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Layout Design: **Heather Sheldrick**
News editor: **Mike Cowley**
Advertisement Manager: **John Riding**
Advertising Sales: **John Snowden**
Editor in Chief: **Peter Brameld**

Editorial: 061-456 8835
Administration: 061-456 8383
Advertising: 061-456 8500
Subscriptions: 061-480 0173
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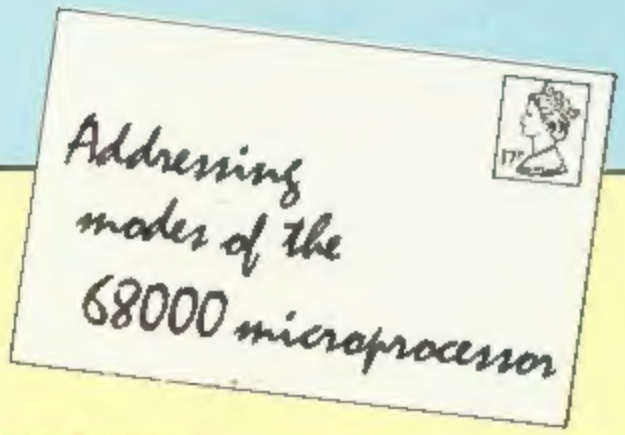
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Tramiel pledges support for the whole range



Jack Tramiel . . . "our sales projections are high"

ON the eve of the consumer launch in the UK of the 520ST Atari chief Jack Tramiel has pledged continuing support for all the company's current machine range.

In an exclusive interview with *Atari User*, the controversial former boss of Commodore insisted that the arrival of the 16 bit micro will not mark the beginning of the end for Atari's less powerful models.

"We intend to support all lines which Atari has manufactured and are selling", said Jack Tramiel.

"This includes the VS2600 games machine, the 130XE and 800XL computers, the ST line and all future machines".

Questioned about the number of 520STs Atari hopes to sell in the first 12 months, the outspoken head of the Atari clan replied: "Sales projections are high.

"We believe that any company which has smaller than 20 per cent share of the personal computer market will be out of business in the long run".

Battling Jack – as he is known in the States – went on to deny claims that the ST was aimed primarily at the business market.

"Since I started in this business, I've always sold personal computers", he said. "People have the imagination to do what they like with my products".

A suggestion made by a leading UK retailer that the 520ST was too cheap with not enough profit in it for dealers to provide the necessary back up also met with a similar rebuke.

"The profit margins we provide for retailers are comparable to any in the computer industry", he said.

Asked about stories emanating from the US that STs are already being sold before any software is available, he said: "Why people are buying it without software is because for every machine there are stages.

"In the first stage the program developers buy machines. In the second stage the computer enthusiasts and hobbyists buy the machines.

"Then, as software is developed, comes the third stage – the consumer buys".

What will follow the ST? "If you are in Las Vegas in November please visit our booth at Comdex. You will see quite a line of new products . . ."

Hard discs on the way

ATARI hard discs for the 520ST are to have a 10mbyte capacity and will be available in the United States in October.

This was the message from Jack Tramiel when he spoke to *Atari User*.

However he did point out that UK purchasers of the 520ST will have to wait until November for the British versions to be made available.

Spreadsheet released

DISC and cassette versions of Audiogenic's spreadsheet Micro Swift are being released this month for the Atari 800XL and 130XE.

The machine code program is operated by pop-up menus and incorporates advanced functions such as definable column widths and a selectable system of cell formatting.

Price will be around £20.

130XE DEAL

COMPUMART has stolen a march on other dealers by offering a cut-price package incorporating the Atari 130XE.

The company is offering savings of £80 on its Atari package – containing the 130XE, 1050 disc drive and ten blank discs – which now costs £299.95.

DUTCH PICK THE 800XL

ATARI has achieved a dramatic breakthrough in Europe with the news that the Dutch government has selected the 800XL as its recommended micro for the country's schools.

The company now predicts that this will result in sales of 100,000 machines to educational outlets in Holland over the next two to three years.

Atari was given the blessing of the Dutch after months of negotiations and in the face of intense competition from major rivals.

This is now being seen as the key to unlock the door to similar deals all over Europe. However France remains the one country where Atari is unlikely to make much headway, thanks to the chauvinistic attitude of the French themselves.

As part of the Dutch deal the 800XL – named as Home Computer of the Year in the British Micro Computing Awards 1985 – is now to be featured in a television series there.

Breakthrough

This, according to the company, is being designed to introduce school children in Holland to the intricacies of computing, similar to the pioneering BBC series.

"This award is a major breakthrough for Atari computers in Holland", says Rob Harding, Atari UK sales manager. "It was won in the face of formidable competition from Philips, the indigenous manufacturer.

"We believe that this will lead to the 800XL becoming the leading 8-bit micro in education".

Games link with toys company

SOFTWARE house Martech has joined forces with a toy manufacturer and comics publisher in developing its latest release for the Atari 8-bit machines.

In mid-October it will be launching Zoids – The Battle Begins, the first in a series of computer games based on a range of Zoid robot toys made by Tomy.

Both manufacturers are keeping in close touch with Marvel, which is bringing out a comic based on the Zoids' adventures.

Martech says Tomy has orders from all over the world for its dinosaur-like robots – sales of the toys have already reached the two-million mark in the UK.

Tomy is also planning to spend in excess of £1.5m on television advertising alone in the run-up to Christmas. Martech is hoping its partner's promotions will help sales of its own game.

"Zoids have clearly captured the imagination of the same kids who buy computer games", said a spokesman for the company.

The Battle Begins is an arcade game which centres on the battle for supremacy between two warring factions of Zoids. Martech says it involves a lot of strategy.



LASER DISC SYSTEM FOR ATARI

ATARI is set to become the first micro manufacturer to introduce a laser-read compact disc system in this country.

Spokesmen at Atari's headquarters in Sunnyvale, California, and at Slough have confirmed the product is under development and will be released before Christmas with a price tag of about $500 – under £400 at current exchange rates.

The CD ROM player is based on a Philips drive unit and is designed to run with the Atari ST range.

It will be capable of storing 500 mbytes of memory on one 12 cm optical laser disc.

A spokesman told *Atari User*: "We are also thinking of making it an audio product so it will double as an audio player".

A prototype previewed in America recently, running with the ST, stored 20 volumes of an encyclopaedia on one third of its capacity.

There was the full index of the encyclopaedia on another third and high quality graphics related to the material on the other third.

It took approximately three seconds to locate any particular reference using laser scanning.

Drive units developed by Philips and disc and tape manufacturer 3M have been available to North American original equipment manufacturers for several months.

Nigel Murphy, 3M's disc products manager in the UK, has said that CD data storage is "the technology that will substitute for all forms of recording media in 10 to 15 years time".

His company believes optical memory systems will take off within the next few years, with annual disc sales expected to reach half a billion by 1990.

The discs will be able to store a variety of information – standard computer data, graphics, digitised TV pictures and audio.

SOFTWARE IMPORTS FROM USA

DISTRIBUTOR Software Express is importing four utilities and five games for the Atari 8 bit range from the United States.

Homepack is a three-in-one package which includes word processor, information manager and telecommunications program. Price is £49.95.

A word processor called Paper Clip will cost around £50. It enables the user to merge Touch Tablet and other pictures with text and also to print out.

Broderbund's Print Shop, price £40, enables users to create letterheads, greetings, messages, signs and displays. Extra data files cost £20.

Last in the utilities section is B-Graph, a graphics construction program which allows bar or pie charts to be made.

The games are Epyx's Rescue on Fractalus and Ballblazer, Broderbund's book-based Mind Wheel game for an Atari with twin drive, and Microprose's strategic war game, Crusade in Europe, and its Great American Road Race. Cost per program ranges from £30 to £40.

Micro Live returns to the screen

TELEVISION'S Micro Live series is returning to BBC 2 as a result of pressure from computer buffs.

Starting on October 13 the now weekly series will cover subjects ranging from electronic music, micros in schools, the Data Protection Act and the use of computers in timing races.

The battle for the personal computer market is to be featured in a serious film with a lightweight title, Big Blue and the 700 Dwarves.

Micro Live will also take an in-depth look at work being done by the Carnegie-Mellon University in the States on molecular memories and robots, communications and networking.

These, together with other items still to be filmed, will take the series up to December 13 when it will take a break for Christmas. It will return for another 10 weeks starting on January 17.

The program's producers have also taken heed of the viewer's mailbag by introducing more items on personal computers. But air time will also be given to the growing business and communications sectors.

Presenters of the program will be Lesley Judd, Ian McNaught-Davies and Fred Harris. Micro Live will go out on BBC 2 at 7.30pm each Friday.

Two-in-one cassette

A CASSETTE offering two versions of the same game – Boulder Dash – one for the Atari 48k and the other the Amstrad, has been launched by Mirrorsoft.

Said executive Pat Bitten: "It makes sense for dealers to stock only one product catering for two machine markets.

"The two-in-one will not affect the customers who will still be getting the game for the normal £9.95".

Top team for 520ST launch

ATARI boss Jack Tramiel is to spearhead the consumer launch of the 520ST on the first day of the Personal Computer World Show on September 4.

The fact that he is to appear with his American entourage is being seen as a demonstration of the importance attached to the new machine's showing on the UK market.

It was because of this that the first ST machines were shipped to Britain some weeks ago, much to the irritation of would-be developers Statesside.

When questioned about this Tramiel said the decision had been made based on the overwhelming interest shown in the ST when it was unveiled at the Hanover Show earlier this year.

"As an international marketing company we put emphasis on all our markets, but especially Europe", Jack Tramiel told *Atari User*.

In recent weeks UK software houses, like their US counterparts, have been involved in a mad scramble to provide ST products ready for the consumer launch here.

Such has been the interest generated by the machine that most major British companies got caught up in the rush to actually buy ST development systems.

"We even had to wait in line to pay for one", bemoaned a spokesman for one company a little slow off the mark.

Programmers have been working round the clock in an attempt to beat the September deadline. Although many will only be showing "unfinished" products, more than 80 software houses will be featuring their wares on the Atari stand at the PCW Show at London's Olympia.

"There has been nothing quite like it since the gold rush", said one industry observer. "It's as though Jack Tramiel had invited them all to the opening of the Klondike".

TOP VALUE

A REVIEWER in Popular Computing Weekly has described the as-yet-to-be-released Commodore Amiga as the main challenger to the Atari ST range.

However the writer, Andrew Pennell, concludes that the ST is likely to score heavily on price – some £400 cheaper for the basic model, which includes a monitor when the Amiga does not – and the fact that it has more RAM.

Atari bridges the gap

ATARI owners have been invited to help fill a gap in our national heritage caused by the likes of Henry VIII and Oliver Cromwell.

Because of these and other iconoclasts there is no British history of Nativity art as there is in other European countries.

But that is something archivists and historians Count and Countess Andrzej von Staufer intend to correct.

They have organised the First British National Nativity Competition to put Britain alongside the other countries of the world who already have a longstanding tradition of Nativity-making.

It coincides with the Twelfth World Congress of Nativitists, which is hosted by a different country every three years and this year is at Innsbruck, Austria, in December.

The competition, in two parts, will be held at Westminster Cathedral on December 8 and at the Christian Resources Exhibition at the Horticultural Halls in London on February 8.

Count and Countess von Staufer have been working closely with their international counterparts for eight years, as well as with British craftspeople, artists, photographers and – during the past two years – computer graphics artists.

They have been helped by Epson UK, which was involved in the Christmas Archives Exhibition, Folk Nativities of the World, at the Barbican Centre last winter.

The Epson connection with the National Nativity Competition is in the special category for the best computer-generated image of the Nativity.

Any part of the Christmas story may be represented, and entries will be judged on originality, content and approach.

Epson will judge this section of the competition and award a prize to the winning computer artists.

"The winner in the computer category will also compete for the overall Best in Show trophy", Count von Staufer told *Atari User*.

"And it is likely to be given a place in the British Nativity archives which will be going on tour to the United States and leading Commonwealth countries shortly".

Atari owners who want to enter the competition should write to National Nativitists Competition, Christmas Archives, 64 Severn Road, Cardiff CF1 9EA enclosing a 24p stamp.

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No. 1 September 1985

NEWSLETTER

£½m computer to the rescue

THE phenomenal growth of MicroLink has hastened the purchase of additional computer power by Telecom Gold.

Demand for the new electronic mail service has been such that despite the tremendous processing power of a Prime computer at certain times of the day users have been inconvenienced by motorway like congestion caused by the large volume of traffic.

Since it started, MicroLink has had to share its computer with the somewhat verbose members of the European Parliament. The traffic jam worsened as subscribers from all over Britain and Europe and as far away as Australia and Japan began logging on in increasing numbers.

With MicroLink growing at more than four times the predicted rate the result left it no option but to request a separate computer for its exclusive use.

Telecom Gold has come to the rescue and on September 7 MicroLink will be moving to its own £500,000 dedicated system — much to the relief of its own users and the Euro MPs.

The move will enable MicroLink to provide an increasing number of exciting facilities together with a response time described by its systems manager Colin Rogerson, as "super quick".

Telecom Gold officials have been staggered by what they describe as the phenomenon of a specialist service growing so big in such a short time.

Rogerson believes he knows exactly why MicroLink has taken off so dramatically.

"It's more friendly than other electronic mail services, it's informative, and it's fun to use", he says.

It's all systems go . . .

THE ever ready Help Line came to the assistance of a distinguished early MicroLink subscriber. Conservative MP for Acton Sir George Young.

He mailboxed to say: "The screen does not scroll when it is in the Telecom Gold mode. The new lines simply superimpose on the old, making it very difficult to read messages.

"I have a BBC Micro with a Telemod 2 modem and a Micronet 800 ROM. To access Telecom Gold I have to generate a new Return signal. What am I doing wrong?"

What Sir George was doing wrong was trying to access the service using Micronet 800 software.

Help Line was able to give him two options: either get a Commstar ROM which has both Prestel and terminal emulation, or keep the Micronet 800 ROM and use it with a terminal emulation program such as Term.

Shortly afterwards Sir George was able to report "all systems go" at his end of the system.

Popular abroad

NOT only is MicroLink the great new *national* electronic mail service — it's also making a name for itself on the *international* scene.

On the Continent there are already subscribers in Belgium, France, Luxembourg, Spain, Switzerland and West Germany.

Further afield are its members in Saudi Arabia, Australia, New Zealand and Japan.

There are even a couple of subscribers stationed at British Forces bases in Germany. In addition to those in the UK and the Republic of Ireland whose numbers increase daily.

Why is MicroLink so popular abroad?

Says one happy customer: "It's a very good way of sending information by the international PSS system. It's faster and more economical than telex, and it's portable.

"I can take my lap-held computer just about anywhere and still be in touch with MicroLink at any time of the day or night."

Showing 'em how

MICROLINK will be notching up another first when it goes on line from the Electron & BBC Micro User Show in Manchester.

A continuous demonstration of the new service will be held at MIST from September 27 to 29, with experts on hand to reveal the full potential for users.

Stories about the show will be transmitted live over MicroLink's own electronic news pages during the three day event.

MicroLink forges commercial ties

NEW commercial ties between Britain and Japan are being forged by MicroLink's speed and efficiency.

For several years Bristol electronics engineer Jeff Gearing has been UK correspondent of a Japanese motoring magazine regularly sending his news reports by mail on floppy discs to its editor, Yuichi Ishikawa.

Other than expensive long distance phone calls, the two men had to rely on the five day minimum airmail service to keep in touch.

Until MicroLink, that is.

Now both Gearing and Ishikawa are subscribers of the fast growing international mail service, and news about Britain's motor industry gets to Japan in seconds rather than days.

MicroLink has paid off for them in another way: high speed two way exchange of up-to-the-minute business information that can be sold as a service to commercial concerns.

And this has led to a further profitable spin off.

For some time Gearing and Ishikawa had been aware that there was a demand in Japan for luxury European goods and in Britain for Japanese made models.

MicroLink is now providing the fast, low cost medium for import export orders resulting in an increasing flow of Wedgwood pottery from Bristol and radio controlled models from Tokio.

Turn to Page 45

When equals doesn't make all things equal...

Programming made easy – Part V of MIKE BIBBY's guide through the micro jungle

STRAIGHT to work this month. Have a look at Program I. I don't think it should cause you too many problems.

We're just assigning the values 1, 2 3 to three numeric variables *NUMBERONE*, *NUMBERTWO*, *NUMBERTHREE*, and printing out the value of the variable immediately after each assignment.

```
10 REM PROGRAM I
20 PRINT CHR$(125)
30 NUMBERONE=1
40 PRINT NUMBERONE
50 NUMBERTWO=2
60 PRINT NUMBERTWO
70 NUMBERTHREE=3
80 PRINT NUMBERTHREE
```

Program I

The end result is that

1
2
3

appears on our screen. A long winded way of doing things I admit, but easy enough to follow.

Program II is a different kettle of fish but believe it or not its output is exactly the same as in Program I.

It's sensible enough down to line 40. We clear the screen in line 20, assign the value 1 to numeric variable *NUMBER* in line 30, then PRINT *NUMBER* in line 40.

Line 50 looks decidedly odd, though:

```
50 NUMBER = NUMBER + 1
```

How can a number be equal to itself plus one? That's what line 50 seems to be saying, after all.

The fact is that equals sign doesn't mean equals here. It just tells the computer to do something. The equals sign instructs the computer to do whatever task is given on its right and then label the result of that task with the label on its left.

In this case the micro interprets line 50 as *starting on the right of the equals sign, take the value labelled by NUMBER and add one to it. Then label the answer with the variable NUMBER*. The micro doesn't bother that the same label has been used on both sides, it just updates *NUMBER* with its new value.

The practical effect of line 50 is to increase *NUMBER* by one – to two. Line 60 then duly prints out this new value of *NUMBER*.

Line 70 is identical to line 50. Starting at the right of the equals sign it takes the value of *NUMBER*, increases it by one, then re-labels it with *NUMBER*. That is, *NUMBER* increases from two to three. Line 80 then prints out the new value of *NUMBER*.

The thing to remember is that the equals sign doesn't mean *equals* – it means *assign*. You do what's on the right of the equals sign and then assign the result to the label on the left.

Let's take this idea a little further. Have a look at Program III. The first five lines should be fairly familiar.

When we run it the screen clears, line 20 we set *NUMBER* equal to zero, line 30 increase it by one, line 40 and then print it, line 50. Since *NUMBER* was zero, and we've increased it by one, the result will be that 1 appears on the screen.

Once the program's done this we come to line 60 which reads:

```
60 GOTO 40
```

As you recall the GOTO 40 tells the micro to make line 40 the next line it does. This increases *NUMBER* by one, as we've seen, so *NUMBER* takes the value two. Line 50 then prints out the 2 and we encounter line 60 again.

This sends us back to line 40 which increases *NUMBER*. Line 50 prints out the new figure, 3, then we're back at line 60, which takes us to line 40 which increases *NUMBER*, and so on.

I think you can see that the program will produce the steadily

```
10 REM PROGRAM II
20 PRINT CHR$(125)
30 NUMBER=1
40 PRINT NUMBER
50 NUMBER=NUMBER+1
60 PRINT NUMBER
70 NUMBER=NUMBER+1
80 PRINT NUMBER
```

Program II

```
10 REM PROGRAM III
20 PRINT CHR$(125)
30 NUMBER=0
40 NUMBER=NUMBER+1
50 PRINT NUMBER
60 GOTO 40
```

Program III

increasing sequence of numbers 1 2 3 4 5 6 7 and so on

Try running it and see. You'll probably be glad to know that the way to break out of the program is by the aptly named Break key.

If you simply want to freeze things for a moment while you examine the output, press the Control and the 1 (one) key at the same time — we write this as 'press Control + 1'. To restart things simply press Control + 1 again.

As we've mentioned, when a program keeps going round in circles like this we call it a loop. We can then make statements such as *NUMBER increases by one each time round the loop*.

If you press Break, or freeze it quickly enough after the start of the program, you'll see that the first value of *NUMBER* printed out is one, and not zero as you might think. All right, we assigned zero to *NUMBER* in line 30, but we increased it by one immediately, before ever printing it out.

But what if we wanted the zero printing out? Well, a sneaky method would be to make line 30 of Program II

```
30 NUMBER=-1
```

What happens here is that line 40 immediately increases *NUMBER* by one to make it zero (-1 + 1 = 0), Line 50 then prints it out.

```
10 REM PROGRAM IV
20 PRINT CHR$(125)
30 NUMBER=0
40 PRINT NUMBER
50 NUMBER=NUMBER+1
60 GOTO 40
```

Program V

Another way round is just to swap lines 40 and 50, so we PRINT before we increase *NUMBER*. This is what I've done in Program IV. Try running it and you'll see — if you're quick enough — that 0 does appear on your screen.

```
10 REM PROGRAM V
20 PRINT CHR$(125)
30 NUMBER=0
40 PRINT NUMBER
50 NUMBER=NUMBER+3
60 GOTO 40
```

Program V

Actually we don't need to go up in steps of one. Have a look at line 50 of Program V

```
NUMBER = NUMBER + 3
```

Remembering that micros start on the right of the equals sign, the Atari takes the value labelled by *NUMBER*, adds three to it, and gives the result the label *NUMBER*. The effect is that line 50 increases the value of *NUMBER* by three each time round the loop, so numbers are printed out on our screen going up in steps of three.

Nor do the numbers always have to be getting larger. Program VI, as

```
10 REM PROGRAM VI
20 PRINT CHR$(125)
30 NUMBER=1000
40 PRINT NUMBER
50 NUMBER=NUMBER-1
60 GOTO 40
```

Program VI

you'll see without too much difficulty, starts at 1000, then prints out 999, 998, 997 and so on. The crux here is line 50

```
50 NUMBER = NUMBER - 1
```

Try running it if you won't take my word for it!

In fact we can write a general program that will start at any number and go up or down in whatever steps we want by using the INPUT statement we met last month. Program VII does the trick.

First of all the program asks us the number we want to start printing from — which we label *START*. Notice how line 30 politely prints out a message to tell us what we're supposed to INPUT. Line 40 does the actual INPUT labelling it as *START*.

Lines 50 and 60 then prompt for and INPUT the increment or step by which we want the numbers to go up, labelling it *INCREMENT*.

We then get down to business. Line 70 assigns the value of *START* to *NUMBER*. We then print this value of *NUMBER* in line 80, so we're off to a good start, if you'll pardon the pun.

We then have to increase *NUMBER* by the value of *INCREMENT* to get the next value. Line 100 then jumps back to 80, which then prints the updated value. Line 90 then increases it again by *INCREMENT*, and so on.

