F100000 BY L. ANDERSON
40 KEY: 00000
50 CLS: 000
60 REMARKS: S2K
70 CLS: 000
80 CLS: 000
90 CLS: 000
100 CLS: 000
110 CLS: 000
120 CLS: 000
130 CLS: 000
140 CLS: 000
150 CLS: 000
160 CLS: 000
170 CLS: 000
180 CLS: 000
190 CLS: 000
200 CLS: 000
210 CLS: 000
220 CLS: 000
230 CLS: 000
240 CLS: 000
250 CLS: 000
260 CLS: 000
270 CLS: 000
280 CLS: 000
290 CLS: 000
300 CLS: 000
310 CLS: 000
320 CLS: 000
330 CLS: 000
340 CLS: 000
350 CLS: 000
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BY GARY SHERIDAN AND HARRISON ANASTASOPOULOS

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Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer – available now – is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232C (teletext) interface board.



Key features of the Sinclair ZX Spectrum

- Full colour – 6 colours each for foreground, background and border, plus flashing and brightness-intensity control.
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- Massive RAM – 16K or 48K.
- Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.
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This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

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The ZX Printer - available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set - including lower-case characters and high-resolution graphics.

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A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.



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BY ALLAN SCARFF

In Go, unlike chess, material gains and losses are relatively unimportant when compared with other strategic matters.

Chess reflects the western style of warfare based on direct power and strength. Go is more subtle, resembling guerrilla warfare as waged in Vietnam by the Vietcong who used Go in the military training of their officers.

While losing a group of stones may be disastrous, in some situations it can be positively beneficial. A good understanding of the status of each group on the board (or screen) is a prerequisite for making sound strategic decisions. So in this article we shall explore the lessons of life and death.

Two or more eyes are alive

Consider the black group marked a in figure 1. Even though the outside intersections are occupied by white, white can never play at points A1 and A2 (these points are examples of eyes) because the rules of Go prohibit more than one stone at a time and last suicide.

The group marked b is more typical of a game situation. Although each eye is comprised of several intersections, allowing white to play inside them, the suicide rule will still prevent the capture of the black group.

One eye or less is dead

Consider the white group in figure 2. It has only one eye and cannot be given another because there is not enough space and the surrounding black group has two eyes and therefore cannot be killed. Note that black should not waste points by playing on the adjacent intersections (marked with x's), while his opponent makes gains elsewhere.

Critical groups

Consider the black group marked a in figure 3. If black gets to play at A2, the



group will live but if white manages to play there first, the group is likely to die.

White can capture the group by continuing to play inside the eye (see the sequence given in figure 4).

If the surrounding white group can be attacked it may be a race to kill or be killed.

However, if white can make his surrounding group unconditionally alive he can remove the one-eyed black group at the end of the game.

It is slightly more difficult to judge the

status of the group marked b. If white plays inside first, can black still make two eyes? The answer is no.

In fact this eye shape is known as the "harbour line" and it is well known by most Go players that if white plays at the junction of the harbour to the sea head, the shape will eventually reduce to one eye. Of course if black plays there first he will be safe.

In contrast to the previous two groups, the group marked c, though not yet strictly alive, is almost impossible to kill. Black has two choices as to where to play to form a second eye so he can afford to wait until white has played on one before replying on the other.

When an eye is too big

Consider figure 5. White has enough space to form a one-eyed group of his own inside the black group. The black group is not therefore unconditionally alive but is quite safe because he would have to ignore no fewer than nine stones in order to lose his group.

However, the danger is greater the larger the eye space and the more white stones there are within it. To be absolutely safe the eye space must be a shape that cannot accommodate an opponent group with its own eye.

Counting the eyes

At least to start with, we need to rationalize simply the problem to attempt a practical computer solution. One method can be outlined as follows:

- 1. Detect the eye spaces bounded by black stones, ignoring black stones.
- 2. Reject any space which is too big.
- 3. Reject any space not bounded by a single group of connected stones.
- 4. Count the eyes associated with each group.
- 5. Repeat the process for the white stones, ignoring black stones.

