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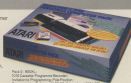
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"We will definitely be bringing out a machine priced between £400 and £500" — Atari sales and marketing chief Jack Tramiel.

## BACK TO JACK

THE move by Commodore executives to switch to Atari is not restricted to the United States.

Alain Stumpf has recently swapped the post of heading up Commodore in Germany for a similar position with Atari there.

He follows a number of Commodore executives in the United States who have changed horses.

"This is not a question of predatory hiring or any problems Commodore may have been currently facing", says Bamberge, Atari's European sales and marketing head and Atari USA.

"I believe it is all very logical in that since people have worked for a winner like Jack Tramiel, they would want to go out of their way to work for him again".

THE 130ST is dead. Atari has confirmed that its eagerly-awaited medium-price personal computer will not be manufactured after all.

But there is to be an ST-based machine in the same £400 to £500 range, and it will be available in the autumn.

"It's true we have swapped the 130ST", sales and marketing boss Rob Harding told Atari User, but we regard this as a positive move, not a backward one.

"Quite frankly, the 130ST as originally planned — a naked CPU with 128k RAM — would not have been sufficiently superior to other machines in its price range.

"Jack Tramiel's philosophy is 'power without the price' which has been achieved with the 520ST — but the 130ST would have fallen short of this high standard as it had to go.

"But we will definitely be bringing out a machine — priced between £400 and £500.

"It will be ST-based, but a much more sophisticated product than the 130ST, with more memory and possibly even a disc drive.

"I'm confident we'll have

# Atari kills off the 130 ST

## Replacement will be more sophisticated

supplies made in the autumn to take on the QL and the new BBC B+.

News of the new machine brought a delighted response from recently-appointed Atari official distributor, Silica Shop.

"We went to the Harwell Show to see the 130ST and were very disappointed at its absence", said a spokesman.

"The decision to scrap this model was a further blow, but we are delighted to hear it will be replaced by something even better.

### Rethink

"I think this will be the right machine for the market, a powerful computer for the price you could normally only buy a Commodore and also drive".

The new machine could bring about a rethink by distributors who have backed away from recent deals offered by Atari because of margins and stocking commitments.

Major distributors Terry

Blood and Lightning were unhappy about the non-appearance of the 130ST, which they saw as a key element in marketing the range.

Joe Woods, marketing manager of TBO, has said: "The 520ST is too expensive for us to take in the quantities Atari wanted".

A more sophisticated version of the 130ST in the same price bracket could make the Atari range look attractive once again. But both TBO and Lightning would still seek less right distribution deals.

Lightning spokesman Terry Farguson told Atari User: "We're willing to open new negotiations for existing stock or new products, but only if the terms are different regarding stocking commitments".

A TED spokesman added: "If Atari asks for the same level of commitment for the new machine as for the 520ST our position is likely to be the same — no deal".

# Silica Shop takes over

STEPPING in where others fear to tread is ... Silica Shop.

It has agreed to become the official distributor for Atari following the disappearance from the scene of Terry Blood and Lightning.

The latter blamed their departure on Atari's requirements for high stock commitment — orders having to start at £250,000 — when they claimed the market did not support it.

Silica Shop's Tony Deane, however, said his firm did not

have any qualms in accepting this commitment.

Since it began dealing with Atari in 1979, Silica has never had problems in placing large orders consistently, he said.

### Expertise

"Unlike other distributors, Silica Shop only deals with one manufacturer, so all the funds we have, all the expertise, can be generated into that one area", he explained.

Distributors who deal with a

number of makes and can only get a percentage of their funds into each one would find it difficult to make a similar commitment, Deane continued.

Commenting on the Atari deal, he said: "We are very happy with their terms. They give very good support and keep their promises. They said they would launch the ST and did so a month ahead of schedule. That's like".

The company also liked Jack Tramiel's pricing policy and his

news of a planned ST model in the £600-£900 range, to replace the dropped 130ST, and which would be more sophisticated.

Deane said: "The Atari range is substantial, its quality superb, and the price is now right. Jack's got everything going for him".

■ Asked if the Commodore Show in Atlanta how he was going to finance the proposed production of the ST computers, Jack Tramiel, as always as usual, replied: "From my own pocket".

# The Tramiels ...waiting for breakthrough

**THE fate of Atari hangs on whether or not the new ST machines achieve a market breakthrough, according to this well-informed USA-based *Fortune* magazine.**

"If ST is not selling Tramiel's low prices mean trouble for Apple and IBM - and imply the end with home computers", writes associate editor Peter Petre.

But he goes on to warn: "If they don't, Atari could be fighting to the death against Commodore".

Author Petre takes a long hard look at Atari since Tramiel took over. From this he concludes that the battling businessman wants to turn the corporation into a family stronghold to be passed on to his three sons.

Sam Tramiel, now the Atari president, had previously worked for his father when he was the boss of Commodore. He then went on to prove himself in his own right out in the Far East.

The *Fortune* article suggests that Tramiel's younger sons are currently assigned to "junior-man positions" in Atari because of their lack of experience.

Leonard, 30, who holds a

PhD in astrophysics, is helping to create software for the ST machines while Gary, 23, who previously worked as a stockbroker now "handles odd jobs" in Atari's financial set-up.