If you have difficulty visualising this, try substituting sets of real numbers for *START* and *INCREMENT* and see what happens as you go round the loop.

For instance, if you mentally input 25 for *START* and 5 for *INCREMENT*, line 70 would give *NUMBER* the value 25, which line 80 would then print out. Line 90 would then add 5 to this, giving *NUMBER* the value 30, then we'd loop back to 80 via 100. The figure 30 would then be printed out. Line 90 would increase it by 5 again, and so on.

All well and good, but having to escape from these loops by pressing Break isn't very elegant is it? Ideally the program should stop of its own accord. In other words, we should give it a condition to finish on. The loops we've met so far haven't had any finishing condition so they're known as unconditional loops.

We need to create a conditional loop, and Program VIII shows us how we go about it.

```
10 REM PROGRAM VII
20 PRINT CHR$(125)
30 PRINT "Number to start at";
40 INPUT START
50 PRINT "Increment of";
60 INPUT INCREMENT
70 NUMBER=START
80 PRINT NUMBER
90 NUMBER=NUMBER+INCREMENT
100 GOTO 80
```

Program VII

```
10 REM PROGRAM VIII
20 PRINT CHR$(125)
30 ? "I'll keep on going
until you enter 999"
40 INPUT NUMBER
50 IF NUMBER=999 THEN STOP
60 GOTO 30
```

Program VIII

The idea is that we keep on looping round printing out the same inane message until we enter 999. That is, the condition for ending the loop is that we INPUT 999 — any other

number will cause the loop to be repeated

Let s see how we achieve this Line 20 clears the screen then line 30 prompts for the INPUT saying the program wi keep on going until 999 s entered

n case you re wondering what the ? is in ne 30 it s the Atar s abbreviation for PRINT If you want to substitute ? for PRINT then go ahead I prefer the clar ty spelling it out gives you

Line 40 then INPUTs into the variable *NUMBER* Line 50 is the heart of the matter this is where we *test for our condition* t reads

```
50 IF NUMBER=999 THEN STOP
```

Th s uses the F THEN statement, one we haven't met before. It reads

IF some condition is TRUE, do what follows the THEN
IF that condition isn t TRUE ignore what's after the THEN
and carry on with the next line

In the case of line 50, this boils down to

IF NUMBER does indeed equal 999 THEN STOP
IF NUMBER isn t 999 THEN drop through to the next line line 60 in this case

So if when prompted by line 30 we d NPUT a value of 999 for *NUMBER* we would do what s after THEN and STOP

We haven t met STOP before, but I don t think you be too surprised to learn that it stops the m cro dead in ts tracks. It also prints out a message indicat ng the line it was stopped at. In th s case it would be STOPPED AT LINE 50

If however we entered a value for *NUMBER* other than 999 our condit on hasn t been met, so we carry on with the next line of the program line 60 which then sends us back to our prompt for NPUT aga n

In other words the IF THEN statement ensures that we keep on oop ng unt we enter the number 999 We ve got ourselves a cond tional loop

Actually there are other ways of stopping t such as pressing Break or enter ng a word when t s expect ng a number For the moment we l, assume that you re good mannered enough to avoid th s Later on we see how to diot proof our nput as it s known

Try running Program VI I, and enter 999 to stop it Then enter

```
CONT
```

The program will restart – CONT stands for continue The same tr ck works after you ve pressed Break

The IF, THEN statement isn t too hard to use just remember

- The condition you re testing for comes directly after the IF.
- You can put any valid Basic instruction after the THEN
- The instruction after the THEN is only carr ed out f the cond t on has been met - that is if t s true
- if the condit on is not true the m cro gnores what s after the THEN and continues with the next line of the program

'Smaller numbers at the sharp end . . .'

Take a look at Program IX now This does exactly the same job as Program VIII but in a different way This time we test to see if the number is NOT equal to 999 and, if this is so, we loop back to our prompt for INPUT Lines 20 to 40 are identical. The vital bits are lines 50 and 60

Line 50 reads

```
50 IF NUMBER<>999 THEN GOTO 30
```

Here our condition s that

```
10 REM PROGRAM IX
20 PRINT CHR$(125)
30 ? "I'll keep on going
until you enter 999"
40 INPUT NUMBER
50 IF NUMBER<>999 THEN GOTO 30
60 END
```

Program IX

NUMBER isn t equal to 999 That s what < > means not equal to And if our condit on s true that is *NUMBER* isn t equal to 999 we THEN loop back to line 30

On the other hand, if the condit on in l ne 30 isn t met – that is *NUMBER* s 999 we s mply drop through to line 60 which reads

```
60 END
```

We met this before As its name suggests, it simply ends proceedings, th s t me w thout any message un ke STOP

.The not equal to symbol, < >, may be new to you t s just one of a set of inequalities as they re known that come in very usefu in comb nation with IF . . THEN statements. Table I summar ses them

If you're anything like me, you ll get confused between > and < The trick is to remember that for both symbo s the larger number goes oppos te the bigger end of the symbol, whereas the smaller number goes oppos te the sharp or smaller end It may not be the way E nstein remembered t but it s good enough for me!

Program X uses what we ve earned about IF THEN state ments as they re known to add a fin shing point to Program V Lines 10 to 40 are dentical We clear the

Inequality	Meaning	Example
=	equa s	7=7 s true 8 7 s fa se
>	greater than	7 >5 is true 3>4 is fa se
<	ess than	3< 4 is true 7< 7 s false
< >	not equal to	4< >5 s true 4< >4 is fa se
>=	greater than or equal to	6 > 5 s true 6 > 9 s false
<=	less than or equa to	7< 7 is true 7< =6 s false

Table Inequalities

screen and INPUT a value for *START* the number we start from

Lines 50 and 60 then prompt for and INPUT the number we wish to end at *FINISH*. 70 and 80 then INPUT *INCREMENT*, the value of our step. As in program VII, the value of *START* is assigned to *NUMBER*, line 90, and then printed, line 100. Next we increase the value of *NUMBER* by *INCREMENT* and store it in *NUMBER* again at line 110.

Line 120 is the crux.

```
120 IF NUMBER>FINISH THEN END
```

What this says is if we've incremented *NUMBER* past *FINISH* end the program here and now. If not, then continue with the next line which will loop back to 100 and print the newly incremented number.

Notice that if we have exceeded the limit we don't actually print that value of *NUMBER* since we don't loop back to the PRINT statement of line 100.

```
10 REM PROGRAM X
20 PRINT CHR$(125)
30 PRINT "Number to start at";
40 INPUT START
50 PRINT "Number to finish at";
60 INPUT FINISH
70 PRINT "Increment of";
80 INPUT INCREMENT
90 NUMBER=START
100 PRINT NUMBER
110 NUMBER=NUMBER+INCREMENT
120 IF NUMBER>FINISH THEN END
130 GOTO 100
```

Program X

Experiment with different values for *START*, *FINISH* and *INCREMENT* and see if you can understand what's happening. This program is quite fundamental and we'll be using its ideas a lot, so it's worth an effort.

For instance, if you start at 25, set the finish to 35 and prescribe a step of 5, you'll get

25
30
35

on your screen.

However a start of 50 and a finish of 55 with an increment of 3 will result in

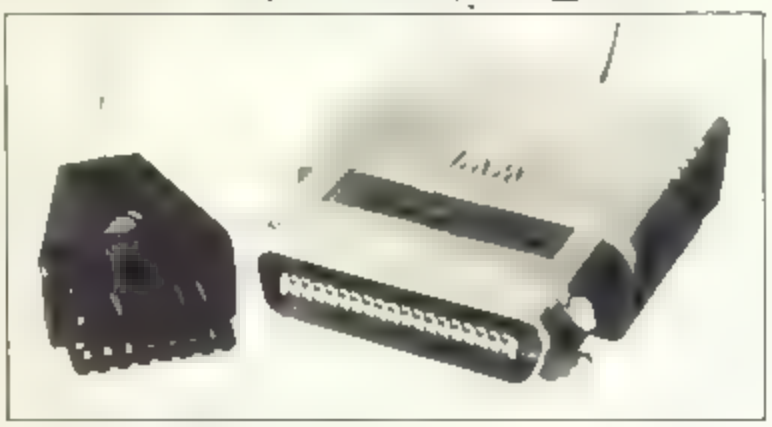
50
53

You won't see a 56 because it exceeds our limit.

What happens if the start and finish numbers are the same, or the increment is negative? In fact, will the program work with negative numbers? And what would happen if we choose an increment of zero? Find out.

● *Well that's all for this month. Next month we'll be continuing with loops but in an entirely different way.*

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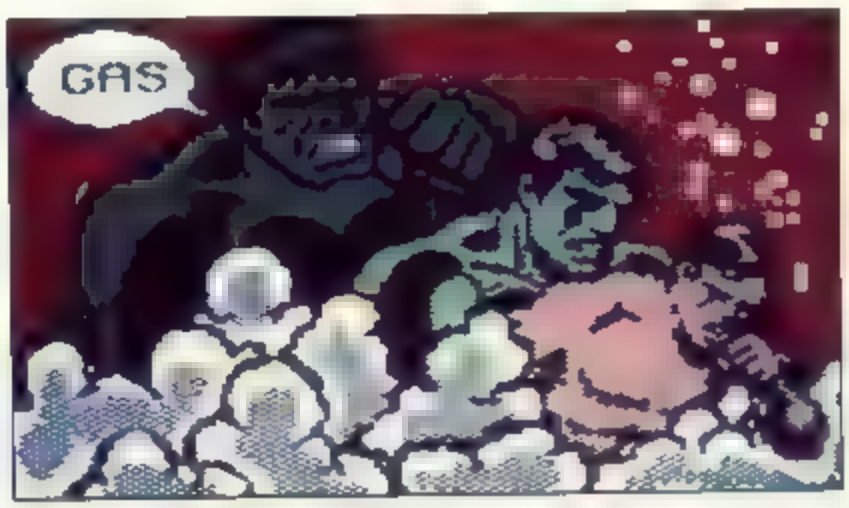
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Bruce Banner in a right spot



The transformation from Hulk to Bruce

Setting the standard for adventure graphics

BRILLIG takes a first look at adventures inspired by those Marvel comic heroes

AS promised last month, let's take a look at the Scott Adams Quest Probe series. Unfortunately, The Fantastic Four – next in the series of Marvel Super Heroes to be put into adventure form – has not yet arrived from Adventure International so I shall only be able to look at the first two games of the series, The Incredible Hulk and Spiderman.

The Quest Probe series is Scott Adams' first major venture into graphics from the off, although his earlier games have had graphics added in some cases. Hence the games are available either as text only cassettes or on disc with graphics, with a commensurate price difference.

The graphic versions also contain a "graphics off" command for any text fans who prefer the faster loading of discs.

Now I have in earlier columns expressed my views on what graphics add to and subtract from a game. In the case of Quest Probe I have to say that the graphics do add to the game for two main reasons.

Firstly the characters portrayed are cartoon characters in their own right. Hence the impression given in the games is an entirely accurate one, and nothing jars with the players perception of the central figure. This is reinforced by the inclusion of an actual Marvel comic in the package, designed to introduce the characters to newcomers.

Secondly the text in the games tends to be fairly sparse and a little repetitive, presumably a reflection on the amount of memory taken up by the graphics. For instance in The Hulk most of the action takes place in or around a series of large domes, while in Spiderman the action takes place in a large office building.

The graphics themselves, particularly in The Hulk, are the best I have seen in any Atari adventure, giving an excellent representation of the original cartoon characters. If graphic adventures are to be the way forward then this is the standard to beat for any new contenders.

The games have a slightly disappointing quality, in that the actual story line behind each is similar, as you send your Super Hero on a gem-collecting mission. I feel that with a little more imagination and variety the characters could have been set some slightly more challeng-



ing tasks to tax their amazing powers

The Quest Probe series to date prov des some good challenging hunt-and-find problems and as this s an nterconnected series it will presumably fo ow the same pattern n the Fantast c Four Worth buy ng for the graphics for sure and any Scott Adams adventure s worth a look but the text only versions are a l'ttle on the dry side

Now on to some of the nitty gritty adventuring problems Picture the scene There you are strol ing contentedly through your adventure a nice full nventory when suddenly everything ooks the same No matter which exit you take your surround ngs never vary n short you have h t what every adventurer dreads – a maze

This s the sort of prob em that s going to confront you n probably seven games out of ten so we had better make sure that there s a way of dea ing w th it

R chard Burke, of Gwent has come up against just such a problem in **Escape from Pulsar 7,** wr tten by Br,an Howarth as one of the Mysterious Adventures now marketed by Adventure nternat ona

R chard s prob em is that he cannot open the locker in the storeroom or indeed always find the storeroom The storeroom in Pulsar 7

'What you need is a point of reference'

forms part of a double maze in the game

The first part of the maze is that several rooms are exits from a series of air ducts The second part in common with several of the other Myster ous Adventures, s the total ack of geographical ogic in the game

n adventures today there is absolutely no excuse for an ex t eading north to a ocation and yet the south ex t from that new location eading somewhere completely different This is the case in Pu sar 7 and probably explains why Richard cannot always find the storeroom

The Br g patent maze mapping method can, however, solve the problems caused by encountering games wr ters with no sense of direction The first sign of a maze is when despite the plethora of exits in many d rect ons the p ayer cannot appear to move The location description remains the same But has the locat on?

The problem is that you cannot tell Everything looks the same What you need s a point of reference, so start with where you are and call that No 1

All you have to do s drop an tem from the nventory such as a pencil to ident fy location No 1 Now go through the available exits and every time you can st see the penc you have dropped mark a dot against that exit It obviously eads nowhere

If you cannot see the penci then you have moved so drop another tem and repeat the process Continue th s until you have mapped the whole maze and from then on it w be a p ece of cake to p ck your way through it

In the case of Pu sar 7 I suggest you name each locat on after the inventory item you drop as the geography of the maze s pure nonsense But by persistence w th my method I can promise Richard w ll f nd someth ng that w be a smash h t with that ocker

Mind you, some adventure writers have got smart to this system so don t be too surprised if your mapp ng items start d sappearing while you are away

Jymm Pearson s **Curse of Crowley Manor** is the Other Venture causing James Chapman problems, being stuck in the numerica lock room with a monstr ous creature Well, James follow Rule Number One and exam ne everything in an adventure inc uding your transportation to the manor and you may f nd some useful l qu d refreshment

Finally a etter from M Woodgate asks me to commit an act of heresy and recommend a good disc adven ture that is not from Infocom

see from his etter that he already has Atari s **The Pay-Off** and that he is cons der ng **Mask of the Sun** by Broderbund – which is no bad choice

Can also suggest the Ultima series (I to IV) f a graphic adventure is what he is after They should keep him busy for a few months

S nce Adventure International has featured as the bulk of th s article Steve Ca k n of Pitsea wins an *Atari User* T shirt for h s G itch of the



If you map a maze by dropping an object at every location it will be a piece of cake to pick your way through

Adventuring

Month recounted to him by none other than Scott Adams at last year's PCW show.

Adventure and has an obstinate bear to pass. Should or Screlami Bear will work. Now try replacing 'am with was one frustrated American did.

No wonder the bear was surprised.

TAKE ONE LARGE HOD...

THOSE of you who solved last month's Bricks puzzle will know that you needed rather a large hod.

The program we present here provides a means of arriving at answers to the questions (a) How many bricks did you drop? and (b) How many E/W moves did you make?

The rooms are in the array R with P as the pointer to the current room. There are a generous 700 rooms and P starts in room 20.

The data correspond to the cards described last month. Each set of three numbers provides the instructions to

- Drop a brick or clear the room – drop 5 or 0 in R(P)
- Move East or West – add 1 or –1 to P
- Get the next three data items and count moves.

Reaching the equivalent of the STOP causes the array C to exceed its bounds and so the TRAP command causes the value of I – the number of moves – to be printed out. The array R is then searched for 5s, the number of these corresponding to the number of bricks dropped.

If you run the program you should get answers of 134,468 moves and 501 bricks. Be warned though, Atari Basic is so slow that the program takes about an hour to run.

```
10 DIM R(700),D(9),N(9),C(9)
20 FOR I=0 TO 700:R(I)=0:NEXT I
30 FOR I=0 TO 9:D(I)=0:N(I)=0:C(I)=0:N
EXT I
40 FOR I=0 TO 9
50 READ X,Y,Z
60 D(I)=X:N(I)=Y:C(I)=Z
70 NEXT I
80 DATA 5,1,1,5,1,2,5,-1,0,5,-1,2,0,1,
3
90 DATA 0,-1,2,5,1,4,0,1,1,5,1,0,5,0,5
100 P=20:N=0
110 TRAP 150
120 FOR I=1 TO 3000000
130 R(P)=D(N):P=P+N(N):N=R(P)+C(N)
140 NEXT I
150 PRINT I
160 BRICKS=0
170 FOR J=0 TO 700
180 IF R(J)=5 THEN BRICKS=BRICKS+1
190 NEXT J
200 PRINT "BRICKS= ";BRICKS
```


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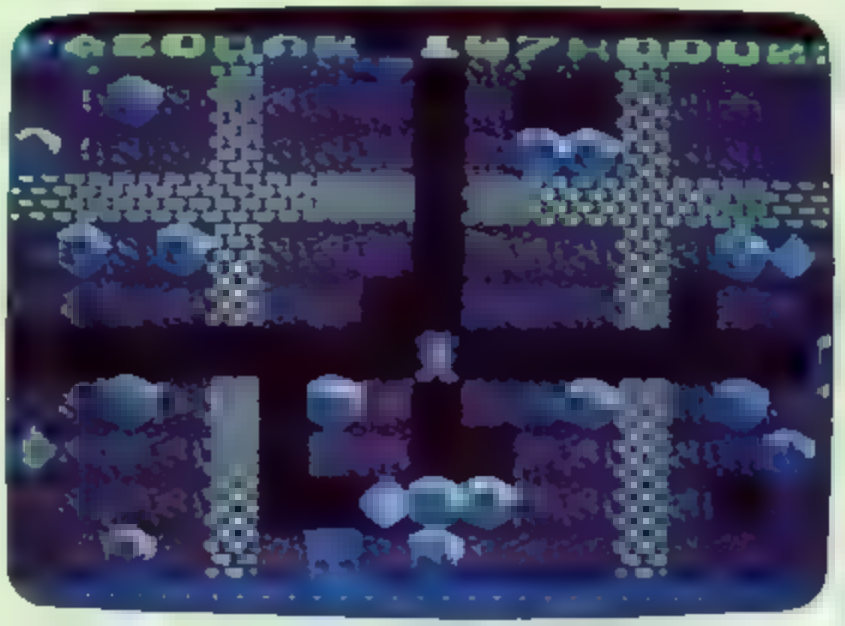
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Sparkling arcade game is fast – and fun...



ONE of the classic arcade games often emulated but never in my opinion surpassed is **Boulderdash.**

The concept is simplicity itself. You control Rockford a handy little mole who whizzes through the boulder-riddled subsoil collecting diamonds as fast as his little paws will carry him.

Collect enough diamonds and a door opens up. Reach the door to be transported to the next level up and start again in a different cave.

In practice it isn't that simple is it ever? as there is a stringent time limit with a really off-putting panic-inducing 10 second countdown.

Rockford is well aware of this, as any pause in the action leaves him frowning and tapping his foot impatiently.

This is quite apart from the fact that the more subsoil you remove the more Rockford is likely to receive a boulder on his head as he strives for the next gem.

The caves themselves are of varying degrees of difficulty from not too easy to downright impossible.

Cave A lets you zoom around and acclimatise to the perils of the plummeting boulders you inadvertently induce. Cave B does more of the same while Cave C wiped me out for about a fortnight as I struggled to clear all 24 diamonds and find the exit in time.

Expert boulderdashers have shown me that there is a technique to every screen although to assist the unworthy there is a facility to flip forward four caves at a time or a pause button to allow you to plan your route through the earth.

Trapping Butterflies which turn into diamonds when you casually drop a rock on their heads is a theme in several caves, together with flooding them and avoiding nasty little warps set to chase you around the screen.

The whole game is tremendous pacey fun and an absolute must for any Atari owner. And if this doesn't leave you exhausted Boulderdash II is coming. Buy it!

Pete Sleeman

HIJACK'S ALL RIGHT, JACK!

IT'S a good job English Software released **Hijack** before the Shiite Muslims decided to play the game for real. Otherwise they might have laid themselves open to charges of opportunism.

As it is, the worst one could level against them is a charge of premeditated plagiarism.

If you ever saw Broderbund's Choplifter, then Hijack will give you a remarkable feeling of déjà vu.

The innovative aspect of the scenario is that it is a train that has been hijacked.

Fly this train to Waterloo doesn't sound quite right, does it?

There are 10 VIPs aboard the train and your job as a chopper pilot is to pick them off the roof of the train and deposit them in the safety of the rear carriage. Meanwhile, of course, there are hazards to be avoided.

Guns fire at you and trees suddenly offer themselves as targets for you to crash into. It's like learning to drive all over again!



The title page is accompanied by a jolly rendition of The Runaway Train but the game sounds consist largely of the tacka-tacka-tacka helicopter rotor and whizz-boom gunshots.

One nice feature is that following a wipe-out you can start from the level you were on when killed. You can also restart from the beginning if you really want to.

It's not one of the most compulsive games I've ever played. In fact in my opinion the cleverest part is the way the title is written in an appropriate shape on the cassette inlay.

It's a lot more colourful than Choplifter and if you never saw Broderbund's classic you may well love Hijack. For my money, though, I prefer the original.

Talking of money, the 48k cassette costs £7.95 and the disc version is £10.95.

Dave Russell

Magick moments in Festeron



ONCE upon a time there was a nasty Queen who as the law governing fairy stories dictates. had a beautiful and virtuous stepdaughter

Now the Queen being the crabby cantankerous and malicious monarch that she was. decreed that no one should marry the fair Princess Morning Star until they first proved themselves worthy

Naturally Queenie devised tests that would ensure that none of the macho knights that sought the Princess's hand would live to tell the tale One besotted wretch was even sent deep into the Mines of Mendon there to slay a Grue and drag the carcass up where all might see it

Now any infocom adventurer worth his or her salt could have told the poor sucker that he'd have been better off staying at home reading a good magazine like Atari User but no off he went. Darkness soon overcame the hapless knight who lost without a lamp, was soon devoured by a lurking Grue

Since nobody ever survived the ordeals the Princess was condemned to a life of loneliness and died without ever seeing a single knight make it to the finals.