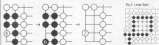
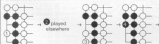
Decision decisions?

Having determined the status of each group — even if only approximately — a whole universe of decision making is opened up.

One simple but large improvement that can be made to our computer program is the suppression of needless moves capturing already dying stones within eyes. But by examining the status of neighbouring groups, quite sophisticated play can be devised.

For instance, a policy of attacking large one-eyed or eyeless groups can be implemented.

But there is no one golden strategy. The best Go programs balance and select between competing strategies. How such programs manage this is another story for another day!



Projects

MORE THAN A WORD CAN SAY

Welcome to the Projects page where I'll start on the development of projects which you have always wanted to build but have never really got around to.

As with *Kin Korner*, I will be describing the constructional aspects, paying special attention to the laying out of the circuit. Unlike it, I will be showing you how to use the circuit to full advantage.

There will be far more informative diagrams than in the past, primarily to reduce my volume of typing. After all a picture is worth a thousand words!

TAKING TIME . . .

To start off with I have chosen the Motorola 6846 programmable timer module around which to design a usable circuit.

We are all preoccupied with time. This design will go some way towards attaining the ideal from your computer.

The programmable timer module, (PTM), has three 16-bit binary counters which are addressed using a normal 8-bit data bus.

How come? I hear you cry. Well, quite simply you store two sets of 8-bits which the chip understands as one 16-bit set.

One of the difficulties to over-

come is the fact that the timer would normally work off the clock of the computer. The 16-bit will be decreased by one on every clock cycle. 16-bit equals 64,000, or around about that.

With a 1MHz clock that is only 64 milliseconds. Not very long, eh? To overcome that problem we just substitute a lower frequency clock instead. But more of that next month.

In figure 1, you will see the pin assignment of the chip. The problem is hard to design a suitable circuit for it, which will serve our requirements.

It must be flexible enough so that there can be further development but also be compact enough to sit inside the popular keyboard size computers.

Fortunately, most of these computers have either an edge connector or another type form which you can take the lines needed for this module.

As there is going to be only the one chip for the maximum circuit I would probably use stripboard. Otherwise I would be tempted to wirewrap on a form of Eurocard and to use up the extra space with other peripherals.

The chip requires a single 5-volt supply which is very convenient of them. The 8 data lines, 0-7, are three, of course, as well as two chip-select lines.

The "enable" pin is, in fact, the

system clock. Each timer has three separate registers; a decrementing clock, a start trigger, and an output line for indicating that the time has elapsed.

There are three register lines with which to select the data and status registers. The last two lines are reset and interrupt request.

CHIPS AND PINS

In Space 2 I have drawn a hotel outline of the chip and to what the pins must be connected. Pins 1 and 16 are obvious. The others may require a little explaining.

The data lines, though, interface directly with those on the main board.

Working in number order around the chip after the ground pin we come to the second timer lines.

Pin 2, the trigger line, or gate line sets counter 1 going as soon as the initialisation is complete.

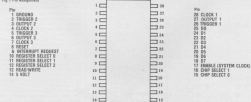
Pin 3, the output line, indicates when the period of timing is over and will drive 3 TTL loads.

Pin 4, the clock input for timer 2 defines the rate at which the binary number loaded into the timer is decremented.

This clock rate can vary up to the "enable" clock which would normally be 1MHz. For most applications 1MHz would be sufficient and give a maximum count time of about 1 minute.

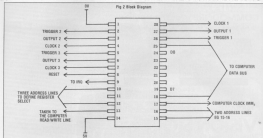
By using a simple 585 timer chip

Fig 1 Pin Assignment



Projects

Fig. 2 Block Diagram



or one of the new decimal divider chips almost any frequency can be defined.

Pins 6, 8, 7 and, likewise, 26, 27 and 28 I have explained in the last paragraph.

The reset line, pin 4, does exactly that. It will, whenever activated, reset the counters to their initial values, which are held in on-chip memory.

All that is then required in the triggers and the counters will start off, together, if required. The next pin, pin 5, houses the IRQ line, or interrupt request line.

OLD ROUTINE . . .

By setting a flag in one of the control registers (to be discussed later) the system interrupt will be activated as soon as any one of the clocks resets at zero.

This will then initialize the microprocessor's interrupt routine which is built into the system.

Pins 18, 11 and 12 define, in system memory where the timer resides, along with pins 19 and 16.

Pins 15 and 16 are the chip select 1 and 2 respectively. CS0 must be at zero and CS1 must be at one for the chip to be addressed.

These two lines define the block in memory and the three register select lines define the location with-

in that block of the 8 registers.

In this respect it works in a similar way to a peripheral interface adapter, PIA.

The read/write line works in exactly the same way as it does in the rest of the system. For reference, the state of any of the registers may be read while the counter is in operation. This can be very helpful when setting up the counters for the first time.

As I have said before, the enable

at pin 17 is the synchronous clock for reading and writing data to and from the counters.

It can, of course, be used for the timers' clock if very short periods are required from the counters.

If you are using a computer with a two phase clock this can be used directly with the counters.

Unfortunately, these days many processors only require a single phase so I will indicate how to derive the correct signal later.



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Figure 1

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For use with the Atari video computer system.

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Graphics



PLAY AROUND WITH PATTERNS

Experimenting with the rules for generating patterns of movement can produce many intriguing displays — and here I aim to set out some of these rules for you to play around with.

The pattern of movement of a point in a plane can be described by giving the position of the point at any time in terms of its initial position and the time.

If the initial position is given by the co-ordinates $(X1, Y1)$, and the current position by (XC, YC) then a typical way of giving the position at any time, T , is

$$XC = X1 + T * Y1$$

$$YC = Y1$$

Note that the initial position corresponds to $T=0$, since this value for T gives

$$XC = X1$$

$$YC = Y1$$

That is to say that at $T=0$ the current position is the same as the initial position.

The rules just given provide only one example of how the current position can be expressed in terms of the current time and the initial position.

Since we can describe the movement of a point in this way we can also deal with the pattern of movement of a flat object by examining how the points that are joined by its edges behave.

Next month we shall examine how solid, three-dimensional objects behave by applying the same idea to its corner points.

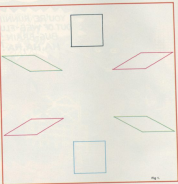


Fig. 1.

If the way that the time is involved in the equations giving the patterns of movement is periodic, then the resulting pattern of movement will also be periodic.

In other words, the shape will return to its original position after a period of time. It will then repeat its previous cycle of movement again.

This is illustrated in figure 2, which was produced by using the rules $XC = X1 + Y1 * \sin(T)$ $YC = Y1 * \cos(T)$.

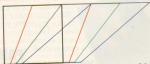


Fig. 2.

The following program produces the initial shape of a square and three of its successive positions using the rules for movement given above.

```
10 DIM X1(4), Y1(4)
20 FOR I=1 TO 4
30 READ X1(I), Y1(I)
40 DATA 1, 1, 1, 1, 1, 1
50 FOR I=1 TO 4
60 T=2*I*(3-1)
70 XC=X1(I)+T*Y1(I)
80 YC=Y1(I)
90 MOVE XC, YC
100 FOR J=2 TO 4
110 X=X1(J)+T*Y1(J)
120 Y=Y1(J)
130 DRAW X, Y
140 NEXT J
150 DRAW X1, Y1
160 NEXT I
```

The resulting shapes are shown in figure 1.

By Gary Marshall



BEWARE THE LOST NUMBERS

I have already explained how to avoid remembering your *Adventure* programs beyond recognition.

However, when your game is complete it will be desirable to remember it, as it will look more professional.

Adventures have a particularly high number of GOTO and GOSUB statements. It is almost impossible to prove that all of these point to lines that exist. The chances are that you will have forgotten to write one of them!

A side benefit of remembering the program is that this will identify any Undefined line errors without the need for exhaustive playing. The utility, when run, will list the lines

BY KETH CAMPBELL

that ought to be there but have gone missing.