Many kingdoms later a scholar happened to be rummaging through the ruined tombs of monarchs and chanced across a glowing object amid the dust and decrepitude

It was the Princess' heart. now long since turned to stone but shining brightly with the unfulfilled wishes of a lifetime And that dear reader was how the Magick Stone of Dreams was discovered

In **Wishbringer,** from Infocom you begin not as a knight in shining armour but as a humble Post Office worker The game begins atop a hillside in the coastal town of Festeron.

You may wish to explore the town before or after going to the post office the cinema cemetery police station light house pleasure wharf, park library and church are well worth a visit

Your boss Mr Crisp is not



the most pleasant of postmasters – when you first meet him he's reading other people's postcards and will tell you in no uncertain terms what he thinks of you

Your first job is to deliver a letter to the proprietor of Ye Olde Magick Shoppe way up on a cliff top on the other side of town You can't afford to hang about too long – the Magick Shoppe shuts at 5pm and the game starts at 3pm

Getting there can present a problem The bane of all messengers in the shape of a vicious poodle blocks the main route and even if you do manage to pacify it the Pooch doesn't stay tranquil for long

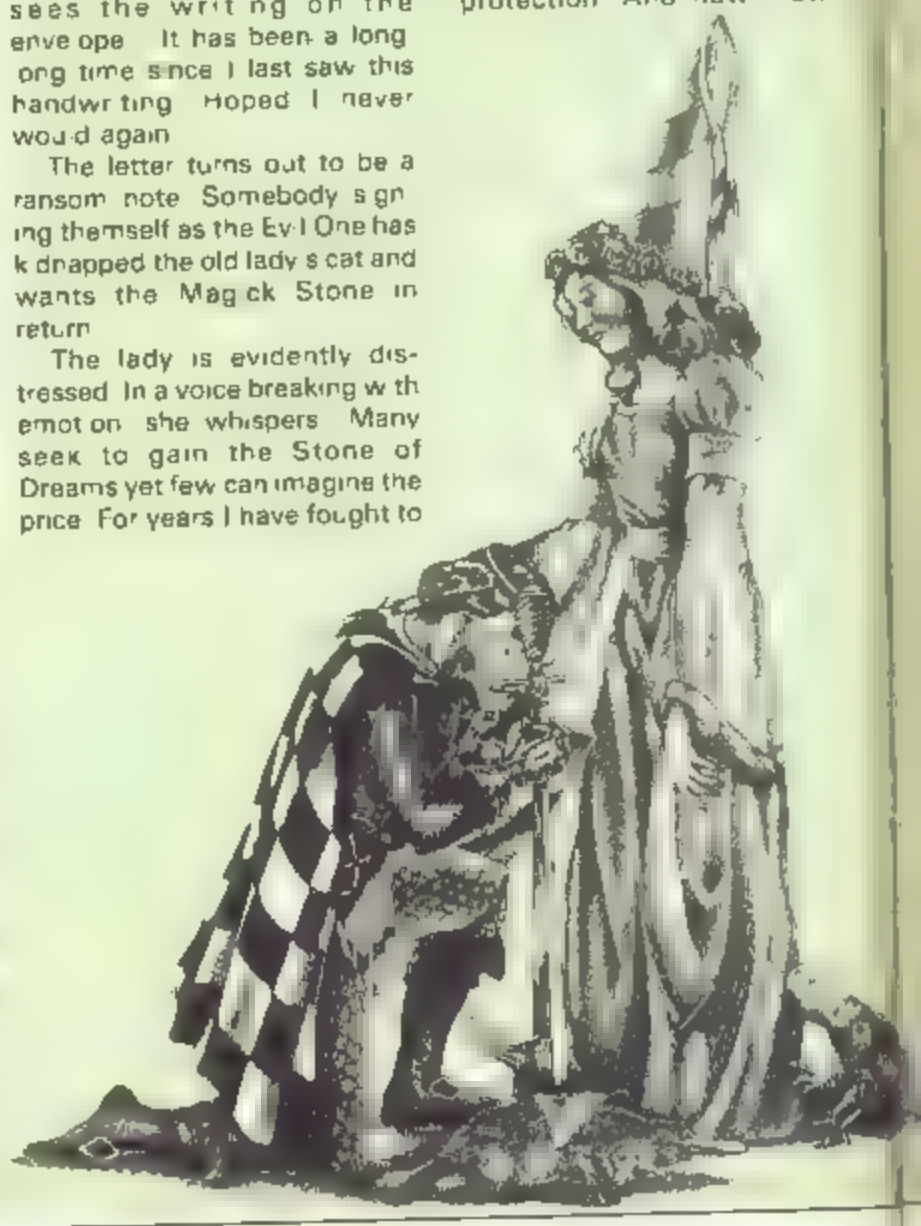
Once at the Magick Shoppe an old lady who is as fragile looking and pale as a faded signature in an antique book receives your delivered letter

She's clearly upset when she sees the writing on the envelope It has been a long long time since I last saw this handwriting Hoped I never would again

The letter turns out to be a ransom note Somebody signing themself as the Evil One has kidnapped the old lady's cat and wants the Magick Stone in return

The lady is evidently distressed In a voice breaking with emotion she whispers Many seek to gain the Stone of Dreams yet few can imagine the price For years I have fought to conceal it from the Evil One and others like her

My youth my home and family all were forfeited for its protection And now now I



c aims my on y compan on'

Guess who s about to be entrusted w th the Stone and the task of rescuing Chaos the cat? Right f rst t me

Before you know it you re thrust out of the shop and into thick fog When you peer through t a l you can see is the summit of Post Off ce hil On y trouble s there s now a mass ve tower where the Post Off ce used to be

f you make t through the fog w thout fa ng to your death off the cl ff you l find the whole scene has changed Where birds once sang vultures now croak Trols ark Your be oved town now seems to be n the grip of decay and despair

And f you thought a nip on the trouser seat from a poodle was bad enough what are you going to th nk about be ng chewed up by the enormous he hound wh ch has usurped the pood e s pos tion?

Fortunate y the Magick Stone - W shbringer can he p With t you can w sh for advice darkness f ght freedom luck foresight and ra n You can only w sh once for each so must choose the occas on with care

You must a so have certain ob ects n order to make the w sh effective For example and most appropriately to w sh for darkness you must f rst have drunk some Grue s m lk

W shbr nger is ranked as an ntroductory leve adventure the other Infocom grad ngs in order of d ffic u ty are standard advanced and expert – wh ch means t s more su table for the apprentice adventurer Never-theless even seasoned advent urers wi l find it a joy to play.

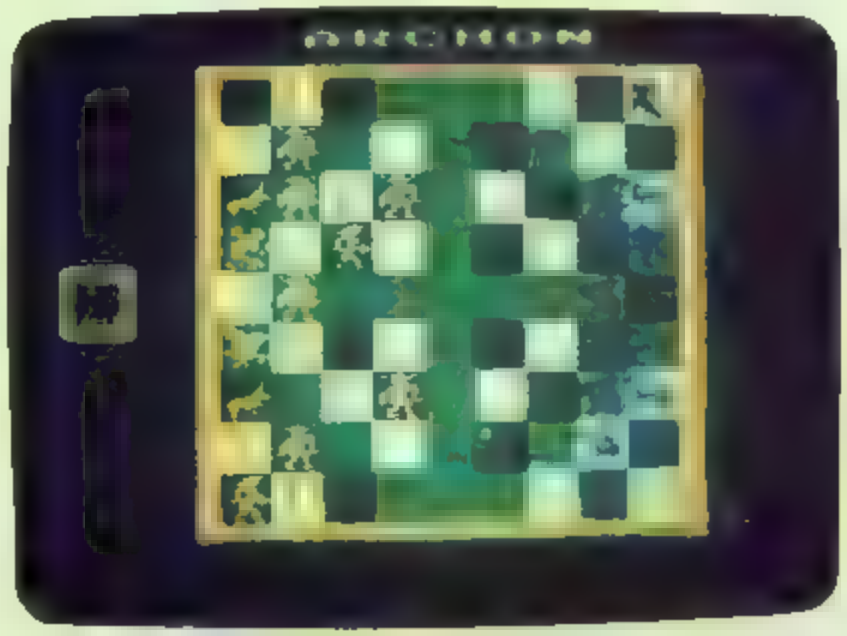
The package comes handsome y boxed with glossy manua map and your very own W shbringer stone.

W shbringer is not ntended as the sequel to the marve lous Sorcerer and Enchanter as some peop e thought it m ght be that pleasure s st l to come

Yet once again Infocom has come up trumps W shbr nger is filled w th humour excitement deta and atmosphere

It maintains ts h gh stan dards and keeps Infocom in pole position as the best adventure pub shers n the wor d Defin te y not to be missed

Bob Chappell



Some of the best at a fraction of the price

I'VE got some good news and some bad news.

F rst the bad news. If, like me you were one of the first to spend your hard-earned cash on an old 800 then you might be forgiven for th nking that you had some terrib e personal problem when it came to buying cheap quality software

But th s is where the good news comes in. Now thanks to a few enterprising software dealers and the growing potential of our own software writers, we can at last enjoy some of the best Atari software at a portion of the price

Archon by Electronic Arts, s one of these c assics to fi ter through t s d stribuited in the UK by Anolasoft and costs £11 95 tape or £14.95 disc It s at first glance similar to chess not on y in its board ayout but in the movements of some of its players.

But that is where the similarity ends

Archon s a two-screen game The ma n screen is a chequered board of light and dark squares.

There are also squares which vary between light and dark but most important there are the power points five squares which, if tota ly con-trol ed by one side will end the game

The second screen s the scene of f erce battles to decide the right to own a square

So much for the layout Now on with the game itself

Archon can either be a one or two p ayer game

You are given the choice of being either the ight force or the dark force and th s is where the squares matter

If you are the light side the light squares w ll give you more strength than the dark squares and vice versa for the dark side

The revolving squares will give a d fferent amount of strength depending on your colour and its co our

Each side has an army of equa strength but d fferent n their fighting styles Thus tactics p ay a ma,or part n Archon

The most important e e-ment is the W zard who can cast spe ls ranging from heal ing your p ayer to reviving a dead piece

Th s usua ly encourages an onslaught on the Wizard from the word go but it can prove a very costly attack and is generally not preferred by the more experienced player

My on y complaint about th s excellent game is that you do not have any ski evel selection n the one player mode so I found myself beating the comp ter time after t me

The manua is well laid out giving h nts on p aying the game and a thorough explan ation of your spe l-casting ab lity

The one I received was a Commodore 64 version which was accompanied by a photo-copy of the Atari key funct ons

I find this a touch strange as Archon was released first on the Atar then on the 64 Perhaps th s was a pre-release version of the manua

Al in all an orig na game well written and a pleasure to play

Paul Irvine

● *The review of M U L.E in the July issue was also by Paul Irvine and we're sorry we only managed to get 60 per cent of his name right!*

Hi-res graphics in modes 4 and 6

introduction to Atari graphics

WE looked last month at Modes 3, 5 and 7 and saw how they were four-colour modes. This month we'll take a look at the modes we missed out, 4 and 6.

These are still "map" modes, but they only allow two colours to be used. If you're wondering why anyone should want to limit themselves to two colours, the answer is memory. By way of a slight digression let's see why this should be so.

We talk about a bit of information and because the word bit is used in everyday language it's easy to forget that it has a precise meaning in this context.

When someone offers you some more food and you say "Well maybe just a bit more, please ..." you're using the word in a very imprecise way.

In information processing terms bit is a contraction of the two words binary digit. We say that one bit of information has been transmitted if the number of possible outcomes has been halved.

Suppose I toss a coin and tell you that the outcome is heads. I've given you one bit of information because I've reduced the possibilities from two to one. Before I transmitted any information, the outcome could have been heads or tails.

Suppose your task is to guess which square on an otherwise empty chess board contains a pawn. If I tell you that it isn't in the left hand half of the board, once again I've given you one bit of information.

In the case of the chess board I've reduced the possibilities from 64 to 32. With the coin I reduced the possibilities from two to one. In both cases I have provided the same amount of information – one bit.

If you've been following Mike Bibby's Bit Wise series, you'll be quite familiar with binary notation so let's work our way back towards the graphics screen.

If you think about a simple black and-white screen each pixel can either be white – lit – or black – unlit. That is we can describe the pixel's state using only one binary digit. Let's say 1 represents lit and 0 represents unlit.

We could now describe a complete screen as a string of 1s and 0s and we could store this information in memory.

Suppose now we have the option of each pixel not only being lit but being coloured red. That is, each pixel can be lit or unlit, and if lit can be white or red.

Our single binary digit can't convey all this information, so we need to introduce another one. We could then describe each pixel's state as 00 – unlit, 01 – white lit – or 11 – red lit. There is another possible combination, 10 – red unlit – but in this case it doesn't make much sense.

It's easy to see that if we wanted to describe a screen containing this much information we'd need a bigger string of 1s and 0s. If even more colours were possible, we'd need an even bigger string.

This information is held in the micro's RAM memory and so we can see that if we want more colours available we have to allocate more memory to hold the possible colour information.

The other variable in the equation is the size of the pixel or the resolution. A high resolution screen has many pixels per row of screen and therefore needs more information-holding space than a low resolution screen.

Mode 4 has the same resolution as Mode 5 – 40 rows × 80 columns plus a text window. However because only two colours are available in Mode 4 it takes up less memory than Mode 5.

Similarly Mode 6 has the same resolution as Mode 7 – 80 rows × 160 columns plus text window – but again with only two available colours.

We can do much the same as we did in Modes 3, 5 and 7. For example type GR.4 and the screen should clear to black with the blue text window at the bottom.

If you now enter

```
COLOR 1: PLOT 5,5
```

you'll see our old friend the orange

square To give us a bit more to look at, enter

DRAWTO 30,9

The co our of the plotted point defaults to orange but we can a ter it by setting register 0 If you enter

SETCOLOR 0,7,4

you alter register 0 to colour 7 uminance 4 and the orange blocks change to a nice deep b ue

The colour information for the background is held in register 4 so if you type

SETCOLOR 4,5,6

the black should change into a purp e – co our 5 – with uminance 6

The colours for the plotted points and the background are the two colours. We could also change the colour of the text window via register 2. Try.

SETCOLOR 2,12,4

for examp e You should now have blue blocks purp e background and green text window – revolt ng, isn't t?

Blue, purple, green that s *three* co ours However we haven't dis covered an undocumented aspect of Mode 4 We ve cheated by counting the colour of the text window which is really a bit of Mode 0 If we used a fu l-screen Mode 4 the text w ndow would d sappear and we d be back to two colours

If we specify COLOR 2 for the plotted points, we p ot them n the background co our If there s nothing already on the screen we wouldn t see any effect of th s However, one way to erase part of a display is to re-plot t in the background colour

For example, try entering

COLOR 2: PLOT 5,5: DRAWTO 30,9

and the line should disappear

In addition to PLOTting, we can still PRINT#6 as we did in Mode 5 For example enter

POSITION 20,20: PRINT #6;"111110000011111"

and you should see lines appear where the 1s are printed and a space in between them where the 0s are

If you're ooking for ways of saving memory, it s worth noting that us'ng PRINT #6 is generally more economica than PLOTt ng pairs of data points This means that a combinat on of Mode 4 and PRINT #6 can be a very economical way of producing a display

Although *we* can see the display simply by looking, there are times when your program needs to 'see' the display That is, it needs to know whether a part cular screen ocation contains anything

For example, you may be bouncing a ball around the screen and need to know if t has hit a wall

Atari Bas c prov des a graphics command wh ch will ook at a screen ocat'on and say what is there The command 's LOCATE and the form it takes s

LOCATE X,Y,Z

where X and Y are the coordinates of the screen ocation and the contents of the locat on are stored n Z.

If you press Reset and enter GR 4 to get back to a c ear Mode 4 screen then enter

COLOR 1: PLOT 40,20

you once again be confronted by an orange square If you now type

LOCATE 40,20,Z: PRINT Z

the number 1 should be printed in the text window

If you now enter

LOCATE 40,19,Z: PRINT Z

the number 0 should appear in the text window In the first case, the 1 signified that location 40,20 con tained a coloured pixel whereas the 0 in the second case signified an unlit pixe

You can use the information gained from looking at the screen to determ ne what happens next in your program. For example, if your ball has hit a wal you must change its direction to s mulate a bounce

For example, enter:

LOCATE 40,20,Z: IF Z=1 THEN SETCOLOR 4,5,6

and see the effect Because we plotted a point at 40,20 the LOCATE command assigned a value of 1 to the variable Z. The IF Z=1 test returns a va ue of "true" so the THEN part of the command is carried out. In this case the colour in register 4 is altered and the background once again becomes purp e

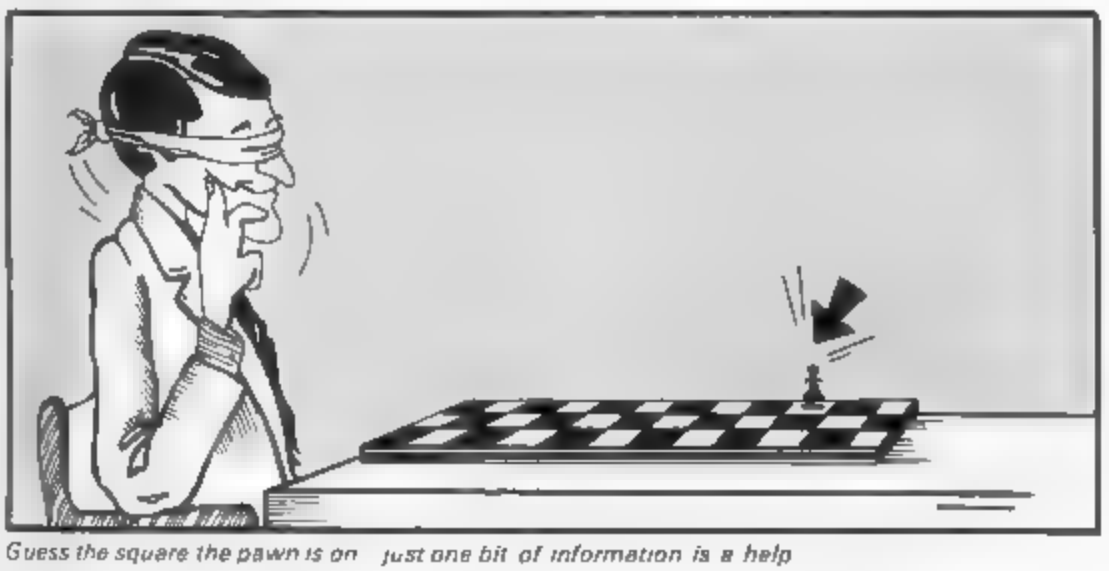
The LOCATE command is very useful but behaves slightly differently depending on which mode you ve selected If you're in Modes 0,1 or 2 the LOCATE returns a value between 0 and 255

If you've selected Modes 3 5 or 7 then LOCATE wi return a value of 0, 1, 2 or 3 As we've just seen in Modes 4 and 6 the LOCATE command returns either 0 or 1

If you recall the earlier articles in this series you ve probab y worked out the correspondence between the characteristics of the mode and the values that LOCATE returns.

Even so suggest you try out the LOCATE command in al the graphics modes that we've covered so far and get familiar with its results.

● *That's your homework for this month – next month we'll look at Mode 8*



Guess the square the pawn is on just one bit of information is a help

ROLAND WADDILOVE goes down the road that leads to artificial intelligence with this program that modifies itself

DATA MAKER

THE assembler published in the August issue of *Atari User* is a very useful tool for developing short machine code routines. If you've been using it, you might well be asking: How can these routines be incorporated in a Basic program?

The best way would be to store the machine code in data statements in the program. Then a simple routine could be used to read each item and store it in memory.

The problem with this method is how to get the code into the data statements. It would be very tedious to do it yourself — surely there must be an easier way?

Well, there is. Just ask your Atari to do it for you!

Data Maker was designed to take any section of memory and to convert it into data statements. All you have to do is tell it where to start and how many bytes to convert.

The program constructs all the data statements and types them in for you. It then deletes itself, leaving just the lines of data.

Quite a clever technique is used by the program and it's worth studying.

What the program does is to clear the screen and print a line number followed by DATA. This is carried out in line 70.

It then Peeks the memory and gets 20 bytes of data. These are printed with commas between by lines 80 to 110. Finally it prints

```
GOTO 130
```

The next line, 120, is the most important line. It Pokes memory location 842 with 13 and ends the program.

What this does is to put the Atari editor into input mode when the program ends. It's as if you had just pressed Return when entering a line. Anything printed on that line is entered.

The clever part is positioning the cursor just before the program ends so that it lands on the line of data that it just printed. It then enters it as if you had typed it in. The cursor is then moved on to the next line.

It's still in input mode, remember, so it enters

```
GOTO 130
```

which it does. This line sends it back to line 70 to print another data statement if it hasn't finished. When it's done this, it stops, enters it and goes round again.

When it's entered all the data, it goes on to line 140 which puts it back into normal keyboard mode. All the line numbers used by the data maker itself are printed on the screen, followed by

```
POKE 842,12
```

in line 150.

Again the cursor is positioned and the editor put into input mode.

The program ends, at which point the editor takes over and enters all the line numbers, deleting the program itself.

Finally it enters the poke which sets the editor back to normal keyboard mode. All that remains are the data statements.

As you can see, it's a powerful technique that's worth mastering.

I find programs that modify themselves quite interesting and there must be many other applications of this clever trick.

How about an artificial intelligence program? It could grow like a living creature, building up its data as it learned.

```
10 REM ****** Data Maker ******
20 REM *** (c) Atari User ***
30 GRAPHICS 0
40 ? :? "Atari Data Maker...":? :? "Li
ne number...";:INPUT L
50 ? :? "Start address...";:INPUT A
60 ? :? "How many bytes...";:INPUT B:B
=B+A
70 ? CHR$(125):POSITION 2,2:? L;"DATA
";:L=L+10
80 FOR I=1 TO 19
90 ? PEEK(A);",";:A=A+1
100 NEXT I
110 ? PEEK(A):? "GOTO 130"
120 POSITION 0,0:POKE 842,13:END
130 IF A<B THEN A=A+1:GOTO 70
140 POKE 842,12:? CHR$(125)
150 POSITION 2,2:FOR I=10 TO 160 STEP
10:? I:NEXT I:? "POKE 842,12"
160 POSITION 0,0:POKE 842,13:END
```

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Part III of MIKE ROWE's series on how to give your program displays the professional touch

It's not at all rude to interrupt...

AN interrupt, in computer terms, is when the computer temporarily stops executing the main program – Basic, machine code or any other language – and executes another program in memory before returning to the original program.