Depending upon the Basic your machine runs, remembering may also save some memory assuming you convert to smaller numbers.

This will not be achieved by the line numbers themselves being smaller, since these will always use 2 bytes each, however small.

The saving comes when the Basic holds GOTO and GOSUB numbers in ASCII form, thus using 1 byte for each digit.

Therefore, the smaller the numbers of the pointers, the less memory will be used.

Having decided, then, to remember your programs, when is the best time to do it? This will depend on what remember facility you have.

Some machines, for example the BBC, have the feature built in, as will most disc operating systems.

On the other hand, machines like the TRS-80 require that a special program be pre-loaded before the Basic program which is to be remembered.

If your machine is this type, you will have to take into account the memory requirement for the utility, and ensure that your ever-growing *Adventure* is not too big before you remember it!

If it is not quite finished, then perhaps it will be best to remember in two's to leave space for insertions, otherwise remember in one's.

If you are getting very short on memory, you might find that you can load both programs as long as you don't try to run the Basic program — the remember utility will probably not take up much more room than the space the *Adventure* requires to run in.

Finally, if you have followed my convention for numbering BASICs, delete these before remembering.

Apart from giving you the extra space you might need, the PEPMark will have lost their identifying last digit of 9 after remembering, and will be more difficult to locate.

We're falling in love again...

The other evening I found myself in a green bedroom wearing pyjamas and carrying a handbag.

Feeling somewhat weary I decided to have a short nap, so I undressed and hopped into bed, imagining my embarrassment when, when asked, I suddenly awake in a crowded room where a party was in progress!

All the guests turned and stared at me, and I tried to sit up. Regaining my senses, I returned with all heads to the bedroom, had a good wash, and feeling much better, put on the lovely silk dress I'd found in a trunk in the closet.

There was no doubt that I looked fantastic in it. Good, I thought, getting on some make-up, Tom should find me quite seductive.

Before you jump to any conclusions, let me explain that I was sitting in front of a computer, playing *Love*, an *Adventure* for women.

The action takes place in Puka Hall, and the object is to fall in love with a character called Tom. This *Adventure* runs on a ZX81 with 128K Ramscot.

I played it in a mixed group with Barbara, Steve and Peter, who provided the computer. I soon got the impression I

was already in love with Tom, so I found his cigarette lighter in my handbag.

Perhaps I ought to seduce him? Well, I obviously lacked a woman's intuition, because I couldn't even find Tom.

Meanwhile, Barbara was busily suggesting what clothes to wear and how to apply lipstick.

Steve and I went to now getting a little bored, and thinking up some fairly direct suggestions, which, being gentlemen, we refrained from mentioning in mixed company.

The game is certainly very suggestive, but Peter took the tape home to examine the listing and assured me that there were no naughty words in the program.

On the whole, Barbara felt that *Love* would be great fun played by a group of women. Personally, I would prefer to conversing with these women than to actually play the game, but then it is advertised as an *Adventure* for women.

Strange, isn't it, that in these days of sexual equality, there are games especially for women, but not for men? Does this mean that all games not billed as 'for women' are suitable only for men?

Love is available from Hamish of George Street, Brighton.



Welcome back to the Wild West where you'll experience excitement and adventures on the Warpath.

Now we continue to set up the rules for this thrilling conflict between Indians and the cowboy.

Once the board has been prepared, you will be asked if you wish to review the map. If you reply "Y", the map will scroll across the screen with you press "ENTER".

Details of the numbers of each type of piece will appear at the top of the screen. The middle of the screen portion of the map will appear (the Troopers always move first) and play may commence.

The order of play:

a) The Troopers and the Indians move first. The player may move all, some or none of the men.

b) All conflicts resulting from that movement are resolved.

c) The Indians now repeat steps (a) and (b).

d) These steps continue throughout the game until one of the winning conditions is met. This may occur during either the movement or the conflict phase.

As promised, we will now discuss two important arrays: **PTABLE** and **IBOARD**. Once we have completed these, we can prepare the map and set up the pieces ready for play to start.

PTABLE is an array of 90 by 3 and is dimensioned in line 780 as **PTABLE**. It contains information on each man in:

- Index 0: The position on the board.
- Index 1: Type of piece — trooper, Indian or etc.
- Index 2: Attack flag.
- Index 3 will be set to zero when the man is eliminated. If a piece is in a temporary **HOLD** condition, it is ignored.

IBOARD is shown in figure 1. It is an array of 24 rows and 24 columns and is a representation of the map surrounded by a 4-byte border.

This requires 504 "cells" and, if dimensioned in integer format, would need at least 1008 bytes (more if your computer does not have the **DEFINT** instruction).

This waste memory space is well worth a number greater than 255. Indeed, I have observed an area of 505 bytes starting at location 11688 (see line 1190). Since it is not a dimensioned array the

only way I can access it is by **POKE** and **PEEK**.

When first initialized the screen is filled with 128's and the border with 9's. Each byte whose equivalent position on the map is occupied by a piece is given the value of the index of that piece (i.e. from 1 to 90). Those occupied by the troopers or Indians are given the value of 99.

The border is a useful feature. In the original **KIDSCREEN**, I carried out the subroutines necessary to ensure that a piece was not attempting to move off the map, but this added to the time required to make a move.

With a border, one need only check if the piece is stepping on to a 99. If so it then the move is illegal.

Now we need another algorithm which relates **IBOARD** to **IBSCREEN**. Given **BL**, the location of the piece on **IBOARD**, a value **ML**, the location on **IBSCREEN**. This subroutine is in line 330. It also returns **W3** which is the location of the piece in memory.

I think you will be able to see that since **IBOARD** is 24 columns wide and the first location is at 100, the variable **Q** is the row number. If you look at **IBSCREEN**, you will see that odd numbered rows are offset by 4, hence the

WARPATH

Part three of Ron Potkin's wild west wargame series tells you how to set up the board. Although it is designed for a TRS-80, we hope there is sufficient detail to help you succeed in adding Warpath to your collection.

LAYOUT OF THE INTERNAL BOARD

Games is played in the area bounded by the four corners 'H', 'L', 'T', 'B' and 'B', 'L', 'T', 'H'. It is initially filled with 128's. The outer margin is filled with 9's.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
2	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
3	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
4	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
5	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
6	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
7	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
8	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
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11	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
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15	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
16	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
17	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
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27	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
28	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
29	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
30	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	

used for "Q" and "V".

Provided the argument is less than 3200, this faster and easier than "Q" - 3200 / Q / 37. If X, the division, is a power of 2 the remainder can always be obtained by **MURDER** AND (X - 1).

Now that all four arrays are defined, we can review how they all fit together.

- The whole game is controlled by **PTABLE** which we run through sequentially; troopers first followed by the Indians.
- Read index 0 from **PTABLE** and obtain the location of that piece on **IBOARD**. If the location is zero, the piece has been eliminated — go to the next piece.
- Obtain the type of piece from index 1, get the correct character from the **H** table and calculate the number of moves for the piece (variable **MV**).
- Use **BL** to calculate **ML**, from line 330. The machine language routine in **ML** is now used to calculate the rectangle to be selected from **IBOARD**.
- Display the rectangle and prompt the player for his move. We do this by alternately printing both the character and the number of moves at the position **CP** as the piece flickers.
- Assume the player wants to move the piece and presses a number key. The hex key wants to move to (variable **MX**) is calculated and a check is made

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CAVE INS should you be the side of the cave with your Laser Cannon or Bomb, part of the wall will start to crumble - the greater the number the more you'll lose.

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Author's name: Christian: Sur-name:

Address:

Tel: Date:

Type of game: (If original please say so)

Loading instructions:

Game instructions: (If not included in the listing)

Office use only

Date received:

Acknowledgement sent: ☐ Evaluator's comments

Name of evaluator: Good enough to publish ☐

Date sent out: Needs some tidying up ☐

Date due back: Not worth publishing ☐

Needs to be returned to author for alterations: ☐ Date sent: Same game already published on this micro ☐

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MACHINE CODE

DECISION MAKING AND THE MICRO

The real power of computers comes from the way they can make decisions and perform different actions according to different values of the input data.