There are several types of nterrupt which are useful for different functions and they can be divided into two types

NM non-maskable interrupts cannot be disabled by the 6502 processor and nclude vertical blank nterrupts VBI disp ay ist nterrupts DLI and Reset

The VB occurs dur'ng the screen blank after drawing one screen and before starting the next These occur every 50th of a second

A DLI can occur after each line is drawn on the screen and takes p ace in the smal delay between drawing each line on the screen

The other type of nterrupts are called IRQ – interrupt request These are maskable which means they can be disab ed by the 6502 processor

These are severa timer interrupts peripher a and serial bus input/output interrupts the Break key and 6502 Break nstructions

NMIs are handled by the Antic chip while IRQs are hand ed by the Pokey and PIA chips

But we are only interested in DLIs for now A DLI can occur every t me a line is drawn on the screen Therefore because it enables you to have a small program running each time a DLI occurs it means you can change various parameters as the screen is drawn

The result of this is that you can change, for example, the colour of any of the registers part way down the screen once or many times

Th s a lows many more colours to be d sp ayed at once Other possible uses are to change the character set n use part way down change sound or music, move players or split players several times, fine scrolling in different directions such as in Frogger – and differing screen widths. Any of these without interfering with your main program at all



A this sounds too good to be true and there has to be a drawback Wel if you are purely a Basic programmer there is. The interrupts must be in mach ne code

However don t panic There is no reason why you cannot use DLI routines from other sources in your own program because using them is very easy

Let s begin by ooking at the routine itself should you decide to try writ ng your own The first point s that t ming is critical Only a relatively short amount of t me is available in a DLI so the routine must be short

t must start by storing any registers it uses A X and Y – on the stack as the main program w l requ re these back after the nterrupt and t must restore them at the end of the rout ne

Also note that many locations for colour or other functions have two locat ons the hardware register and the shadow register In these cases you would normally POKE to the shadow register and the OS transfers the number to the hardware register during the vertical blank

Any registers changed by the routine should be the hardware registers not the shadow reg sters used from Basic

For examp e to change the background colour in Basic you would POKE 712 with a number This is the shadow of the hardware co our register for the background 53274

However if you POKEd directly to this the operating system would reset it to the value in 712 during the VBI

This can be used to your advantage in that any colour change in a DLI wi be reset to norma each t me the screen is redrawn, thus keeping the change just below the DLI

Any colour change on a line will not occur in a constant position on that line This can be overcome by storing the value in WSYNC 54282

Don't panic, but the interrupts must be in machine code

before the colour register This de ays the nterrupt unti the end of the l ne mak ng a neat boundary

The best way to write your own DLI is to examine the ones in the examples .n this article first.

Having got your DLI rout ne written or borrowed it is used as fol ows F rst mod fy the disp ay st Th s involves changing each display l st l ne where the DLI is required by sett ng bit 7 In other words add 128 – $80 to the line Th s can be a s ngle ine or several lines.

Next POKE 512 and 513 $200 $201 with the ow and high byte va ues of the location of the DLI machine code routine

For example Page 6 is 1536 Here mach ne code is safe from Basic and most other operations POKE in the code from 1536 and POKE 512 and 513 with 0 and 6 respectively 6*256+0 1536 Finally POKE 54286 with 192 to enable the DLI to occur

Note there is only one address for DLI routines and f more than one is to be used then the interrupts must change the address as each s executed

If this seems comp cated t sn t rea ly as the following examp es show

First you can change colours part way down the screen Program I changes the background colour half

```
10 REM DLI EXAMPLE 1
20 REM by Mike Rowe
100 GRAPHICS 2
110 DL=PEEK(560)+PEEK(561)*256:REM FIN
D START OF DISPLAY LIST
120 POKE DL+10,6+128:REM TELL ANTIC WH
ERE TO EXECUTE THE INTERRUPT
130 POSITION 4,2:? #6;"DISPLAY LIST"
140 POSITION 6,4:? #6;"[illegible]":REM
 interrupt IN INVERSE
150 POSITION 6,7:? #6;"example"
160 POSITION 5,9:? #6;"[illegible]":REM INVERSE
200 FOR I=0 TO 10:READ A:POKE 1536+I,A
:NEXT I:REM READ MACHINE CODE INTO PAG
E 6
210 DATA 72,169,22,141,10,212,141,26,2
08,104,64
220 POKE 512,0:POKE 513,6:REM TELL OS
THE ADDRESS OF YOUR MACHINE CODE
230 POKE 54286,192:REM ENABLE DLI
```

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Strip Poker	c)7 95	Mule	(d) 2 95
Strip Poker	d)10 95	One On One	c)8 95
Ghost Chaser	(c 7 95	One On One	(d 12 95
Ghost Chaser	(d 10 95	Murder On The	(d 12 95
Mig Alley Ace	c)7 95	Return to Eden	(c)8 95
Mig Alley Ace	c)10 95	Lords of Time	c)8.95
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Solo Flight	(d 10 95	Dungeon Adventure	c)8 95
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Pole Position	(d)10 95	Red Moon	c)8 95
Bruce Lee	c)10 95	Miner 2049	r) 2 95
Bruce Lee	(d) 0 95	Hitchhikers	(d 24 95
Zaxxon	c) 0 95	Graphic Master	d)22 95
Dropzone	c)7 95	Zork 1 2 3	(d)28 95
Dropzone	d) 0 95	Planetfall	.d)29 95
F 15 Strike Eagle	(c)9.95	[illegible]del	.d 28.95
F 15 Strike Eagle	d) 0.95	Enchanter	(d)29 95
Pacman	(c)7 95	Starcross	(d)29 95
Dig Dug	(c 7 95	Seastalker	(d)28 95
Mr Do	(c)7 95	Wish Bringer	(d)2 95
Quasimodo	(c 7 95	Cut Throats	(d)24 95
Beach Head	(d)10.95	Ogre in Danger	(d)24 95
Dallas Quest	(d)10 95	Mask of the Sun	(d)28 95
Contact	(d) 0 95	50 Mission Crush	(d)28 95
Exodus (Ultima 3)	(d) 8 95	Battle Normandy	d)28.95
Nato Commander	(d) 0 95	Battle of Shiloh	d)28.95
Hijack	c)8 95	Combat Leader	d)14.95
Kissin Kousins	c)8 95	Broad Sides	d)28.95
Smash Hits 2 3	(c)12 95	Computer Ambush	(d)34.95
Smash Hits 1 2 3	d)14 95	Cosmic Balance 2	(d 28.95
Colossus Chess	(c)9 95	Eagles	(d 28 95
Colossus Chess	.d 12 95	Field of Fire	(d)28 95
Chuckie Egg	(c)6 95	Fortress	(d)28 95
Ghostbusters	(d 11 95	Knights Desert	(d)28 95
Decathlon	(c)9 95	Rails West	(d)28 95
Decathlon	14 95	Reforger 88	(d)39 95
Pinball 2	14 95	Tigers in Snow	d)28 95
River Raid	c)9 95	War in Russia	d)54 95
Hero	15 95	Six Gun Shootout	d)28 95
Archon	c 0.95	Flight Sim 2	.d)39.95

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Display List

way down a Graphics 2 screen Note that more than one colour register could have been changed

The machine code for the DLI in this program disassembles as shown in Figure I This shows a single change of colour The colour can be changed several times down the screen

In Program I we increase the colour of the foreground by 4 on each line to produce a multicoloured design

The next step from this is to make the colours rotate Program II produces a gradual change in colour rotating up the screen as seen in numerous Atari demos

Spectacular isn't it? And so easy

Graphics 0 is rather plain and boring normally By using a DLI on each line a spectacular multicolour 48-colour Graphics 0 screen can be made as in Program IV You can alter the colours by changing the Data statements in lines 210 and 230

Decimal	Hex	Disassembly	
72	$48	PHA	,Save accumulator on to stack
169 22	$A9 16	LDA $16	Load accumulator with change in colour
141 10 212	$8D 0A D4	STA $D40A	Store in WSYNC
141 26 208	$8D 1A D0	STA $D01A	Store in background hardware register
104	$68	PLA	Restore accumulator value
64	$40	TIR	Return from interrupt

Figure I Disassembly of DL

```
10 REM DLI EXAMPLE 2
20 REM by Mike Rowe
100 DATA 72,173,197,2,24,105,4
110 DATA 141,10,212,141,197,2,141,23,2
00,104,64
120 FOR I=1536 TO 1553:READ A:POKE I,A
:NEXT I.REM READ MACHINE CODE INTO PAG
E 6
199 REM DRAW DESIGN
200 GRAPHICS 7:SETCOLOR 2,0,0
210 COLOR 2
220 PLOT 80,65:DRAWTO 50,20:DRAWTO 110
,20:DRAWTO 80,65:POKE 765,2:POSITION 5
0,20:XIO 18,#6,0,0,"S:"
230 PLOT 80,10:DRAWTO 50,55:DRAWTO 110
,55:DRAWTO 80,10:POSITION 50,55:XIO 18
,#6,0,0,"S:"
240 FOR I=10 TO 55:PLOT 110,55:DRAWTO
80,I:NEXT I
245 FOR I=1 TO 100:PLOT RND(0)*159,RND
(0)*79:NEXT I
250 DL=PEEK(560)+PEEK(561)*256:REM FIN
D START OF DISPLAY LIST
260 FOR I=DL+6 TO DL+69:POKE I,I+128:
NEXT I:REM TELL ANTIC THAT 64 GR.7 LIN
ES HAVE INTERRUPTS
300 POKE 512,0:POKE 513,6:REM POKE IN
LOCATION OF MACHINE CODE
310 POKE 54286,192:REM ENABLE DLI
```

Program I

```
0 REM DLI EXAMPLE 3
5 REM by Mike Rowe
10 GRAPHICS 0.POKE 87,7:POKE 752,1:REM
 START WITH GRAPHICS 0 TO CONVERT TO G
RAPHICS 15 (WILL THEN WORK ON 400/800)
15 DL=PEEK(560)+PEEK(561)*256:REM STAR
T OF DISPLAY LIST
20 FOR I=DL TO DL+133:IF PEEK(I)=15 TH
EN POKE I,14+128:REM CHANGE TO GR.15 A
ND ADD DLI REQUEST
25 IF PEEK(I)=79 THEN POKE I,78+128:RE
M AGAIN BUT ALLOW FOR LINES WITH LMS C
ALL
30 NEXT I
40 FOR I=DL+134 TO DL+160:POKE I,14:NE
XT I:REM CONVERT REST OF SCREEN TO NOR
MAL GR.15
45 COLOR 2:REM DRAW DESIGN IN COLOUR 2
50 FOR J=1 TO 7:READ X:FOR I=1 TO 5:PL
OT X+I,10:DRAWTO X+I,80:NEXT I:NEXT J
55 FOR J=1 TO 5:READ X:FOR I=0 TO 9:PL
OT X,10+I:DRAWTO X+24,10+I:NEXT I:NEXT
 J
60 FOR J=1 TO 3:READ X:FOR I=0 TO 9:PL
OT X,40+I:DRAWTO X+24,40+I:NEXT I:NEXT
 J
65 FOR I=121 TO 125:PLOT I,10:DRAWTO I
,49:NEXT I:FOR I=104 TO 110:PLOT I,49:
DRAWTO I+15,80:NEXT I
70 FOR I=71 TO 80:PLOT 131,I:DRAWTO 15
5,I:NEXT I
80 ? CHR$(125):? ,"128 COLOURS!"
100 FOR I=1536 TO 1536+17:READ A:POKE
I,A:NEXT I:REM READ IN MACHINE CODE
120 POKE 512,0:POKE 513,6:REM TELL OS
WHERE THIS IS
130 POKE 54286,192:REM ENABLE DLI
150 GOTO 150
199 REM MACHINE CODE AND PICTURE DATA
200 DATA 10,30,50,70,90,100,140
210 DATA 11,71,41,101,131
220 DATA 11,71,101
230 DATA 72,24,173,197,2,105,2,141,10,
212,141,23,208,141,197,2,104,64
```

Program II

```
10 REM DLI EXAMPLE 4
15 REM by Mike Rowe
20 REM MULTICOLOURED GRAPHICS 0
100 GRAPHICS 0
110 DL=PEEK(560)+PEEK(561)*256:REM FIN
D START OF DISPLAY LIST
120 FOR I=DL+6 TO DL+28:POKE I,130:NEX
T I:REM TELL EVERY LINE TO JUMP TO DLI
130 POKE DL+3,134
140 POKE 512,0:POKE 513,6:REM POKE IN
LOCATION OF DLI ROUTINE
150 FOR I=1536 TO 1536+45:READ A:POKE
I,A:NEXT I:REM READ IN MACHINE CODE
160 DATA 72,138,72,174,255,6,189,64,6,
141,10,212,141,24,208,141,198,2,189,11
4,6
170 DATA 141,23,208,141,197,2,238,255,
6,171,255,6,201,24,208,5,169,0,141,255
,6,104,170,104,64
180 POKE 1791,0
190 POKE 54286,192:REM ENABLE DLI
200 READ A.POKE 1623,A:FOR I=1600 TO 1
622:READ A:POKE I,A:NEXT I:REM READ IN
 24 VALUES FOR EACH LINE COLOUR
210 DATA 006,022,086,118,240,180,160,0
40,036,092,180,150,122,168,250,028,032
,080,060,140,188,070,220,160
220 READ A:POKE 1671,A:FOR I=1650 TO 1
672:READ A:POKE I,A:NEXT I:REM READ IN
 LUMINANCE OF THE CHARACTERS
230 DATA 0,2,4,6,8,10,12,14,0,2,6,6,8,
10,12,14,8,2,4,6,8,10,0,14
```

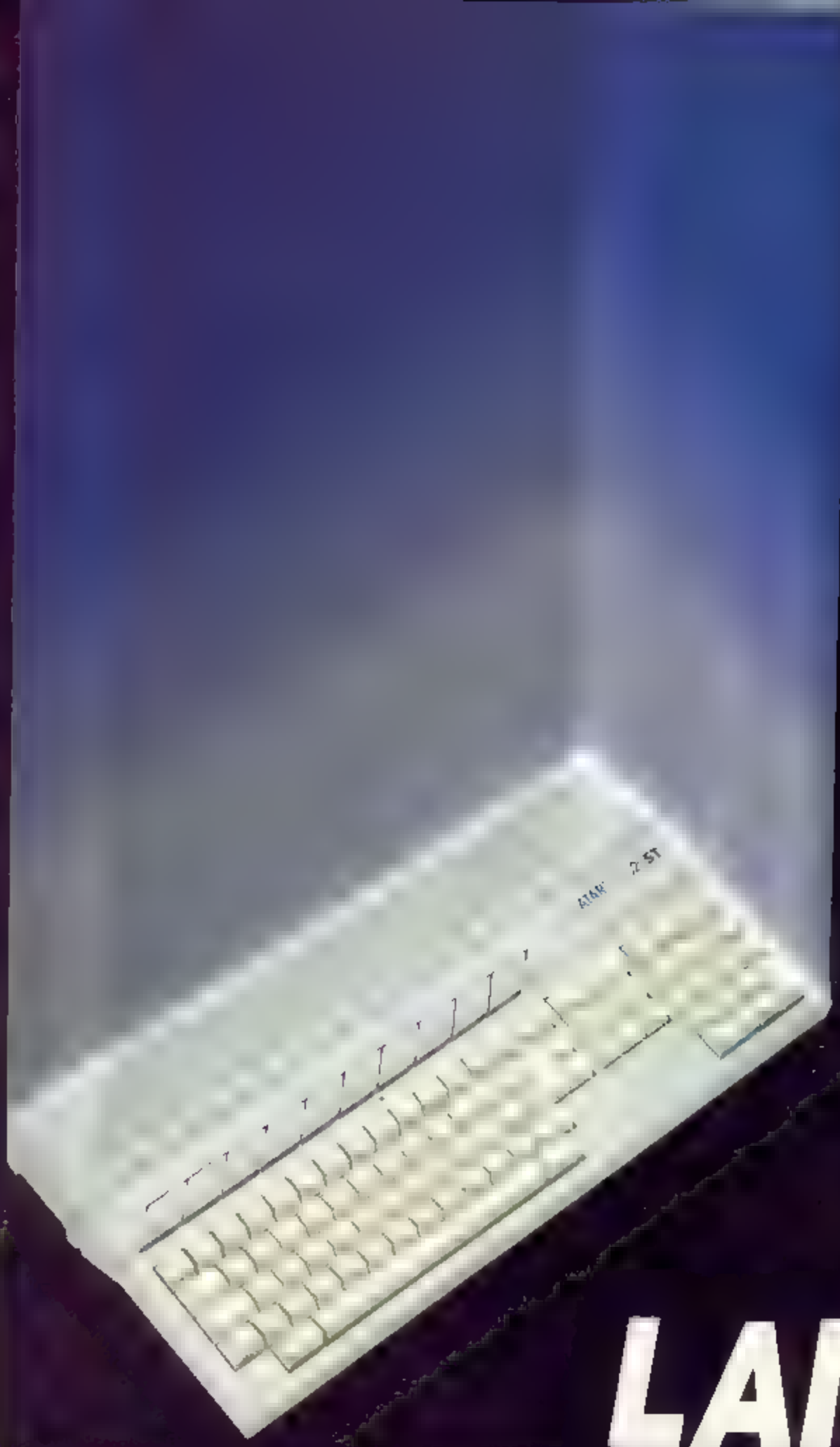
Program IV

All these examples involve altering colours on screen but other uses are just as easy As mentioned before you can change character set part way down screen

You can run sound effects or music in DLIs You can split players part way down the screen to make it appear as though there are more than eight player-missiles Finally you can use DLIs to get horizontal scrolling in different directions on different lines

Remember as far as the Atari is concerned it's not at all rude to interrupt

8-PAGE SPECIAL FEATURE



THE 520 ST HAS LANDED

THE 520ST is about to take its first public bow amid scenes never before witnessed in the micro industry anywhere in the world.

In the UK alone some 90 software houses have been working around the clock to launch programs on the ST bandwagon.

A similar number of [illegible] companies have already committed themselves to the new machine States-side – making this the biggest pre-launch build up ever seen.

Billed as revolutionary both in power and price, the 520ST has already lived up to its name in the opinion of all leading British computer magazine reviewers. According to them it is no longer just a new machine, but THE machine for 1985 and the foreseeable future.

The 520ST has caught the imagination of both the industry and the critics alike. And after its formal launch at this month's PCW Show it is expected to take the buying public by storm...

The race is on to provide a wide range of ST goodies

SOFTWARE publisher Talent is converting Lost Kingdom of Zkull for the ST

The text adventure is set in real time has hundreds of locations and a large vocabulary and many traps, tasks puzzles and mazes

The company also plans to bring out Flexfile a data management system with new techniques of user interfacing to offer a wide range of facilities without the need for programming

It will run under the GEM operating system for single file applications lists, medical records personnel histories credit and stock records on single card index

Flexfile is menu-driven, integrated with the GEM environment of icons drop-down menus and mouse and uses variable sized overlapping windows

Data entry is at the keyboard, with most other operations mouse driven Optional in screen help windows prompt the user at every stage with no programming languages required

The record card is user-defined can be of any size up to the limit of a single screen and can hold a number of fields such as numbers, dates class variables and strings

Talent intends to demonstrate both programs at the PCW Show

A MUSIC system and a flight simulator for the ST have been promised by Island Logic though no prices or release dates have been set

The music system will be similar to Island Logic's BBC and Commodore version 'but by utilising the capabilities of GEM will be a lot more elegant on a window-based ST system'

The flight simulator will make users feel they are flying over real landscapes, thanks to the ST's graphics capabilities says the company

LANGUAGES are in the pipeline at Metacomco and should be ready for demonstration at the PCW Show

The company will bring out a full C compiler ISO standard Pascal macro assembler and full Lisp compiler for the ST

An Atari development kit consisting of one language plus editor manual and example programs will retail for about £80 says Metacomco's Peter Mackeonis

EXPECTED to be available to the public in late October is Computer One's version of C with source debugger assembler and full screen Lisa-type editor making full use of GEM

The company is also considering porting its QL monitor across to the ST It should be quite impressive with windowing facilities' says Computer One's Chris Bentley

The C language package will be demonstrated at the PCW Show

OASIS Software will almost certainly be bringing out a comprehensive assembler and a monitor to operate with the assembler to simulate a logic analyser

The company may also do Atari ST versions of its graphics utilities like White Lightning and will be aiming to get at least one ST product on the market for Christmas

FIREBIRD won't talk about a 68000 version of the best selling cult game Elite — Acornsoft's hold over the name complicates any plans the BT-owned software house may have for an Atari version

But Firebird has commissioned an independent author to write an ST game it hopes will be just as good.

This substantial project, which has the working title Star Glider, should be released early next year, says Firebird's Herbert Wright.

"It has a lot more in it than the usual arcade or adventure game, including some pretty flashy graphics".

Some of the work that has already been done on it will be demonstrated at the PCW Show



THE race between UK software houses to announce the first program for the 520ST has been won by Microdeal of Cornwall. It has pipped some 80 other companies to the post with the news that its arcade adventure game, Lands of Havoc is to be released this September.

This came only a matter of weeks after Atari made development systems for the new machine available.

Atari User asked Microdeal's John Symes how his company was able to be so quick off the mark.

"Lands of Havoc was already available for the Commodore and the QL. We expanded and although we took a year to develop the game the program was written on a Vax mini computer so we could easily adapt it for the Atari.

"It was the success of the original versions which resulted in moving over to the 520ST. Atari asked us to bring the game to them," revealed John Symes. "They must have been impressed because once they saw what it was like they agreed to provide us with a development system."

Lands of Havoc boasts 2,000 screens. The object is to bring about the downfall of the Dark Lords who have turned the once bountiful land into a place of desolation.

The disc costs £19.95.

QUEST International is working on two major business software packages, both conversions of proven programs.

Cash Trader, an accounting package designed for smaller businesses should be ready for demonstrating at the PCW show. The ST version is likely to cost less than the £195 price tag on previous versions.

The Padmede business control system, a fully integrated five module accounts package is two thirds ready for the ST, says Quest's Daniel McNulty.

It will cost less than the £1,245 charged for other versions.

McNulty says Quest is committed to producing business software for smaller micros and has a vested interest in designing programs for the ST.

AN ST version of its 8-bit Atari light synthesiser Colourspace is being developed by Llamasoft.

The multi-coloured special effects generator is operated by a combination of keyboard and joystick to produce the kind of light shows seen at rock concerts.

The planned synthesiser for the ST should provide even more spectacular displays says Llamasoft.

SCHEDULED to be on sale early next year is an "extremely large and complex game" for the ST from Martech.

The program is "very heavily into graphics capabilities of the 520ST, and involves several simulations in a war type scenario", a spokesman said.

A NEW page make-up system for the ST to be called the Fleet Street Editor is being developed by Mirrorsoft.