We will now start to look at the 'decision making' instructions in assembly language.

In Basic we have instructions of the form 'IF condition THEN GOTO line number', where the condition may be a complicated expression involving arithmetic, logical and comparison operators.

In assembly language, however, the only conditions we can use directly involve the *zero*, *carry*, *carry and overflow* flags.

The first type of conditional jump we are going to look at is the Branch or Relative jump, and the instructions available on the 6800, 6809 and Z80 are listed in tables 1, 2 and 3.

The only conditional jumps on the 6800 are the eight branch instructions shown in table 1, but the 6809 and Z80 have others which we will deal with later.

In Basic we have to use line numbers to refer to the program instructions. In assembly language we use labels instead of line numbers.

The editing programs in some assemblies use line numbers but this is purely to keep the lines in the right order and it is impossible to refer to the line numbers in the assembly language programs.

The standards for 6800, 6809 and Z80 assembly languages specify that labels may be up to six characters long, the first character must be alphabetic, and

any subsequent characters may be alphabetic or numeric.

Thus, START, FINISH, LMS, ADDR, are valid labels but *START, \$\$, are invalid.

Also, register names, opcode numbers and other reserved words are usually not allowed as labels, but even when your assembler allows reserved words to be used as labels it is not good practice to use them.

Some Z80 assemblers require that a label must be followed by a colon. In this case it may be possible to use a reserved word as a label because the colon permits the assembler to distinguish between.

For example, ADDR used as a label and ADDR used as an opcode are identical.

To see how we use labels with the branch or relative jump instructions, let us look at simple counting loops in the three assembly languages.

Table 1			
	Hex Op-Code	Label	Instruction
6800	82 04	START	LDI #15
	13	LOOP	DBI
	90 00		BNE LOOP
6809	56 10	START	LDH #10
	46	LOOP	HLA
	26 10		BNE LOOP
Z80	75 04	START	LD B, 15
	65	LOOP	DEC B
	16 10		JNZ LOOP

We start by setting a register to the initial value of the count, then decrement the counter register. If the register is not zero we jump back to the decrement instruction labelled LOOP.

When the counter register becomes zero, after 16 steps, the program will continue with the next instruction.

The branch or relative jump instruc-

tion introduces a new addressing mode, *relative addressing*.

The second byte of the operand code is a displacement specifying how many bytes to jump regardless of the absolute address of the instruction the jump will be to the address a specified number of bytes away.

The displacement is a signed binary number, with values from 0 to 127 hex to 128 (decimal) representing a forward jump and values from 80 to FF hex (128 to 255 decimal) representing a backward jump.

The absolute address, which is the destination of the relative jump, is calculated by taking the absolute address of the byte immediately following the relative jump instruction and adding the displacement, making allowance for the sign.

In the examples above, if the first line began at address 1000 hex the second line would begin at 1003 hex, the third line would begin at 1005 hex and the address of the byte following the relative jump instruction would be 1007 hex.

The value of 10 hex for the displacement, interpreted as a signed number, is equivalent to -6, so the destination address is 1007 + (-6), or 1001.

To illustrate a forward relative jump consider the following examples:

Address	Hex Op-Code	Label	Instruction
1000	82 04		LDI #15
1001	13		DBI
1002	90 00		BNE 1001
1003	56 10		LDH #10
1004	46		HLA
1005	26 10		BNE 1004
1006	75 04		LD B, 15
1007	65		DEC B
1008	16 10		JNZ 1007
1009
100A

The destination, 1008 hex, is calculated by adding the displacement, 10 hex, to the address of the byte following the relative jump instruction, 1003 hex, or conversely the displacement is calculated by subtracting 1003 hex from 1008 hex.

WITH A HOP, A SKIP AND JUMP!

As well as these relative jumps we have absolute jumps, where the destination address is included in the instruction.

The Z80 instruction set includes conditional absolute jumps, which are shown in table 4. On the 6800 and 6809 relative addressing is used for all con-



BY TED BALL

MACHINE CODE

dional jumps, and in other addressing modes we have only the unconditional jump, with opcode **jump** (**JMP**).

In assembly language we can write a label or a numeric value for the destination address, for example:

```

8000 & 8000
    JMP #8000
    JMP #8000

200
    B* 10000
    B* NEXTART
    
```

The object code format for the unconditional jump instructions is one byte for the opcode followed by two bytes for the operand.

The operand appears in the usual format for a two-byte operand, with the low byte first and the high byte second on the 8000 and 200, and with the high byte first and the low byte second on the 8000. Thus we would have:

```

Hex Object Code  Source Code
8000 00 00 00    JMP #8000
200  00 00 00    JMP #8000
8000 00 00 00    JMP #8000
    
```



FLAGS SIGNAL THE MESSAGE

In order to use the conditional jumps we need to know how the other instructions affect the flags. It is not difficult to learn which flags are affected by various classes of instruction, but you will need to look this up in a reference manual at first.

In most cases we only need to bother with the sign, zero and carry flags and it is usually quite easy to work out how these flags are affected by most instructions.

However, there are complications when signed arithmetic is involved, and next month we will look more closely at the mechanics of signed binary arithmetic, paying special attention to the values of the carry and overflow flags in the various cases that can arise.

Table 1 8080 Branch Instructions Meaning		
Hex Code	Instruction	Meaning
70	BPL label	Branch if plus (positive)
72	BMP label	Branch if minus (negative)
74	BVC label	Branch if Overflow clear
76	BVS label	Branch if Overflow set
78	BNC label	Branch if Carry clear
7A	BNC label	Branch if Carry set
7C	BNC label	Branch if Not Equal (Not Zero)
7E	BNC label	Branch if Equal (Zero)

Table 2 8080 Branch Instructions Meaning		
Hex Code	Instruction	Meaning
20	BPL label	Branch always
22	BPL label	Branch never
24	BPL label	Branch if higher (greater)
26	BPL label	Branch if lower or equal
28	BPL label	Branch if Carry clear
2A	BPL label	Branch if higher or equal
2C	BPL label	Branch if Carry set
2E	BPL label	Branch if lower
30	BPL label	Branch if Not Equal (Not Zero)
32	BPL label	Branch if Equal (Zero)
34	BPL label	Branch if Overflow clear
36	BPL label	Branch if Overflow set
38	BPL label	Branch if Plus (positive)
3A	BPL label	Branch if Minus (negative)
3C	BPL label	Branch if Greater or Equal
3E	BPL label	Branch if Less Than Zero
40	BPL label	Branch if Greater Than Zero
42	BPL label	Branch if Less Than or Equal to Zero
44	BPL label	Branch if Less Than or Equal to Zero
46	BPL label	Branch if Less Than or Equal to Zero

*These two different opcodes mean the same for the same object code.

Table 3 Z80 Relative Jumps Meaning		
Hex Code	Instruction	Meaning
70	CALL label	Call
72	JR label	Increment R & Jump if Not Zero
74	JR NC, label	Jump Relative
76	JR Z, label	Jump Relative if Not Zero
78	JR NC, label	Jump Relative if Zero
7A	JR C, label	Jump Relative if Carry

Table 4 Z80 Absolute Jumps Meaning		
Hex Code	Instruction	Meaning
00	JP label	Jump
02	JP NC, label	Jump if Not Zero
04	JP Z, label	Jump if Zero
06	JP NC, label	Jump if Not Carry
08	JP C, label	Jump if Carry
0A	JP NC, label	Jump if Priority flag Overflow set
0C	JP NC, label	Jump if Priority flag Overflow clear
0E	JP NC, label	Jump if Sign Positive
10	JP NC, label	Jump if Sign Negative



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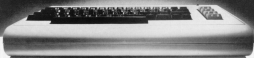
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BLOODS

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