The company says it will drive a full phototypesetting system and will include full graphics and the ability for users to develop their own illustrations.

Due for release in March 1986 and costing in the region of £60 it has been developed by Jill Zaum who was primarily responsible for the software being used to generate page make-up for the Mirror Group of newspapers.

Mirrorsoft state they are definitely planning further developments for the ST believing it to be a major machine in 1986. A flight simulator is already planned.

PROGRAM development aids for professionals and the serious hobbyist are on the way from GST Computer Systems.

The company is porting its successful C compiler, macro assembler and linker from the QL.

The first ST product will encompass all three components and the company is also likely to issue the macro assembler and linker together at a later date says GST's Chris Sheybeler.

Prices should be announced at the PCW Show.

The firm is almost certainly going to produce a low cost GEM toolkit which should be out before Christmas and has plans for cross compilation tools to help the smaller software houses.

A POWERFUL communications package available from late September is promised by Kuma Computers.

The all encompassing software will handle all types of electronic communications including MicroLink, Telecom Gold, bulletin boards, Prestel and file transfer.

Also available at the same time will be word processing, spreadsheet and database software with some very nice features, says the company.

Kuma has been working in 6800 machine code for a couple of years and is really impressed with the 520ST.

Languages and other tool type software is well along the pipeline too, the spokesman said.

The first Kuma products for the ST will be demonstrated at the PCW Show.

Watch Atari User every month for all the latest ST news



How an ST game is born

A FORMER miner who first became interested in computers through playing arcade games in pubs is the author of Microdeal's Lands of Havoc.

Steve Bak of Mansfield graduated from zapping aliens to writing complex programs in six machine languages.

Now his former credits include the Cuthbert series – well known to Dragon and Commodore 64 users – and Scramble for the Tandy colour computer.

But how did he go about creating a program such as Lands of Havoc? Bak told *Atari User*.

"The first stage involves a lot of sitting down and thinking while an idea comes to you. Once the idea is there you have to think about structuring the game so it is both interesting and progressive to play.

Presentation is the next thing to worry about, how the game should appear on screen. The story line also needs filling in.

This stage took Bak four months working 50 hours a week plus stealing a few hours of other people's time. It was at this point he realised the game would not be able to compete with many other bigger games on the market for it then only had 80 screens.

He enlarged it by developing the storyline further and eventually added another 1 920 screens. This part was not a solo effort however.

"I try to involve people who are not programmers as a scientific mind usually sees things in black and white, whereas non-programmers seem more creative and are able to add to a story" he said.

Only then did Bak start the actual programming. The original game for the Commodore took three months, the Spectrum version two, and the latest, for the ST another two.

Bak had to write routines for every step of the game.

"I do not write more than 100 lines a night so am fresh enough to go through it all at the end to ensure there are no bugs" he says.

"The last stage is fitting each small routine into a whole fully integrated program, then passing it on for others to pick to pieces.

If they believe there are any problems I sort them out and, when everyone is satisfied, turn out the final program and put it in Microdeal's hands while I sit back.

And that's how the 520ST version of Lands of Havoc was born.



IT'S A REAL GEM OF AN IDEA

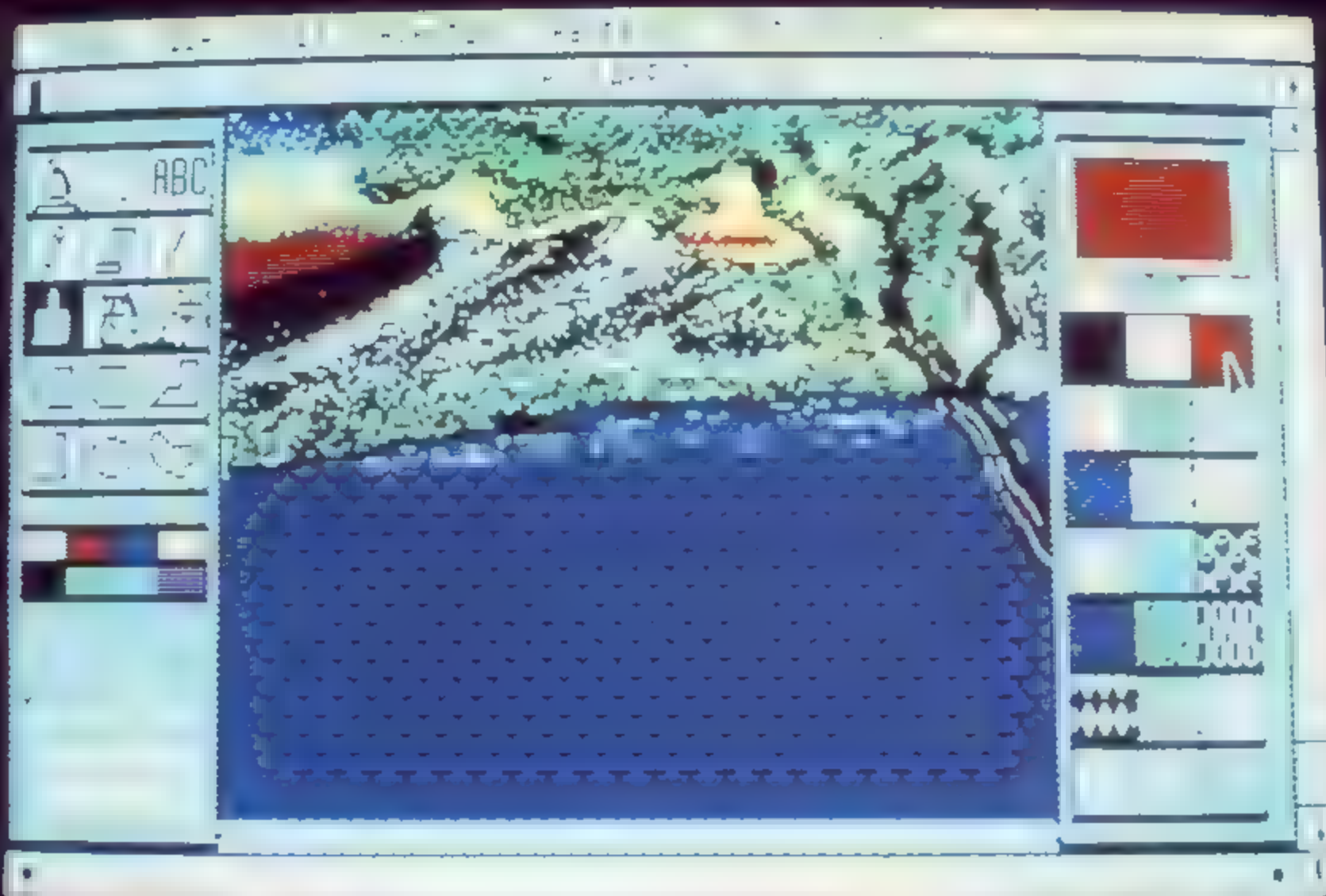
THOSE who have followed Digital Research's fortunes from the launch of CP/M in 1975 through to Concurrent PC-DOS in 1984 will appreciate that as a systems house we have so far specialised in languages and operating-system products for the industry.

However, we are taking a different approach with GEM because it is a user interface which is compatible with a wide range of applications, operating systems, languages and hardware.

GEM will have more impact on the end-user market than any other product which we or any other

---

**Frank Iveson is Director, Northern European Operations, Digital Research (UK).*



Artistic work made easy with GEM applications packages

By FRANK IVESON

software house have so far produced

A work ng def nit on of the term user nterface s the repertory of commands a user needs to know to make his or her mach ne work to sat sfact on

Command repertories wh ch requ re the memor sat on of obscure sequences of keystrokes are d.ff cult to retain and the fu power of the system may never be fully appreci-ated by the non-techn ca user

This s true of the command structures of CP M MS DOS PC DOS and especia ly of some variants of un x wh ch contain certa n innocent look ng commands which can destroy the ntegrity of the system if used at the wrong t me

There is also confusion among users who regu arly work at different mach nes Often a user has to nterrupt work to decide if the command he or she s about to enter does in fact belong to the system n use

More resistance to persona computer use stems from the obscur ty factor than any other non cost consider at on especia y among women

Menu-driven applicat ons are a so affected by obscur ty Menus provide more c ues than commands but a major difficulty for the novice is the d sappearance of the subject matter from the screen while choosing a menu option Even for experienced users th s causes cont nu ng frustra-tion with the software Users are ready for something better

The GEM user interface remed es these frustrat ons and e im nates obscurity More than 50 software houses have stated their intention to publish GEM based packages by the end of the current year.

Among these are Chang Labs Compsoft, Pegasus, Thorn EM Computer Software Letraset Infocom and ABC Software

The ava ab e GEM applicat ons nclude GEM Desktop which replaces operating system com mands an advanced word processor GEM Write graphics programs such as GEM Graph and GEM Draw and several business packages inc uding SPI s well known Open Access suite

The 520ST is now shipping with Desktop GEM Pa nt and DR Logo under GEM GEM Paint s a draw ng and design package and DR Logo is the D g tal Research version of Logo

wh ch won a European computer press award presented last year by West Germany s Chip magazine

The fundamental research beh nd the GEM concept was done in the early 70s by Xerox PARC n the US and was first mplemented on Xerox s Star network and later by Apple on Lisa and Macintosh GEM s therefore based on a long h story of user experience

Xerox s recent comm tment to GEM is a further indication of the matur ty of the product, and rein forces the approach of th s spec a interface as an ndustry standard

GEM Desktop, the operating system metaphor is the f rst GEM applicat on that most users will come across. Visua y ts screen resemb es a bird s eye v ew of a desk with documents fo ders d sc dr ves and a rubb sh b n These objects are called icons

Analogues of rea world accessories such as calculators and clocks are also available At the top of the screen is a menu bar

n GEM Desktop and al other GEM applicat ons the user selects a resource by using a mouse or the cursor keys to move a po nter on the screen over an icon or desk accessory

C cking the mouse or keyboard equiva ent se ects the resource represented Mov ng the pointer to a command on the menu bar causes a sub menu to drop down into the top quarter of the screen

Thus in GEM Desktop se ecting a disc drive icon and moving the pointer to the F e command on the menu bar reveals the F e dropdown menu Click ng on the command Open in this dropdown menu d sp ays the con tents of the dr ve in a directory w ndow and the dropdown menu d sappears

The directory window conta ns more icons – named fo ders and documents representing f es and applications

By moving the pointer over a folder and click ng the folder is selected Repeating the menu bar procedure as above or double click ng opens up the folder into a second con-filled w ndow wh ch over aps the f rst and conta ns a cata ogue of the fo der contents

Pointer movements can delete or save files and groups of f es in the w ndow by dragg ng them to the rubb sh b n or to a disc drive, can change the sizes of the desktop area and the w ndows and can scroll their contents

They select the whole range of commands ava ab e in Desktop via the menu bar and dropdown menus.

No command has to be typed n or memorised Errors are explained in full in dia ogue boxes which contain opt ons for recovery

For draw ng and painting applications use of a b tpad or tab et and pen are even more nta tive to users

Hav ng mastered the simple skills of hand and eye co-ordination in mov ng the pointer with the mouse or other po nter device the user has only to become fam iar with the simp e ogic of GEM s visua command structure n Desktop to know how to get started with all other applications because GEM is a highly consistent user interface

Non GEM applications coexist with GEM applicat ons written to the same operat ng system Runn ng a non-GEM application s simply a matter of opening the appropriate application folder icon when contro is handed back to DOS and the app cation runs norma y

Co-existence is possib e because the functionality of GEM software is based on a system extension which does not interfere w th the workings of the under ying operating system

The GEM system extension and GEM software can be imp emented on any 16 and 32 bit CPU conf guration, for CP/M MS-DOS PC DOS and Concurrent DOS operating systems

GEM s appl cab lity to a wide range of hardware configurations and operating systems will help good GEM app cations to spread fast from one machine to another and/or between operating systems.

Mov ng GEM itself to anoth r machine only requires m nor modif - cations to periphera parts of the GEM software

For example, a software developer wishing to move an application written for the Macintosh s 68000 env ronment to a more popular comp ter need only imp ement minor modificat ons of subroutine cal s to convert t to GEM, followed by recomp ation for another operat ng system

Because IBM dictates in the personal computer market other manufacturers, software houses, dea ers and users all need a standard IBM compatible user nterface GEM is such a standard and it w l m grate to a l conceivable 16 and 32 bit configurations of the f.ture

n the JS amid cla ms made for Microsoft's Windows and IBM's Topview, GEM Desktop is the only mach ne independent icon based user interface on the market and selling in vo ume

ATARI S decision to bundle the 520ST with GEM has been described as a brilliant marketing ploy by UK computer market observers

This is due to the fact that GEM allows the ST to offer similar working environments to machines like the Macintosh which are more than double the price

Even the market leading IBM is getting in on the act GEM is currently available in 10 retail applications for the IBM PC

Meanwhile the number of major manufacturers who have become licensed to distribute GEM and GEM applications with their machines has risen to more than 20

Speeding applications

TO speed the deve opment of versions of GEM appl cations by manufacturers and software dev e opers Digital Research has intro duced the GEM Programmers Toolkit.

The Toolk t itself uses a GEM interface and programmers are p eased with it They expect the graph cs to be slow but in fact GEM s fast code doesn t sacrifice perfor mance

The Toolkit allows programmers to nteractively design GEM cons and other ob ects without resort ng to back of envelope ca cu ations or special cod ng W th Too kit s con editor for example the programmers paint and edit an object at the pixel evel until satisfied, and the Toolk t generates the code automat ca y

Sim arly, text for custom d a ogue boxes s nstalled simply by typing it in using any of the major West European languages whose character set s supported by the operating system in question

GEM applications are also possible in a number of high evel languages for wh ch the Toolkit can be equ pped

Demonstrat on programs may be produced in a matter of days, and full scale imp ementations w th n a few months

The Toolkit also comes with good l cens ng agreements allowing software houses and manufacturers to bundle GEM Desktop with their own applications or machines

THE ST has many remarkable features, not least of all its operating system. To most users, the ST is controlled by the GEM – Graphics Environment Manager – and that is the means by which users will communicate with the machine.

However buried away from s ght is the TOS Tramiel Operating System or what most people understand to be a DOS · disc operating system When the ST .s booted up, which at the moment is done from the TOS system d'sc the mach ne not only loads the TOS into RAM but also loads the GEM Desktop which is the screen that appears when loading s complete

JEREMY VINE digs deep into the inner workings of the Atari 520ST to explain the interaction of TOS and GEM

One OS – or two?

The name 'TOS system disc' is slightly misleading as you can see, because it contains far more than merely the TOS.

Despite the name TOS and the state of the art hardware, the DOS is in fact a virtual clone of CP/M 68k. I say virtual as there are differences wh.ch are not strictly part of CP/M and t would appear to mix in some of the better features of MS-DOS But more of that later

Des gned by Digital Research, CP/M 68k, as its name suggests s a version of CP/M which runs on a 68000 processor the chip at the heart of the ST

Now a.l th's may seem to be confusing Which is the operating system – GEM or TOS?

To understand the function of these systems it's important to realise the purpose of a DOS. Stated simply, it is a program, or more accurately a number of programs that process commands ins de the m cro

As these operations are related to accessing the disc drive, though not exclusively, the term is DOS rather than OS operating system.

The function of the DOS is to see that commands and files of data are processed and in general take away from the user the headaches of what s happening inside the machine

From the user's point of view, the DOS is a convenient method of helping h m to manage his files on disc

The means of control are by typing a command line, say, DIR, for a d rectory of fi es. But as useful as that is, systems like CP/M have not been renowned for their friendliness Command lines like

PIP B:=A:*.*

are not quick to type, nor are they immediately obv ous. The above command line merely te ls the system to copy all files from disc dr ve A to dr ve B And this s what salesmen have called user-friendly systems . . .

To make life easier, these functions of a DOS copying, formatting, and so on are presented by a GEM system 'n pictures, or to be more accurate, icon graphics.

Just point the mouse, drag the icons, click and the files are copied OK, so far, but if the GEM system does all this why bother with the TOS? Well it's not quite as simple as I've made out so far.

The TOS is far more complicated and those develop ng professional software will need the command facilities of TOS to probe the inner depths of the machine

Unfortunately for the enthusiastic user, Atari has not made th s easy and there s no straightforward method of entering TOS

But more importantly, the TOS is THE operating system of the ST GEM is merely a second level operating system which is under the control of TOS and the ST

GEM DOS, also developed by Dig tal Research, needs certain requ rements in order to work

At least 128k of RAM is needed and of course the 520ST meets this more than adequately. This requirement explains why the 130ST 128k RAM – has not and might not be released

Atari has the intention of plac ng the TOS and GEM system n ROM, within the machine This would of course release valuable space within the memory and increase speed

Although the requirement is for a minimum 128k, the TOS and GEM Desktop together on the system d sc account for around 200k of code This also explains why the mach.ne takes about 30 seconds to boot.

The TOS is an interesting beast as it is not quite one thing or the other

A first glance at it suggests that it is merely a copy of CP/M 68k and considering DR's invo vement n the entire package GEM and LOGO – this would hardly be surprising.

But unlike CP/M 68k the filing system can be hierarchical, which is a definite improvement. This feature is reminiscent of MS DOS and is more than just a nice touch

The GEM Desktop allows the user to open different folders for storage of files. These folders are in effect sub-directories under the ma'n direc tory

This can be seen if opening a folder from within a present directory. The window display shows the contents within that folder – sub-directory and clos ng the window returns the

---

** Jeremy Vine is a freelance writer and author of several books including one on the Atari ST, The ST Companion*

user to the directory above In this way a hierarchical directory structure can be created

As GEM has this structure the parent DOS – as I w refer to TOS – also has a hierarchical nature So it s more than ust cosmetic Creating directories with n d rectories s a conven ent method of splitt ng up and find ng f es.

But what else happens when you boot up the machine with the system disc?

The purpose of booting the ST is not on y to oad TOS and GEM but to in tialise the entire system and carry out certa n status checks

These determ ne what kind of monitor s being used mono colour and so on whether there are applicat ons in cartridge memory that can be run, that s a cartridge is inserted sett ng var ous reg sters to default values, and a host of other vita functions

Of course this is transparent to the user and a l you w see is the pretty desktop d sp ay once booted or the part cular app cation if us ng a cartridge

The status of the desktop can be saved at any point and this is stored in a file ca led DESKTOP INF This contains all the startup conditions of the desktop, these being the number of w ndows open – if any – the r positions on the screen, which drive(s) to access and the labels assigned to the disc dentifiers.

It also provides information to the system about the way in which an app cation should be run This



information is set up by the user with the INSTALL APPLICATION option on the desktop screen

And that just about concludes this brief look at the TOS and GEM

Fortunately for the user, these two systems work in unison and together provide a powerful and easy means of control over the main operations of the micro.

The overall manager is the TOS, with the GEM system as a second level operating system

GEM is the friendly face of the ST and the one part of the ST al users will come to know and understand well, but behind the cons and windows is another system wh ch maintains order within the machine

A case of two systems in perfect harmony - well, that's the theory anyway . .

American software on the move

NEWS of exc t ng software be ng deve oped for the Atar ST s beginn ng to f ter through from the U ted States

Noted producer of the best se ng DB Master database Stoneware has reached an agreement with Atar Corp to deve op a new f ng program for the ST The company promises it w l be extreme y easy for the entry evel home or business user

Users w l be ab e to select co ours and change fonts as we as lay out f es to su t nd v dual needs

M crobits is deve oping the Omega te ecomm nications package for the ST and existing 8 b t Atar computers It w l have cons w ndows and pu down menus and w use e ther a mouse or oyst ck

The 16 b t program is expec ted to cost about $50 Microbits is a so deve oping a 3D batt e zone game for the ST

Spinnaker Software expects to have eight products for the ST shortly These are be eved to be adventure games Infocom is p anning to convert its entire ine of text adventures

And Sierra On ine intends to bring out top se ng favour ites King s Quest and Ult ma II for the new machine

Getting in first

AN enterprising UK distributor went Transatlantic to ensure it wou d be the first company to be able to de iver software for the 520ST Faced with the prospect of shortages here for some t me to come Software Express arranged to mport programs from Haba Systems of Vannuys California tself break ng new ground as the n tia company to produce software for the new machine States-side

The distributors first consignment which was due to arrive n August ncluded Haba Check Minder HabaCom and Haba Hippo C'

Check Minder is a money manager program which enables the user to monitor income and expenses and prepare tax returns.

The second HabaCom s a telecommun cat ons program wh ch supports termina emu ation direct ink to the com puter and VT100 TTY/CRT and fu l/ha f duplex baud rates

Haba Hippo C' the th rd program is a complete an guage system consisting of comp ler assembler and linker t supports GEM DOS cal s and functions.

Depending on the rate of exchange between the two countr es prices for Check Minder and HabaCom are expected to be around £50 while Hippo C w ll cost in the region of £60

This month Software Express s expecting delivery of two more programs HabaWord a word processor w th arge document capab l t es and HabaCa c a versatile spreadsheet Prices have yet to be fixed

The company is currently negotiating for more American software for the ST but the deals have yet to be finalised



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MACINTOSH v F16 v 520ST

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	APPLE MACINTOSH	APRICOT F16	ATARI 520ST
			YES
	128K		512K
	512K		1MB
	Apple		GEM
	ES		YES
	ES		YES
	ES		YES
	NO		YES
	ES		YES
	ES		YES
	YES		YES
	NO		YES
	NO		YES
	68000		68000
	Mac OS		GEM
			512K
			3.5"
	Macintosh		512K
			640 x 400
	Single Button		Two Button
	NO		YES
	NO		YES
	NO		YES [new]
	NO		YES
	NO		YES
	NO		YES
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FEELING a bit peckish one afternoon, Horace, a friendly Blob creature, wanders off in search of food. There's not a bite to eat to be found anywhere, so after a short while he decides to risk entering the maze monsters' den.

He's in luck, the ground is covered with crumbs left over after one of their great feasts. The sight of all those tasty morsels makes Horace completely forget about the monsters until they start to chase him.

Can you help Horace collect the crumbs and avoid the monsters? Be careful, though – the monsters are out to make a meal of Horace if they can catch him . . .

Maze Munch is a fast arcade game to sharpen up your reflexes and get the adrenalin flowing. You start with three lives on screen one and the difficulty increases with each screen cleared. Your best score is recorded in a high-score table.

If you find it too easy or too



Wazo Wurst

If you've got an appetite for a fast moving maze game then help Horace munch the morsels in this action-packed game by ROLAND WADDILOVE

hard, the difficulty can be changed by altering L in line 4210. The higher the number the harder it is.

There are several features to interest programmers, so it's not just for games players. A short machine code routine is used for all printing. This prints the multicoloured characters used by directly writing to screen RAM.

If you want to see how it works you can use Kevin Edwards' disassembler which was in the July issue of *Atari User*. The code is stored in page 6 in the memory starting at 1536.

A fast tune accompanies the high-score table, instructions and title page

The high-score routine shows how to sort numbers and strings in Atari Basic.

The program has been broken down into short subroutines as usual and is as structured as possible. A title at the start of each subroutine describes its function so it should be fairly easy to follow.

VARIABLES

C-H	The monsters coordinates
L	Level of difficulty
X,Y	Your coordinates
SCREEN	Screen number
DOTS	Number of dots left
OK	A flag to show whether you're OK
NAME$(50)	Names in the high-score table
HI(5)	High scores
A(19,14)	A copy of what s on the screen

```
10 REM *     MAZE MUNCH      *
20 REM * BY ROLAND WADDILOVE *
30 REM *   (C) ATARI USER    *
40 GOSUB 9000 REM Initialise
50 GOSUB 8500.REM Instructions
100 GOSUB 4000:REM Score table
150 GOSUB 5000:REM Draw maze
160 GOSUB 6000:REM Start
200 GOSUB 1000 REM Move man
220 GOSUB 1500 REM Move ghosts
300 IF OK AND DOTS THEN 200
310 IF OK THEN GOSUB 7500
320 IF  NOT OK THEN GOSUB 7000
330 IF LIVES THEN 150
350 GOSUB 4500:REM Hi score
400 GOTO 100.REM Another game
500 END
1000 REM ------ Move Man      ----
1060 S STICK(0):I=X (S=11)+(S=7):J Y-(
S 14)+(S 13)
1061 IF I<0 THEN I=I+20
1062 IF I>19 THEN I=I 20
1065 IF A(I,J)=4 THEN Z=USR(15536):DOTS
=DOTS-1:SOUND 0,60,10,8
1070 IF A(I,J)<>3 THEN Z=USR(1604,N,Y,
A,I,J,2):X=I:Y=J.A(X,Y) 0
1080 IF (X=C AND Y=D) OR (X=E AND Y=F)
 OR (X=G AND Y=H) THEN OK=0
1100 SOUND 0,0,0,0
1200 RETURN
1500 REM ----- Move ghosts -----
1550 IF PEEK(53770)>L THEN SOUND 1,0,0
,0:GOTO 1620
1560 I=C+(X>C) (X<C).IF A(I,D) 3 THEN
I=C
1580 J=D+(Y>D) (Y<D):IF A(I,J)=3 THEN
J=D
1590 Z=USR(1604,C,D,A(C,D),I,J,1):C=I:
D=J:SOUND 1,121,10,4
1600 IF X=C AND Y=D THEN OK=0
1610 RETURN
1620 IF PEEK(53770)>L THEN SOUND 2,0,0
,0:GOTO 1700
1630 I=E+(X>E)-(X<E):IF A(I,F)=3 THEN
I=E
1640 J=F+(Y>F)-(Y<F):IF A(I,J)=3 THEN
J=F
1650 Z=USR(1604,E,F,A(E,F),I,J,1):E=I:
F=J:SOUND 2,162,10,4

1660 IF X=E AND Y=F THEN OK=0
1670 RETURN
1700 IF PEEK(53770)>L THEN SOUND 3,0,0
,0.RETURN
1710 I=G+(X>G) (X<G):IF A(I,H)=3 THEN
I=G
1720 J=H+(Y>H) (Y<H):IF A(I,J)=3 THEN
J=H
1730 Z=USR(1604,G,H,A(G,H),I,J,1):G=I:
H=J SOUND 3,193,10,4
1740 IF X=G AND Y=H THEN OK=0
1800 RETURN
4000 REM --    Score table     --
4010 GRAPHICS 2:SETCOLOR 2,0,0:POKE 75
5,0
4020 N=PEEK(88)+256*PEEK(89):Y=1
4030 MAZE$="  HIGH SCORES"
4032 FOR I=1 TO 12
4034 POKE N+I,ASC(MAZE$(I,I))+32
4036 NEXT I
4040 N=N+20
4050 FOR I=1 TO 5
4055 POKE (20*I+N),I+16+192
4060 FOR J=2 TO 11
4070 POKE (20*I+J+N),ASC(NAME$(Y,Y)) 3
2
4075 Y=Y+1
4080 NEXT J
4082 T$=STR$(HI(I))
4084 FOR J=1 TO LEN(T$)
4086 POKE (20*I+13+J+N),ASC(T$(J,J)) 3
2+192
4088 NEXT J
4090 NEXT I
4100 ? "     Press Fire Button"
4200 GOSUB 8000
4210 (  50 LIVES=3:SCREEN=1):POKE 1682,0
:POKE 1683,0
4300 RETURN
4500 REM ----- High scores -----
4505 FOR I=0 TO 3:SOUND I,0,0,0:NEXT I
4510 N=PEEK(40811)-16+10*(PEEK(40810)-
16)+100*(PEEK(40809)-16)+1000*(PEEK(40
808)-16)
4520 IF N<HI(5) THEN RETURN
4530 GRAPHICS 0:SETCOLOR 2,0,0
4540 ? :? :? "Well done, you're in":?
:? "the high score table."
4550 ? :? :? "What is your name ",
4560 INPUT T$
4565 IF LEN(T$)<10 THEN T$(LEN(T$)+1)=
"          ":REM 10 spaces
4570 HI(5)=N:NAME$(4)=T$
4600 FOR I=5 TO 2 STEP -1
4610 IF HI(I)<HI(I-1) THEN 4650
4620 T$=NAME$(I*10-9,I*10):NAME$(I*10-
9,I*10)=NAME$(I*10-19,I*10-10)
4630 NAME$(I*10-19,I*10-10)=T$
4640 N=HI(I):HI(I)=HI(I-1):HI(I-1)=N
4650 NEXT I
4800 RETURN
5000 REM ----- Draw maze -----
5005 FOR I=0 TO 3:SOUND I,0,0,0:NEXT I
5008 FOR I=0 TO 100:NEXT I
5010 R=PEEK(53770)
5015 IF R<50 THEN GRAPHICS 7:SETCOLOR
0,3,6:SETCOLOR 1,13,12:SETCOLOR 2,7,6
5020 IF R>49 AND R<100 THEN GRAPHICS 7
.SETCOLOR 0,3,6:SETCOLOR 1,13,12:SETCO
LOR 2,0,6
5025 IF R>99 AND R<150 THEN GRAPHICS 7
:SETCOLOR 0,3,6:SETCOLOR 1,13,12:SETCO
LOR 2,5,4
5030 IF R>149 AND R<200 THEN GRAPHICS
7:SETCOLOR 0,0,6:SETCOLOR 1,13,12:SETC
OLOR 2,3,4
5035 IF R>199 THEN GRAPHICS 7:SETCOLOR
 0,0,6:SETCOLOR 1,13,12:SETCOLOR 2,10,
4
5040 POKE 755,0:RESTORE 5200
5050 FOR J=0 TO 14
5060 READ MAZE$
5070 FOR I=0 TO 19
5080 IF MAZE$(I+1,I+1)="*" THEN K=3:A(
I,J)=I
5090 IF MAZE$(I+1,I+1)=" " THEN K=0
5110 IF MAZE$(I+1,I+1)="." THEN K=4:A(
I,J)=4
5120 Z=USR(1604,I,J,0,I,J,K)
5150 NEXT I
5160 NEXT J
5200 DATA **********************
5210 DATA *........**.... ...*
5220 DATA *.******.**.******.*
5230 DATA *.*    *....*    *.*
5240 DATA *.******.**.******.*
5250 DATA * . . ...**. . . . *
5260 DATA **.***.******.***.**
5270 DATA    .* *. . .   * *. .
5280 DATA **.***.******.***.**
5290 DATA *  .... .**  ......*
5300 DATA *.******.**.******.*
5310 DATA *.*    *  . *    * *
5320 DATA *.******.** ****** *
5330 DATA *. . .  .** . . . .*
5350 DATA **********************
5400 RETURN
6000 REM ------- Start ---------
6010 C=10:D=1
6020 E=18 F=13
6030 G=1:H=13
6040 Z=USR(1604,C,D,1,C,D,1)
6050 Z=USR(1604,E,F,1,E,F,1)
6060 Z=USR(1604,G,H,1,G,H,1)
6070 N=1 Y=1:A(1,1)=0
6080 Z=USR(1604,N,Y,2,N,Y,2)
6100 ? "Score:                    Hig
h:";HI(1)
6120 ? :? "Screen:";SCREEN;"
       Lives:";LIVES;
6150 OK=1:DOTS=117
6200 RETURN
7000 REM ------ Caught ------
7010 LIVES=LIVES-1
7020 Z=USR(1604,N,Y,1,X,Y,1)
7030 SOUND 1,0,0,0:SOUND 2,0,0,0:SOUND
 3,0,0,0
7040 FOR I=100 TO 255 STEP 2
7050 SOUND 0,I,10,4:SOUND 1,I/2,10,I:S
OUND 2,I/4,10,2:SOUND 3,300-I,10,1
7060 NEXT I
7200 RETURN
7500 REM ------ Cleared maze -----
7510 FOR I=0 TO 200:NEXT I
7520 SCREEN=SCREEN+1:L=L+20
7600 RETURN
8000 REM ---------  Tune ---------
8040 J=1:SOUND 2,193,10,3
8050 RESTORE P(J):SOUND 1,C(J),10,4:IF
 J=9 THEN J=0
8070 READ I:IF I=0 THEN J=J+1:GOTO 805
0
8080 SOUND 0,I,10,10
8100 IF PEEK(20)<6 THEN 8100
8110 POKE 20,0:IF STRIG(0) THEN 8070
8120 RETURN
8200 DATA 85,96,76,96,72,96,64,76,96,6
4,76,96,64,76,0
8220 DATA 64,72,57,72,53,72,47,57,72,4
7,57,72,47,57,0
8240 DATA 64,57,72,64,76,72,85,76,96,8
5,96,102,114,128,144,153,173,193,173,1
53,144,128,114,102,0
8500 REM -     Instructions     -
8510 GRAPHICS 2:POKE 755,0
8515 SETCOLOR 2,0,0:SETCOLOR 4,0,0
8520 MAZE$="MAZE MUNCH"
8530 N=64+PEEK(88)+256*PEEK(89)
8540 FOR I=1 TO 10
8550 POKE N+I,ASC(MAZE$(I,I))-32
8560 NEXT I
8565 ? "                Atari  User"
8570 ? :? :? "          Press Fire But
```

```
tan";
8575 GOSUB 8000
8580 GRAPHICS 0:SETCOLOR 2,8,0:SETCOLO
R 4,8,6:POKE 755,0
8585 POSITION 9,2:? "M A Z E    M O N
C H"
8590 ? :? :? "Hungry Horace has entere
d the maze    monster's den in search
of Munchy"
8600 ? "morsels left after the great f
east."
8610 ? :? "These tasty titbits are a d
iner's     delight and sought by all t
he Blob    creatures."
8620 ? :? "Can you help Horace collect
 these     crumbs? Be careful though,
the maze"
8630 ? "monsters will make a meal of y
ou if   they catch you!"
8640 ? :? :?  ? "Press Fire button..."
8700 GOSUB 8000
8800 RETURN
9000 REM ----- Initialise --- --
9005 POKE 755,0
9006 RESTORE 9300:FOR I=0 TO 187:READ
J.POKE 1536+I,J:NEXT I
9010 RESTORE 9000
9020 DIM MAZE$(20),A(19,14),P(9),C(9),
NAME$(50),MI(5),T$(10)
9025 FOR I = 1 TO 5:NAME$(I*10-9,I*10)="
ATARI USER":MI(I) 600-100*I.NEXT I
9040 FOR I=1 TO 9:READ J:P(I)=J:READ J
 C(I) J:NEXT I
9050 DATA 8200,173,8200,173,8220,238,8
220,238,8200,173,8200,173,8220,238,822
0,238,8240,128
9090 FOR I 0 TO 49
9094 READ J:POKE 17244+I,J
9096 NEXT I
9100 DATA 0,0,0,0,0,0,0,0,0,0
9110 DATA 5.00,25,100,23,212,31,244,16
,132
9120 DATA 10,160,30,152,42,168,43,232,
10,168
9130 DATA 255,255,192,3,197,83,192,3,2
55,255
9140 DATA 0,0,0,0,2,64,0,0,0,0
9200 RETURN
9300 DATA 255,63,255,63,0,0,21,85,21,8
5
9310 DATA 15,255,63,253,255,245,85,84,
85,80
9320 DATA 104,240,24,173,67,6,105,5,14
1,67,6,173,66,6,105,0,141,66,6,216
9330 DATA 74,74,74,74,24,105,16,141,10
4,159,173,66,6,41,15,24,105,16,141,105
9020 DATA 159,173,67,6,74,74,74,74,24,
105,16,141,106,159,173,67,6,41,15,24
9030 DATA 105,16,141,107,159,96,66,67,
104,104,104,133,212,104,104,133,213,10
4,104,32
9040 DATA 92,6,104,104,133,212,104,104
,133,213,104,104,24,240,0,170,169,0,10
5,10
9050 DATA 202,208,251,105,188,133,214,
169,6,133,215,166,212,164,213,165,88,1
33,212,165
9060 DATA 89,133,213,152,240,15,165,21
2,105,200,133,212,165,213,105,0,133,21
3,136,208
9070 DATA 241,138,10,101,212,133,212,1
65,213,105,0,133,213,162,5,160,0,177,2
14,145
9080 DATA 212,200,177,214,145,212,230,
214,230,214,136,165,212,24,105,40,133,
212,165,213
9090 DATA 105,0,133,213,202,208,226,96
```




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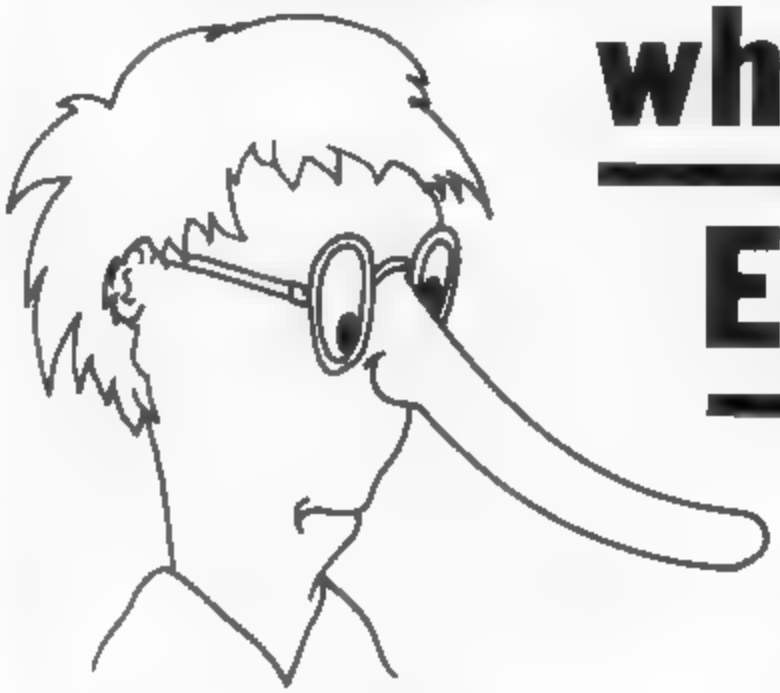
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EOR–A way to find out who's telling the Exclusive truth



MIKE BIBBY continues his series on binary numbers

IN the last article we looked at the AND and OR operations on binary numbers – logical operations, as they are known. These were simply rules for combining numbers bit by bit. We shall continue our exploration this month with a look at the EOR operation.

EOR stands for Exclusive OR – sometimes people call it XOR Either way t s the same thing EOR is a variant on the way we normally use the term OR

For example if I say

Mike OR Pete wears glasses

th s s true if Mike wears g asses OR Pete wears glasses OR both Mike *and* Pete wear g asses

Now t s th s ast case of OR we re nterested in where they both wear glasses EOR works just l ke OR up to this point However EOR does not allow' both of them to wear g asses. Either one does or the other but not both

To put t another way the one who wears the glasses does so *exclusively* f both are wearing glasses then while

Mike OR Pete wears glasses

would be true

Mike EOR Pete wears glasses

would be a downr ght ie

We could sign fy that a statement is true with the letter T and use F for fa se At schoo our teachers used ticks for truth and crosses for fa se Since we re us ng computers though we ll use numbers 1 will denote true and 0 w ll denote false We ve chosen 1 and 0 because they fit in so well with the binary system

So, in the above example, if Mike has g asses we can give Mike the va ue 1 If Pete hasn t glasses we can g ve Pete the value 0 Tab e shows the idea, applied to each combination of spectacle user The ones and zeros are known as truth values states or cond tions

As you can see, there are four possible cases as far as Mike and Pete wear ng glasses are concerned neither can wear them as in case 1 where both Mike and Pete has 0 value

Then again, Pete may wear them (1) whereas M ke does not (0) case 2, and so on

If you look carefully at the numbers involved in al four cases, you see that we ve got four pairs of bits we can comb ne Each pair of bits is made up of the 'truth bit' for Mike and the truth bit for Pete

What I ve done n Table I s to comb ne these pairs for all four cases in accordance with our OR rules. We ve stored the resu t in a third

	Wears glasses		
	Mike	Pete	
Case 1	0	0	neither wears glasses
Case 2	0	1	Pete wears glasses
Case 3	1	0	Mike wears glasses
Case 4	1	1	Both wear glasses

Table I

Mike wears glasses	Pete wears glasses	Mike OR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	1

Table II

Mike wears glasses	Pete wears glasses	Mike AND Pete wears glasses
0	0	0
0	1	0
1	0	0
1	1	1

Table III

column

We call such a table a Truth Table In this case it's the truth table for OR We can use it to work out the result for any OR combination of two bits All we have to do is to find the row that starts with the two bit values we're combining and then look in the third column for the result

Table III shows a similar table for

Mike AND Pete wear glasses

Again the first two columns are identical, covering all four possible cases. The third column combines them according to the AND rules

Look again at Table II. This corresponds in a sense to our binary rule for OR you get a 1 if either or both bits you combine contain a 1

However if when talking about Mike and Pete you mean OR in the exclusive sense, EOR, then the combination of Mike wearing glasses and Pete also wearing glasses would have to be false This is because EOR means either one or the other wears glasses, but not both - it's *exclusively* one or the other

If we do mean EOR in this exclusive sense we'd write our statement about them as

Mike EOR Pete wears glasses

Its Truth table is given in Table IV

Mike wears glasses	Pete wears glasses	Mike EOR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	0

Table IV

If you look at each case, you'll see that the only time Mike EOR Pete is true is when either one or the other wears glasses, but not both (or neither)

More formally, if both bits are 0, or both bits are 1 the result is 0 If either is 1 and the other is 0 the result is 1

To put it another way, if the bits are identical the result is 0, otherwise the result is 1

Let's have a look at how we EOR binary pairs of numbers. It's the same as for OR and AND just apply the rules for EORing to each pair of bits in succession. For example

```
          %10110110
EOR       %11100101
gives     %01010011
```

Take a look at what happens when you EOR a number with zero.

```
          %10110110
EOR       %00000000
gives     %10110110
```

that is, when you EOR a number with zero it leaves that number unchanged Also something interesting happens when you EOR a number with itself

```
          %10110110
EOR       %10110110
gives     %00000000
```

Whenever you EOR a number with itself, the result is zero This is as it should be remember, when you EOR two identical bits the result is zero

Now EOR has a property which makes it quite useful – let's look what happens when we take a number, EOR it with a second number and then go on to EOR the result once more with that second number

```
First number          %10101101
Second number  EOR     %01101000
Result                %11000101
Second number  EOR     %01101000
Final result          %10101101
```

As you can see, the first number has magically re-appeared! This always happens when you EOR twice with the same number as, in a sense, the two EORings cancel each other out

Table V summarises the process for all four possible pairs of one bit numbers. As you can see, for all the cases the final resulting bit (when the first bit has been EORed twice with the second) is identical to the first bit

Another way to think of it is that we are doing

first number EOR second number EOR second number

Taking the underlined part first, we've already seen that any number EORed with itself gives a zero result. So what we're really doing is

first number EOR 0

which, as we've also seen, must leave just the first number, since EORing with zero leaves a number unchanged

All this may seem rather abstruse, but actually it's quite useful. In fact we tend to use AND, OR and EOR quite often in graphics, particularly in animation

To simulate movement we frequently print something on the screen, then after leaving it there for a while to register on the eye, we blank it out and print it in a new position and so on

Sometimes we blank the character out by printing it again in the same place but in the background colour

We can, however, use EOR If we use EOR to place our character on the screen – never mind exactly how for the moment – when it comes to wanting rid of it, we can just repeat ourselves.

That is, we just EOR the character on again. As we've seen, the effect of two EORs is to cancel each other out. In this case, they cancel out to the original background – and the character disappears

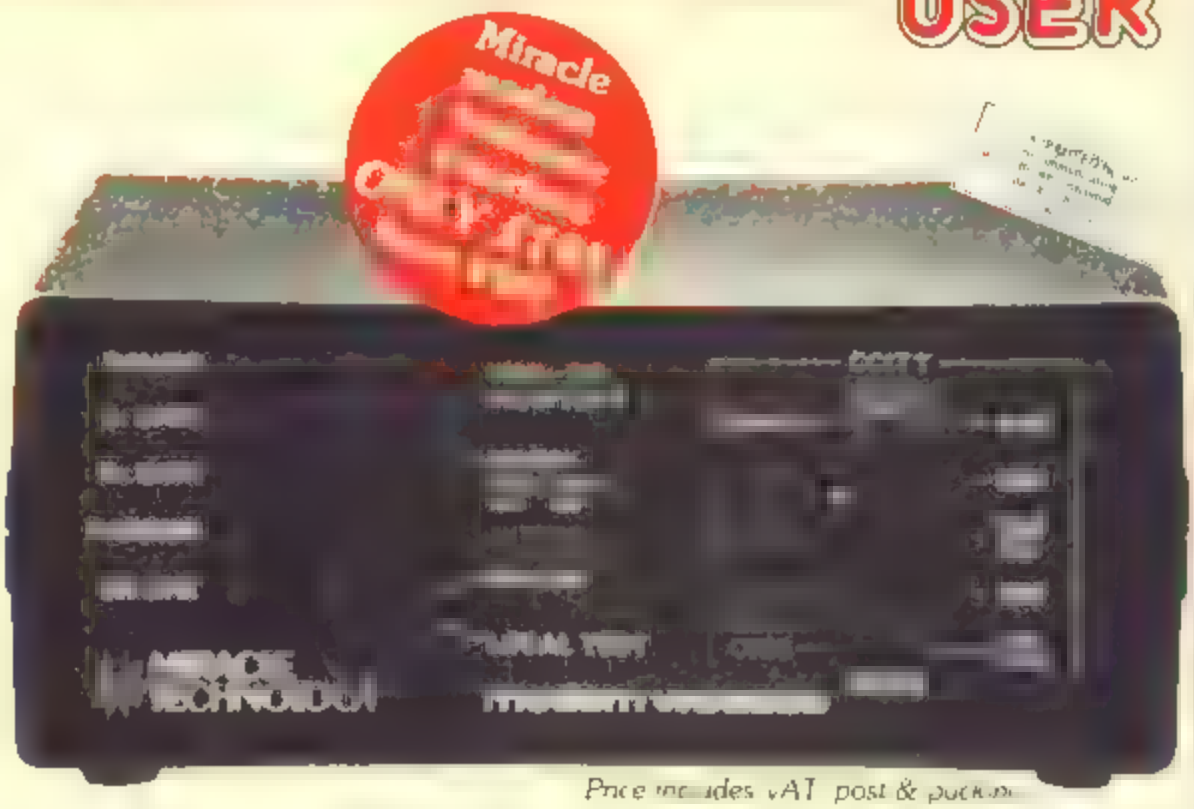
The point is, logical operators, as AND OR and EOR are known, can be invaluable to both the Basic and machine code programmer.

● *Next month we'll take a brief look at the idea of masks.*

First bit	Second bit	Result 1st EOR	Second bit again	Result 2nd EOR
0	0	0	0	0
0	1	1	1	0
1	0	1	0	1
1	1	0	1	1

Table V

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But first, send for the Miracle package – and enter the fascinating, limitless world of communications!

Use the order form on Page 61



What it offers the Atari user...

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The number of bulletin boards is growing rapidly. New ones are springing up in all parts of Britain and all over the world, with people of like minds chatting to each other on all manner of subjects. The only snag is that the vast majority are single user boards — which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

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The modern equivalent of the telegram is the telemessage. Send it before 10pm and delivery is guaranteed by first post the following day, except Sunday. The service was intended for people phoning their message to the operator, and it costs £3.50 for 50 words. But you can now use it via MicroLink for only £1.25 for up to 350 words!

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How much it costs to use MicroLink

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Standing charge: £3 per calendar month or part

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Applicable for duration of connection to the Service
Minimum charge 1 minute
Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday, and Sunday and public holidays
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Filing charge: 20p per unit of 2,048 characters per month

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MicroLink PSS service: 2p per minute or part (300 baud) 2.5p per minute or part (1200, 75 baud

Only applies to users outside the 01 London call area

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Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 16.5p per 100 (N America £1.15 per 400 (Rest of world £2.75 per 400 Ships at sea

Deferred messages sent on the night service are subject to a 10 per cent discount

Incoming telex: 50p for each correctly addressed telex delivered to your mailbox Obtaining a mailbox reference from the sender incurs a further charge of 50p

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Screen dumps with the Atari t

WHAT a wonderful company Atari is turning out to be since J.T. took over a while ago. Just look at the range of disc drives, modems, monitors, computers, printers and so forth that are on offer today.

After swapp ng my good and trusty 800 for a 130XE recently which was a bit of a wrench I decided to go the whole hog and increase my collection of Atari paraphernalia by one pr nter The prob em was which one?

There were a number of cho ces of course from the Atar range of printers to Epson Alphacom and Star to name but a few

In the end decided to stick to the company known and oved so long Why? Well how about because they plug straight nto the back of your computer without the need for an extra interface?

But which one shou d I go for? Should it be the letter qua ty 1027? No lacking graphic abi ty What about the 1020 or the 1025 1029?

In the end I dec ded upon the new 1029 It s inexpens ve at under £200 It s capable of prnt ng five or 10 characters per inch and graphics among other th ngs as well as looking very nice

Anyway off went cash n hand and arrived home w th the beast a while later After read ng through the instruct on book a few t mes I must



confess that was a ttle d sappo n ted that could not dump a screen to the pr nter straight away

Why do I hear you ask?

Well, the 1029 s a dot matrix printer with a single pr nted line of seven dots high by 480 dots across

Only seven dots h gh? Then how do you print characters?

When n graphics mode magine seven lines high by one ine w de That s what you have to pr nt to The bottom line has the value of 1 the next ine up 2 then 4 8 16 32 and fna y 64 for the top ne

That s r ght no 128

So f you want a sing e dot on the bottom ine and a sing e dot on the top ine you print CHR$ 65, See 1 for the bottom p us 64 for the top

Now take this one step further Try to convert the top seven lines of

Program

```
19950 REM Subroutine to print a GR.8
19960 REM screen to the Atari 1029
19970 REM seven pin printer.
19980 REM Routine by Mick Reid 1985
19990 REM
20000 SCREEN=PEEK(88)+256*PEEK(89):IOC
B=1.IF OFFSET)160 OR OFFSET<0 THEN OFF
SET=0
20010 ON PEEK(1570)<>6 GOTO 20020:RESTO
RE 20040:FOR I=0 TO 171:READ A:POKE 15
36+I,A.NEXT I
20020 FOR PR=0 TO 27:CLOSE #IOCB:OPEN
#IOCB,8,0,"P:":? #IOCB,CHR$(27);"9";CH
R$(27);"0";CHR$(1);CHR$(64+OFFSET);
20025 ON OFFSET=0 GOTO 20030:FOR I=1 T
O OFFSET:? #IOCB;CHR$(0);:NEXT I
20030 DUMMY=USR(1536,IOCB,SCREEN):SCRE
EN=SCREEN+280:NEXT PR:RETURN
20040 DATA 104,104,104,10,10,10,10,141
,182,6,104,141,173,6,104
20050 DATA 141,172,6,169,0,141,183,6,1
72,54,6,24,173,94,6,105,1,141,172,6,173
20060 DATA 95,6,105,0,141,173,6,238,18
3,6,173,183,6,201,40,208,226,96,162,0,
24
20070 DATA 173,173,6,157,95,6,173,172,
6,157,94,6,105,40,141,172,6,173,173,6,
105
20080 DATA 0,141,173,6,24,138,105,6,17
0,224,37,144,221,162,0,14,255,255,62,1
74,6
20090 DATA 14,255,255,62,174,6,14,255,
255,62,174,6,14,255,255,62,174,6,14,25
5,255
20100 DATA 62,174,6,14,255,255,62,174,
6,14,255,255,62,174,6,232,224,0,208,20
9,174
20110 DATA 182,6,169,11,157,66,3,169,1
74,157,68,3,169,6,157,69,3,169,0,157,7
3
20120 DATA 3,169,0,157,72,3,32,86,228,
96
```

Program

```
10 GRAPHICS 24
20 FOR I=0 TO 319 STEP 5
30 COLOR 1:PLOT I,0:DRAWTO 319-I,191:N
EXT I
40 FOR I=191 TO 0 STEP -4
50 PLOT 0,I:DRAWTO 319,191-I:NEXT I
60 GOSUB 20000
70 END
```

1029



By MICHAEL KING

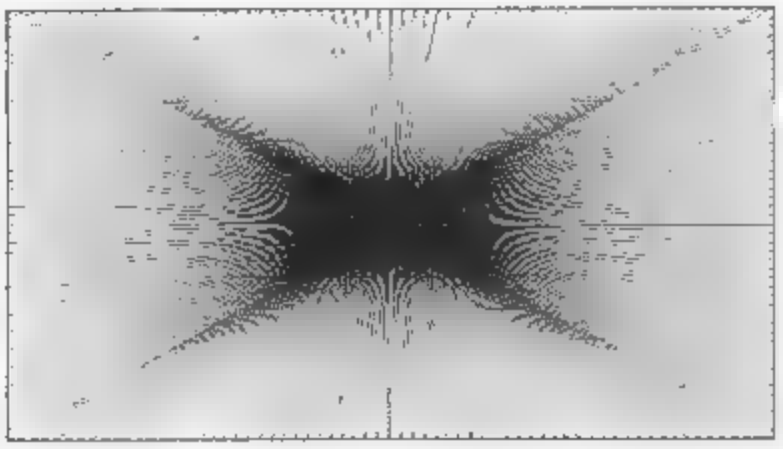


Figure 1 Printout made by using Programs and together

screen information standard 8 bit horizontal bytes to the 7 bit vertical bytes understood by the 1029 That's a lot of bit manipulation if you want to print out a whole screen

Well for all of you who have been out and parted with your well earned cash for the 1029 look no further Type in Program and save it to disc before putting it to use

This is only a subroutine and must be used together with your own program to set up your own picture screen

If you would like an example, type in Program II which will set up a graphics 8 screen with a basic design scribbled over it see Figure 1.

Just set the variable OFFSET to a value between 0 and 160 This is the offset of the picture on the paper left to right.

If you wish your masterpiece to occupy the left edge of the paper, then set OFFSET to 0 or to occupy the right side of the paper set it to 160 But for a centered picture rather nice, OFFSET should be 80

Ensure your 1029 is on and type RUN The whole screen will be dumped to the printer

PROGRAM STRUCTURE

20000 Finds the screen address sets the variable IOCB to use the IOCB number 1 and checks to see if OFFSET is within the range 0 to 160

20010 Uses a little trick that gives Atari Basic an IF THEN ELSE command If PEEK(1570) =6 (converter loaded THEN control will be passed to line 20020 ELSE the rest of line 20010 will be acted upon and the converter will be read into page 6

20020 Start of the loop that opens the printer and prints the line headers to the printer

20025 There's that ON GOTO trick again Prints the OFFSET number of blank pixels to the paper

20030 The USR call Also adds 280 (7 * 40) to the variable SCREEN to give us the next printable line

The rest of the program is the data for the converter

Addressing modes of the 68000 microprocessor

In Part II of his series examining the power of the 68000 chip at the heart of the Atari ST, MIKE COOK examines its versatile addressing modes

LAST month we looked at the instruction set of the 68000 microprocessor And, just as man cannot live by bread alone, neither can a microprocessor live by instruction alone

What g ves an nstruction set its power is the address ng modes associated with it

This s beca se an nstruction dent fies the operation to be perfor med such as add and subtract but the addressing mode explains where the operation s to be performed

The best nstruction set n the wor d is no good w thout a var ety of address ng modes

Basica y the action of an nstruc tion can be based in one of two places e ther an on chip reg ster or an off ch p memory oc ation

There are two different types on on chip reg sters n the 68000 These are the address reg sters and the data registers Off chip memory can be spec f ed w th a 32 b t address a though only 24 bits are used in the 68000

Reg sters can be thought of as temporary storage to be used while b t patterns are be ng man pu ated whereas off ch p memory is used for more permanent data as wel as stor ng the program and access ng the hardware

So why do we need d fferent types of address ng mode? The answer is to cope with different programming prob ems

The best way to understand the d fferent modes is to look at each n turn and see how they can help us

First the form most assemblers use when hand ng address informa tion for th s processor Th s consists of three basic parts

- The instruction mnemonic and engthof operat on - byte word ong word
- The source where the data s to be taken from
- The destinat on where the resu t s to be p aced

The art of programming is to t e these three th ngs together to perform as you want w thout ty ng yourse f in knots

The manner in wh ch the source and dest nat on are spec f ed s known as the addressing mode Th s calcu ates an address which is known as the effective address t s this effect ve address that s used

Let s take the s mp est addressing mode that of Reg ster Direct

This simp y uses the registers to hold the data For example f you wanted to move the data from data register D3 to address reg ster A5 you wou d use the reg ster direct address ng mode for both source and destinat on

Assemblers might d ffer in syntax but typically the form would be

MOVE W D3,A5

which means move the word 16 b ts FROM data register 3 TO address register 5

In fact there are two variants of the same mode being used here They are Data Reg ster D rect for the data reg ster and Address Reg ster Direct for the address register

The Address Register Direct address ng mode s used main y in the housekeep ng parts of a program or to operate on temporary storage areas

Now in order to write any type of program you need to be ab e to cope w th constants even if only to set up the init a va ue of a variable

A constant is a value that s known at the time you wr te the program we say that it s known at compi e t me

So when the assemb er turns a the mnemonics into the binary bit patterns of machine code nstruc tions the number we want to use s known

What happens s that the assembler places these numbers a ongs de the instructions in the body of the program The va ues to use follows immediately after the nstruc t on

Hence the name of Immediate Data Address ng ts main use is to in tialise counters or var ab es For examp e suppose we want to set up

data register D1 with the value 9 we would write

MOVE.B #9,D1

that is move the byte (8 bits) into data register D1. The # before the number tells the assembler to treat what follows as an immediate decimal value.

In fact there are two types of immediate addressing mode – Immediate and Quick Immediate. The quick mode incorporates the value into the instruction whereas the normal mode adds the value at the end of the instruction bytes.

Only limited number values can be used with the quick mode but any assembler worth its salt will choose the quick mode if the numbers are within the restricted range.

Therefore you do not have to worry too much about the difference between them.

To handle a variable you must be able to access off chip memory. Most of the time you know what address you want to use, just as in a high level language you know what name the variable is. We say the address is known at compile time.

To do this you can use the Direct Memory Addressing mode. This takes a value and compiles it next to the instruction just like the immediate mode. The difference is that when the number is used it is taken not as a value but as the address where a value is to be found.

For example, to move the value in memory location 8 into data register D4 you would use

MOVE.B &8,D4

where $ indicates that what follows is the hexadecimal value of the memory address from which to take the data.

Again there are two types of this addressing mode – Absolute Short and Absolute Long. The difference lies in how many extra bytes are used to specify the address.

Basically the short mode is used when you want to address the first or last 32k of memory – where you can get away with specifying the address in two bytes – otherwise you need the long mode which specifies the address in four bytes. Again any semi-decent assembler should choose the correct one for you.

In many cases the address of a variable is not known at compile time.

This may be where you want to apply the same operation to many different variables. In high level languages you would use an array with a fixed name and a variable subscript. In machine code you would use a form of indirect memory addressing of which there are five different variants.

Indirect Memory Addressing is therefore the most complicated of the addressing modes.

The simplest of this complex bunch is the Register Indirect mode.

In this mode a register holds not the value but the address of a value. We say that the register points to a memory location – of course before this mode is used the register must be set up to point to the area you want.

For example, suppose we wanted to clear a section of memory. Then we could set up the address of the start of our section in memory in address register A0 and then perform

MOVE.B # 0,(A1)

The brackets indicate not to use the register itself as the destination but what the register points to.

We can then increment the register, jump back and perform the same instruction. This time we clear the second byte of our memory.

We can add a constant on to the value in a register by using the Register Indirect with Displacement Addressing mode. This allows you to access memory locations up to 32k either side of that pointed to by the register.

This can be useful if we want to access a particular element of an array whose address is variable.

Note that the displacement can be zero, in which case the addressing mode would be in effect the same as the simple register indirect mode. To indicate this it is usual to place the displacement outside the brackets, so

MOVE.B # 0, # 6(A1)

which clears the byte six locations away from that pointed at by the address register.

Perhaps the most complex addressing mode of all is Register Indirect with Displacement and Index.

This works like Register Indirect with Displacement but with the addition of another value. The effective address is the sum of the displacement, the contents of an address register and the contents of a data register – the index bit. When all three have been added the result defines the location to use.

As it is quite a complex mode any example to illustrate it is going to be complex but here is one case where I have used this mode in anger.

I had a digitised picture and wanted to count how many pixels I had of each brightness level. So I set up an address register (A3) to point at the start of an array whose elements were the brightness levels and whose contents were the number of pixels at that level.

I then put the pixel brightness level into a data register (D3) and performed

ADD.B # 1, # 0(A3,D2)

This added the value 1 to the memory pointed at by the sum of A3 and D2.

The displacement was not needed and so could be zero. As there were many such arrays in my system, once A3 was primed with the correct value the same code could be used for all arrays.

There are two more modes in this section. Post-increment Register Indirect and Pre-decrement Register Indirect. They are quite a mouthful but basically are variants of the simple form of indirect addressing.

One mode *increments* the actual register *after* performing the operation and the other mode *decrements* the register *before* performing the operation.

These two modes are usually used together to form a push-down stack in memory. As any of the address registers can be used in this mode it gives us up to eight different stacks. This allows us to pass parameters to subroutines on stacks. This is just what is needed when implementing the high level language Forth.

Basically, to push data from D0 on to a stack pointed at by A5 you

would use

MOVE.L D0,–(A5)

To recover the data back into D2 then

MOVE.L +(A5),D2

As you can specify byte, word or long word operations the increment sizes are one, two and four respectively. This also allows you to process an array or string a single element at a time.

Relative addressing does not mean "Dear Aunty Flo" but is a way of specifying an address relative to the instruction in the program.

I am sure you have played Monopoly and received the card 'Go back three places'. Well, that is relative addressing, your destination depends upon where you are.

In most processors this is reserved for program branching, but in the 68000 it can be used with many different instructions.

The purpose of this is to enable you to write code that is position independent. That means that the code can run when placed anywhere in memory. This is necessary in overlay systems where memory to run programs is dynamically allocated by a memory allocation program.

Code can be moved in from disc to an area of memory when needed. It can then stay in the memory after use unless some other program needs more space in which case it is purged (removed).

As the free memory – known as a heap – is always changing it is essential that programs must be position independent.

There are two types of relative addressing – one that specifies a displacement and one which uses an index value as well as a displacement.

Normally you will access these through labels in your assembler program and the assembler will look after calculating the displacements at compile time.

The final addressing mode is the simplest one – Implied Register Addressing. The register to use is specified in the instruction. This is a catch-all mode for those instructions that alter the status register, program counter or stack pointer.

The register to use is part of the instruction itself, so will not trouble you further.

Mastering the addressing modes is 90 per cent of being a good machine code programmer and sound knowledge of what each one does is essential. As you can see, the 68000 provides a comprehensive collection of addressing modes which can be used as both source and destination in many instructions.

● *Next time we will look at the overall environment the 68000 presents to the programmer.*

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LOGO IS AN EXTENSIBLE LANGUAGE says DEREK RADBURN

WORDS and lists are what makes Logo tick. They may not be as well known as turtle graphics, but it is worth remembering that turtle graphics was developed in a word and list environment.

In Atari Logo almost all aspects of list processing are present, the exceptions being TEXT and DEFINE. The purpose of this article is to show something of what is possible in Logo using words and lists.

To begin with, Logo is an extensible language. You can make the system larger and more powerful. I will illustrate what I mean by looking at its conditional test.

Logo's test is one found in many programming languages, the IF condition true THEN do this and, optionally, ELSE do this. Let's illustrate this:

```
TO ENTER
  TYPE [What shape do you want? (S or
    T)] MAKE "KEY RC
  IF NOT OR :KEY = "S :KEY = "T [PRINT
    [You must respond with S or T]
    WAIT 50 ENTER]
END
```

All that this very trivial procedure does is to ask for some input, create a variable called KEY to hold the response, and then test the value of that variable to ensure that it's what is asked for.

There are several things to note about this. First, in this example the THEN branch is a list and the optional ELSE list is not present.

Second, input is handled by RC, ReadCharacter, which always outputs a single character word. Notice also the use of TYPE instead of PRINT: can you work out why?

Third, by using OR it is possible for IF to check two conditions and output true if either is found.

It is possible for OR to take more than two inputs. To do this OR has to be preceded by a parenthesis (and the list of conditions terminated by a closing parenthesis,).

When a Logo primitive, which normally takes two inputs, is used in this way with more than two inputs it is known as a "greedy procedure".

These might make writing procedures easier, but they have their price when things go wrong – error messages tend to be misleading.

Now one thing which is useful to have is a conditional test which allows an action to be carried out once before a test is invoked. The structure for this is DO action UNTIL condition. It is quite easy to write such a test in Logo:

```
TO DO :ACTION :CONDITION
  [illegible] :ACTION
  IF RUN :CONDITION [STOP]
  DO :[illegible]TION :CONDITION
END
```

DO takes two lists as its inputs. Let's put it to use:

```
TO SPINSQ
  DO [SQ RT 27]
END

TO SQ
  REPEAT 4 [FD 50 RT 90]
END

TO MOREP
  TYPE [Again?\ ] MAKE "KEY RC
  IF NOT :KEY = "Y [OP "TRUE] [OP
    "FALSE]
END
```

Notice here the use of the backslash. This stops the Logo interpreter from processing the character following it.

Another point to note is the use of NOT in the IF test.

Finally, OP is short for OutPut which causes the procedure to terminate, sending back the item following OutPut to the calling procedure or command level – top level.

The DO procedure is an example of tail recursion. Recursion is a process which often gives problems in getting to grips with understanding it. Essentially recursion exists in ordinary everyday life.

Think about walking:

```
TO WALK
  MOVE OPPOSITE FOOT IN FRONT OF OTHER
  WALK
END
```

I do not suggest you type this into your Atari, but it does, I suggest, put a Logo type of form to an everyday recursive activity.

As you have probably noticed the particular quality of a recursive procedure is that it has, as part of its definition, a call to itself.

This is not the same as a REPEAT loop. Recursion produces many images and uses a lot of memory. The REPEAT loop does not.

Often in explanations of Logo, recursion is used to do trivial things in turtle graphics where the use of the REPEAT loop would be far more appropriate and economical.

Here is an example of recursion being used to manipulate a word or

Logo

st, together w th some new Logo commands

```
TO REV :OBJECT
  IF EMPTYP :OBJECT [IF WORDP :OBJECT
    [OP " ] [OP []]]
  IF WORDP :OBJECT [OP WORD LAST
    :OBJECT REV BL :OBJECT]
  IF LISTP :OBJECT [OP LPUT REV FIRST
    :OBJECT REV BF :OBJECT]
END
```

If you're not c ear what th s procedure does try typing PR REV LOVE ATARI LOGO]

Let s try to ana yse and explain what s happen ng First not ce REV needs to be g ven two things The first is someth ng which can use any output wh ch arises from REV the second is an input for REV to operate upon

The first line of REV, as distinct from ts t t e line checks to see whether the input 'OBJECT is empty

If it is it causes either an empty word or ist to be output wh ch term nates that call to the procedure

The second l ne tests to see if the input to REV s a word If it is t builds a new word by taking the ast letter of the input and joins it to the resu ts wh ch come from us ng REV with the But ast everyth ng but the ast etter of the input

The third line tests to see if the nput is a st n th s event the first item of the st s sub ected to another call to REV and then a new list s built up by p ac ng the results at the end us ng LPUT astPUT and then us ng REV on the BF ButFirst - of the original nput. This application of recurs on is known as total recursion

f this example seems rather comp ex t is because t is a very genera ised procedure capab e of hand ng both words and lists w thout the user needing to dis t nguish them

It is important here to note that the Logo system sees words and ists as being very d fferent Try this examp e

```
PR "ATARI
```

and this

```
PR [ATARI]
```

What you shou d see s no apparent d fference

But now try this'

```
IF "ATARI = [ATARI] [PR
   "SAME] [PR "DIFFERENT]
```

Now you know!

t s important to know where each

'The Logo system sees words and lists as being very different'

data type may be used WORD joins only words together to form one word SE or SENTENCE, joins either words or l sts If it s word to word or word and list or list to l st, the resu t output is one list

With e ther FPUT, FirstPUT or LPUT there are a so two inputs The first can be a word or a list but the second must be a list

The resultant output is either in the case of word to st a list with an embedded list and a word or n the case of list to list, a list w th two lists embedded in it

I want to finish by showing how Logo and sts can be used for numeric manipulation The three procedures which follow will generate a of the prime numbers up to a chosen leve Try using PR PRIME 50 You should get your results very qu ckly

```
TO PRIMEP :N :PRIMELIST
  IF EMPTYP :PRIMELIST [OP "TRUE]
  IF EQUALP 0 (REMAINDER :N FIRST
    :PRIMELIST) [OP "FALSE]
  OP PRIMEP :N BF :PRIMELIST
END
```

The function of this procedure is to take a number and check whether it s a multiple of any of the pr me factors provided in the second input

If there is no remainder after divis on then the number s not prime and "FALSE is output

By recursion the procedure runs down the list of factors until, if the list s empty then the number must be prime and "TRUE is output

```
TO SIEVE :N :L
  IF :N < 1 [OP :L]
  IF AND PRIMEP :N - 1 :L PRIMEP :N +
    1 :L [OP LPUT :N + 1 LPUT :N - 1
    SIEVE :N - 6 :L]
  IF OR PRIMEP :N + 1 :L PRIMEP :N - 1
    :L [IF PRIMEP :N + 1 :L [OP LPUT
    :N + 1 SIEVE :N - 6 :L] [OP LPUT
    :N - 1 SIEVE :N - 6 :L]]
  OP SIEVE :N - 6 :L
END
```

It will be necessary to type this in the editor, by typ ng ED SIEVE since there is not the limit on ndividua line length there which exists at toplevel

Th s is the procedure where the "business" is done The algorithm being used here makes use of the fact that, apart from 2 and 3 all primes are adjacent to multiples of 6, hence the progress ve subtraction of 6 and the examination of numbers one more or one less than N

There are three conditions wh ch the procedure has to handle. The first s where both adjacent numbers are prime, this is dealt with in the second line, the second is where only one adjacent number is prime – line three - and f nal y where neither is prime line four

At the end of each of these l nes there is a recursive call to SIEVE with N decremented by 6

```
TO PRIME :N
  OP SIEVE ((QUOT (:N - 6) 6) * 6 + 6)
    (SIEVE (QUOT (SQRT :N) 6) * 6 [2
    3] )
```

The funct on of th s procedure is to present S EVE w th suitab y prepared nputs notice one of those is actualy a call to SIEVE itself

The f rst input is a complex expression which when eva uated gives SIEVE the next multiple of 6 above the initial input of PRIME.

The second input s the output which results from a call to S EVE which produces the list of prime factors this ear y ca l has 2 and 3 as its n tial prime factors

Atari Logo does not have a QUOT operator so you w have to write it

```
TO QUOT :N :D
  OP INT :N / :D
END
```

Try this out and see what the largest number s that t can hand e before the system runs out of memory

Try out some procedures of your own I wou d be nterested n hearing about what you produce

The golden road to successful listings

I FEEL I must write to explain to beginners who are having difficulty getting programs to run which they have typed in from magazines

When I started typing in programs from magazines three years ago I encountered exactly the same problems

I would check the listing and my typing dozens of times and not find any errors, so I would write off to the magazine concerned

I would receive a reply saying that I had made a mistake So I would check my listing again and again and sometimes after hours I would spot a silly typing error say a letter O which should have been a zero

All I can say is check your typing very very carefully and I can guarantee you will find the error eventually I still make typing errors even now

I can't understand why Mr N Buckle from Kent does not like Antic's checksum methods and thousands of other Atari owners find Typo II a godsend in pin pointing typing errors **Paul Carfoot, Burton-on-Trent.**

● We're thinking of reprinting this letter every month! If you are one of the many people who have written with problems in getting the listed programs to run believe us Paul is right

When we find genuine bugs in the programs we print corrections

Wanted — a full list

I WOULD like to say thank you for a fine first issue of Atari User and to say that you have now filled a void on the shelves of my local newsagents

In spite of owning a number of books on the Atari micros, I have not been able to find a full list of error messages, and even with some of the ones that I do have I have been unable to decipher the shorthand in which they are written.

I would suggest that if you could rectify this shortcoming in future issues of Atari User you would earn the gratitude of many of your readers. **– T.J. Hurley, Liverpool**

● Some of the error messages are pretty inscrutable aren't they? Our favourite is DEVICE NAK We'll bear your suggestion in mind

Clean out of REMs

WHEN I bought the July issue of Atari User I typed Bomb Run in on my 800XL and at the end I typed RUN

Every time I pressed the Return button the computer kept putting up Error 12 at line 50

I know that the 12 means that it cannot find line 50

It did it on the Submarine game and this time it said Error 12 at line 90 I have checked these two games over and over again.

Could you tell me please tell me how I can make these games run **Paul Lynch, Birmingham.**

● Both line 50 of Bomb Run and line 90 of Submarine GOSUB to a REM statement

We suspect you've entered these games without bothering to type in the REM statements.

With many listings this would be fine but in both these cases the program authors have chosen to jump to a REM

Typing in the missing line numbers with just the word REM on them should cure your problems without too much extra typing

Odd dice

WHILE I was reading the June edition of Atari User I noticed that in Random Thoughts on Page 54 the two dice are wrongly printed.

On all dice opposite sides add up to 7 From the numbers visible on both dice this rule does not apply **Philip Smith, Walsall**

● At least it shows that gambling isn't one of our vices

Poor service

HOW pleased I am to see that we have now got a great magazine Atari User

I was feeling sorry that I had changed my computer to the Atari until I got your first edition.

What had got me fed up was the ignorance of Atari UK in Slough

In January of this year I sent a tape of a program that I was having trouble with and no one had the decency to reply or send my tape back

After trying loads of times to contact Helpline by telephone it was always engaged I did manage to speak to someone who promised I would be written to in two weeks

I don't know which century they meant the two weeks to be in, because I still have heard nothing.

Ten weeks ago I got in touch with customer relations at Slough, who told me if I sent another copy of the program they would give it urgent attention

But then again silence in my opinion if Jack Tramiel wants to sell his computer in the UK he should come and sort things out at

Illumination on luminance

I HAVE owned an Atari 800XL for two months and have just seen your series on graphic modes Issue 1!

Being a beginner I typed in listing 2 and found it only showed one luminance so I sat down and worked out a listing for each colour and luminance I think it will come in handy for other Atari beginners

To pause use Control+1 **– C M. Hempsall, Nottingham.**

```
10 PRINT CHR$(125)
20 FOR A=0 TO 15:FOR B=0 TO 14 STEP 2
30 IF B<15 THEN SETCOLOR 1,14,14
40 IF B>6 THEN SETCOLOR 1,0,0
50 POSITION 13,12:PRINT A,B
60 POSITION 11,11:PRINT "COLOUR   LUMI
NANCE"
70 SETCOLOR 2,A,B:FOR C=0 TO 1000:NEXT
 C:NEXT B:PRINT CHR$(125):NEXT A
80 GRAPHICS 0:POSITION 15,12:PRINT "TH
AT'S ALL"
```

ATARI USER Mailbag

WE welcome letters from readers about your experiences using the Atari micros, about tips you would like to pass on to other users and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

Atari UK. It's no wonder Warners had to go down with the service Atari gives.

I don't suppose I am the only one who has suffered these difficulties with Atari. If there are others, I would like to hear from them, and I will send their complaints along with my own to friends in America who are personal friends of Jack Tramiel. **G. Whittaker, Swinton, Manchester.**

Room for improvement

I WOULD like to congratulate you on producing such a good magazine and wish you good luck for the future.

But I feel that the magazine could be improved in several ways. Although it is well presented I feel the subjects are aimed too much at novice and beginning computerists rather than the veteran Atari programmers.

So please could you try to broaden your horizons and show us what the Atari really is capable of.

Topics you could cover are scrolling display list interrupts, vertical blank interrupts, assembly language routines and complex graphic techniques.

Also, how about some photographs in your software reviews section.

Other than that I feel that your magazine is excellent value and is just what we Atari owners need – I mean, who wants to pay three quid for an American Atari magazine? – **Steven Hurst, Horwich, Lancs.**

Why am I locked out?

WHEN I use my Atari 800XL, it sometimes locks up.

It just stops - you can't type anything at all. Even if you press Reset it will not clear the screen.

The only thing you can do is to switch off the computer – and this can make me quite mad, because I lose the program on the computer.

Could you please explain why this happens?

Secondly, could you tell me what the Help button is? It does not seem to do anything.

P. Cartlidge, Church Lawton, Stoke-on-Trent.

● If your machine locks up, you should take it back to your dealer and explain the problem.

For information on the Help key, see our July issue, Page 57.

Not for homework

COULD you tell me if it is possible to record sounds produced by my computer in the audio channel on my 1010 cassette recorder, and then to use these sounds while loading programs?

This was intimated by Elisabeth Dennis in her review of "Snowball" by Level 9 in issue No. 1. – **David E. Barker, Derby.**

● No, it is not possible to record sounds from your programs onto your recorder.

Elisabeth was referring to programs like Atari's conversational language series which have an audio track alongside the program track on the tape.

This audio track is put on using specialised recording equipment – not the sort of thing you could do at home.

Check-sum a good idea

I HAVE now received both my May and June issues of Atari User and found them very interesting. I particularly liked the 12 page feature on computer communications, and wish I could afford a modem, because it looks great fun.

I thing a check sum program is a good idea. I was going to write and suggest the idea myself but I got beaten to it.

They save a lot of time and frustration and newcomers are often put off as I was if a program doesn't work after hours of typing.

Please get one soon.

I have a couple of suggestions. My first is that your programs be made available on cassette as well as disc.

I think this is a great idea having all the programs on a disc, but as not many of us can afford disc drives I think a cassette would please many people.

In future issues I would like to see a private ads page for readers to advertise their unwanted equipment and games.

I have seen this sort of thing in other magazines and I think it is a good idea. Apart from these two suggestions I think your magazine is great – **Luke Hollingbery, Kirby Mallory, Leicestershire.**

Making it childproof

AFTER typing in the Alphabet Train I found a problem. If the user has not got a joystick, the Break key can easily be pressed by a very enthusiastic child, thus ending the program.

If you insert the following lines they will stop this from happening.

Lines 150 & 915, POKE 16,64: POKE 53774,64

As the program takes up nearly all of the 16k, it will be necessary to delete some of the REM statements if the user has not got a machine over 16k – **Kelvin E. Cuffy, Rayleigh, Essex.**

Monitor questions

CAN you plug in a monochrome monitor and use it at the same time as a TV display – the monitor for text and the TV for graphics?

Which monochrome monitors can be used with the Atari 800XL and which have standard connecting cables – if any?

Do 80-column monitors show 40 character lines?

Is there any way of making the 800XL show an 80 character line on a suitable monitor by using Peek and Poke or a machine code routine? **J. Smart, Hitchin, Herts.**

● Yes, you can connect a monitor and a TV at the same time but you will get the same picture on both – one in colour, one in black-and-white.

Any monitor with a composite input connection – that is almost any monochrome monitor – will work. Cables will probably be wired up as extras or contact an Atari dealer for a ready-made cable stating the make of monitor you have decided on.

The picture is generated by the computer and the monitor just displays it. Hence any monitor whatever the number of characters it can display

w l only show you 40 characters per line if that is al you feed in to it

There have been programs wh ch put 80 co umns on to a Graphics 8 screen but they are very long and complex, and n mach ne code Try your local user group to see if they have one or perhaps someone would care to wr te n w th one?

★ ★ ★

COULD you please recommend a good colour monitor with sound output for the Atari 800XL? I can afford to pay around £200 **Paul Erskine, Belfast.**

● As above, any monitor with a compos te v deo nput wi l do Ferguson do a nice one as do a number of other com pan es. We recommend, strangely enough the Commodore monitor designed for CBM 64 at between £200 and £230

Software suits

. AM very pleased with your magazine especially Mailbag and the lengthy software reports. Keep it up

In the July edition you gave a report on the new DOS 2 5 You said that it would be free and to ring the Atari Helpline during office hours to find my nearest user group or retailer who would be able to put DOS 2 5 onto one of my own blank discs

I rang the Helpline to find out where my nearest user group or retailer was. They told me that I might have to pay 50p or more but no more than a pound to have it transferred on to one of my own discs.

, was satisfied with this and they told me that my nearest retailer was in Leicester

I went there with my blank disc but they told me that no way could they put a copy of DOS 2 5 onto my disc for me. They told me it would be around £3 and that they didn t have t in stock They said that they were expecting it in at any moment

I have been in again and they are selling it at £3 25 on Memorex discs with a label stuck on saying DOS 2 5

I am very disappointed at this because I think there is a lot of difference between three pounds and one pound Atari software isn t cheap and at last I thought I might get something at the right price for a change – **R. Grace, Leicester.**

● We are offering DOS 2 5 on a disc free with our D sc Doubler See Page 60.

Lusting after Elite

ALTHOUGH there are thousands of computer games available it s rare I find one I really like

Recently however I dis covered an excellent game on my friend s BBC Micro Acornsoft s Elite

Now I ve heard they've started to produce versions for other micros. Obviously what I d like to know is is there any chance of an Atari version? **D. Barrows, Redcar.**

● We ve heard a rumour that an Atari version s being negotiated For a s m lar game wh le you re waiting try Star Ra ders

Incidentally the rumour suggests a 68000 vers on cal ed Star Rider

Upgrading the 520ST

I AM glad that someone has started a British magazine which is Atari orientated and is easily available at most newsagents.

I have several points that need to be clarified and so I decided that your column might be able to help I have owned an Atari 800 for three years and I am very interested in the new ST series.

However after contemplating placing an order I have decided that I need to have available the answers to the following questions

First of all, if I purchased a version of the 520ST with a disc orientated O S could I upgrade it to a ROM version when the ROMs become available?

Secondly does the ST manual contain a thorough memory map or will I have to purchase one when one becomes available?

Finally, in my collection of 300 magazines there is not one review of DR's Personal Basic Do you know where I might be able to find out about the standard, if not the ST s, version of Personal Basic?

Having already written to Atari (UK) and only receiving their standard sales leaflet. I would be very grateful if you can help me **Jason Hopkins, Leicester**

● ROM upgrades wil be availab e to purchasers of

The answer to inverse video

THANK you for Britain s most readable 'Atari only' magazine

I bought the first issue out of curiosity, and shortly afterwards found myself buying the second it must be good

I'm glad to see you are trying to catch the interest of the younger Atari users something which hasn t been the custom in the past.

The varied editorials are most interesting but how about some short demo programs in assembly to allow dabblers like myself to get to grips with the Assembler Editor cartridge?

I have a tip for all Home Filing Manager owners It concerns the annoying inverse video (italics) printout on Epson type printers.

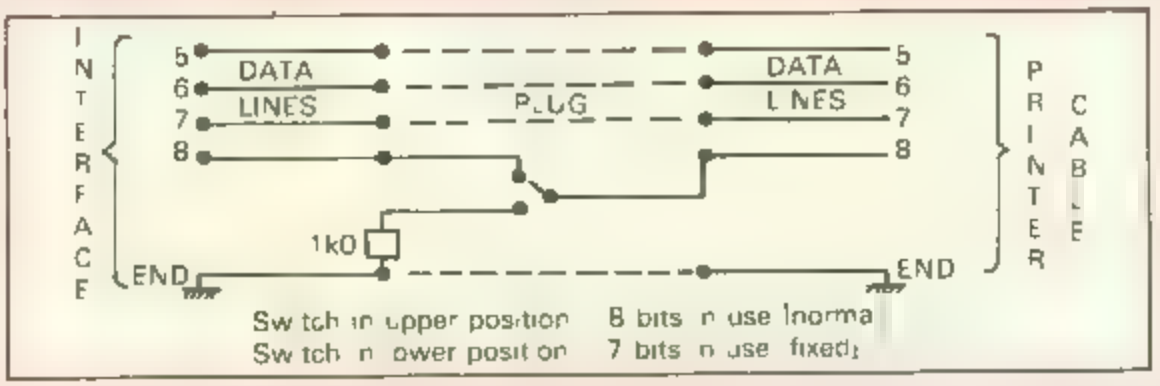
Having spoken to Atari s Helpline, who verified that it was not curable with an easy software fix, I decided to have a go on the hardware front

The solution lies in the fact that the characters are sent to the printer in inverse Atascii codes. That is, decimal 129 to 255. These generate a 1 in the eighth bit of the parallel interface

So by grounding the data 8 wire in the printer cable the eighth bit now becomes a 0 and the printer receives decimal codes from 0 to 128.

A miniature single pole double throw switch now resides in my printer plug resulting in 7 or 8 bit operation to suit any program

I hope this modification is of some use to other readers with this problem – **R.B. Moss, Hadfield, Cheshire.**



Mailbag

disc based Gem systems probably in the autumn

The answer to your second question is not known at present. The Basic manual *might* contain some form of memory map but the Gem manual certainly doesn't.

We don't know of a Personal Basic review either. Try writing to Digital Research themselves.

Atari link-up

I HAVE an Atari 400 and am hopefully going to buy a 65XEM when it is released.

I would like to know if there is any way I can connect these two together for a computer link up. **Peter Dunlop, East Kilbride**

● You can connect the two machines via the joystick ports to send information from one to the other.

However you won't be able to use the same cassettes or discs that you've used on your 400.

Of course this assumes that the 65XEM ever sees the light of day.

User group needed

LAST Christmas I treated myself to the 800XL 1050 disc drive and the 1027 printer. It is all very confusing, but I am enjoying myself enormously trying to understand it all.

I would be very grateful if you could possibly help me with the following.

● *How do I find out if there is an Atari user group in my area?*

● *Could you advise me the best software package to insert separate 12 months sales figures for 1984 with the annual total, then as each months 1985 figures are fed in drop the corresponding 1984 figure, calculate the moving annual total and project what the 1985 total figure will be.* **F.J. Savage, Leeds**

● There doesn't seem to be a user group in the Leeds area but try calling the Atari Help line just in case they've recently received news of one.

You need Visicalc or Syncalc to do what you require. Visicalc is not as good as Syncalc but will do what you want with no problems.

Looking for a book

IN the June edition of Atari User there was the listing of a game Submarine by Vince Apps, one of 40 educational games listed in a book published by Granada Collins.

So far I have been unable to obtain a copy of this book, and I wonder if you can tell me where I may obtain one. **R H. Cook, Leicester**

● Any decent bookshop should be able to order it for you.

. . . and some software

I WOULD like to congratulate you on a fine magazine for the Atari. I've got it on prescription (also subscription) as I've felt sick about the lack of support the Atari seems to get.

On a recent visit to Boots I found they stocked the 800XL but little software, yet for the Commodore and Spectrum there was plenty.

What is the point of stocking the hardware if you don't stock software? There are many products for the Atari available by mail order, the problem being that unless you have tried the product before you buy it you can be very disappointed.

So, dealers, please give the support the Atari and its owners deserve. **P.D. Little, Carshalton.**

Failure to save

I HAVE an Atari 800XL having upgraded from a 400. This step in the available RAM has increased my programming skills.

So I wonder if you could tell me if there is an additional RAM pack for the 800XL to hopefully boost it up past that point. Not only RAM – Is there one for ROM? Also do you know if there are any programs available to increase the baud rate on the 1010 data recorder? **Craig Brankin.**

● ROM is expanded via the cartridge port on top of the machine. At the moment 64k is the maximum for an 800XL in this country.

Baud rate on the 1010 recorder can be changed up to about 900 baud from its current 600 baud.

Beyond this, reliability suffers severely. Programs have appeared in the computer press to achieve this but if any of our readers have written one we'd be glad to take a look at it.

Packing in the RAM

I HAVE an Atari 600XL and a 1010 tape recorder but I cannot save programs that I have typed in. Can you please help me so that I can save great programs like your Bomb Run on tape? **Eoin Maewre, Fintray, Aberdeenshire**

● Unless you have faulty equipment there should be no problem.

With a program in memory and the Ready prompt on the screen, press the Record and Play buttons together on your 1010 then type CSAVE and press Return twice. The program will then be saved to tape.

To load it back in re-wind the tape, press Play on the 1010 and then type CLOAD and press Return twice.

MORE HAPPENING ON DISC

I WRITE to correct what I feel to be a misconception in your answer to Nigel Ward (Mailbag July 1985).

You are wrong in saying that games on tape and the same game on disc are of the same size. Zaxxon was specifically mentioned, and in this case the disc version contains missiles and movement in 3D in the dogfight screen which the tape version lacks.

Now without getting too technical, the disc format for such a game does not contain any form of DOS.

Instead the first 6 bytes of sector 1 contain firstly a dummy byte, then the number of 128 blocks of memory to load, then the memory address to start the load in lo/hi format, and lastly the initialisation address, again in lo/hi format.

The operating system extracts this information and proceeds to load the indicated number of blocks.

This is the same format as used for a boot tape, however it does not take any account of any protection scheme that may be present.

Now such a record is called sequential as each block is loaded in one by one serially until it is fully loaded, so the disc requires no directory nor VTOC, so no DOS needs to be loaded to handle these entries.

A Basic load file on the other hand requires both. Such a file is called a linked file, the main difference being that each sector only contains 125 bytes of program with the last 3 bytes containing information about the number of bytes in that sector, the file number and where the next sector is to be found on the disc. No doubt this will be covered in these pages in the future.

Information from "De-Re Atari" and "Technical User's Notes", although both are heavy reading.

Many thanks for your support for the most superior home computer. **Derryck Croker, Wembley.**

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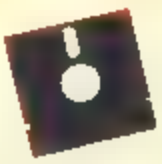
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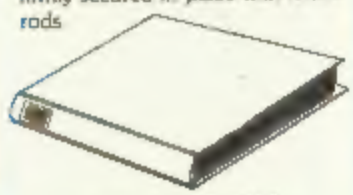
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