The magazine claims that when Tramiel bought Atari it was distressed merchandise, and so made to order for him.

Atari had lost \$500 million in 1985 after the video bubble burst. This is said to have placed pressure on Warner Communications - under whose wing the company came at that time - to offload with Atari "the outlying cash".

*Fortune* reports that the deal with Tramiel took shape during a "frantic week".

Petre writes: "The sale of assets agreement was a 300 page document to experience, full of qualifications, loopholes and doors left open to be closed later."

"Tramiel paid no cash. He got the assets in exchange for long term debt and warrants that give Warner claim to 33 per cent of Atari's stock".

According to *Fortune*, the new task Atari is already claiming to be operating at a profit.

"That's not implausible", writes Petre, "although the company got most of its \$125 million in revenues during the last half by unloading bloated inventories at odd rates".

Still the writer points out that Atari is currently facing serious risks.

One of these, he claims, is that the XE from which the corporation hopes to draw a substantial amount of revenue could face problems.

"The cooling of the home computer bid could mean that the XE may already have been passed by", he warns.



The Tramiels - Chairman Jack, 55, with, clockwise from lower left, President Sam 35, Gary, 25 and Leonard, 30.

## Software set up is sorted out

**LEADING UK software houses have been briefed on Atari's requirements and plans over the next few months by the company's software director, Rip Hartmann.**

Hartmann admitted that shortage of software has been a problem for Atari in the past. "But that's not going to be the case in the future", he promised.

Under Jack Tramiel's leadership, we're a much more aggressive company, and we intend to see that we have the software support right across the market for our new product range".

Following the company's showing at the American Consumer Electronics Show, the major US software houses realised that producing for Atari

was going to provide a winner for them.

"We think you'll agree when the products are unveiled in Europe", Hartmann told the British software publishers. "We see the new Atari systems as being centres of home activity."

"Sure, there'll still be room for games, but much more emphasis is being paid to serious uses such as home accounts and word processing".

Hartmann gave an indication of Atari's philosophy when questioned about the future of cassette program transfers.

"They're going to become things of the past", he forecast. "The whole market is shifting into disc drives. Prices have to come down".

## £750 for the 520 ST?

ATARI has denied reports in the trade press that it intends to cut the \$2000 to three different packages.

A company spokesman told *Atari User*: "The machine will be sold in only one configuration."

"This will include 12in high resolution mono screen, the 520ST with mouse, 3 1/2in 500K disc drive and bundled software

consisting of Basic, Logo, Gemwrite, GemPaint, TOS operating system and SOS business operating system".

At press time Atari was looking at a price in the £700 to £800 range for this package.

"In fact if you said it was going to cost £749.99 you would probably be accurate", said the spokesman.



## 520 ST turns up - in a trickle

The first major batches of Atari 520STs have begun arriving in Britain.

But prospective purchasers are advised to be very patient. It could be autumn before they are able to walk into a shop and buy one off the shelf.

"It's about the machines will be in short supply for a while yet", said a computer spokesman.

"The 520STs are arriving in the hundreds rather than the thousands and we have a large backlog of orders from systems houses, educational establishments and the like that have to be filled as a priority".

On a brighter note, there should be no shortage of software when the machines become freely available.

More than 50 software houses have already bought development systems and are expecting to have finished or nearly finished products by the beginning of September.

By that time more than 100 - perhaps as many as 200 - software houses are expected to be working on programs for the 520ST ranging from games to specialized business packages.

## 50 packs promised

At announcement that more than 50 ST software packages would be released by July 8 was made by Atari's vice-president, Sigmond Harrison at the recent Comdex Show in Atlanta.

To be included in that number was a Lotus 123 counterpart, he said.

And when those gathered at the press conference complained about Atari's poor press picks, he smiled: "There are times to have sorrow. There are times to have tears. This is our time for eating beans - but we plan to eat caviar when our time comes".

## Canoe champions rely on an Atari

ATARI users watching the Rapid Racing canoeing on ITV's World of Sport recently may have noticed their favourite computer getting a lot of credit during the various score readouts.

In fact Atari regularly plays an important role at the annual championships held on the white water at Ears, North Wales.

The event attracts the world's top canoeists from all disciplines to compete against each other over four different races in four days.

The occasion is covered by a big TV crew which depends on an Atari for accurate results data processing and most of the score displays and lists of competitors that appear as overlays on the television screen.

### Sophisticated

This work is done on an "old" Atari 800 with an 810 disc drive, high speed printer, 850 I/O box, three monitors, a sophisticated computer/TV interface adapter, and various other "boxes of tricks".

All of these are arranged in a mobile caravanette and operated in conjunction with the



The Atari's output is used as an overlay by the TV team

timing computers by a two-man team.

The 31k machine code program was written for Atari by Andrew MacLean, author of *SpeedZone* among others, and is a cleverly thought-out menu-driven system allowing a non-technically minded person to operate it.

It gives the user instant access to and from a wide variety of functions and can cater for up to 64 named and numbered competitors in four independent sets of race results.

allowing both mid-point and finish times.

At any time results can be quickly printed or displayed on demand in a wide variety of presentation styles and can be based on points or times for any race or all four races combined.

The operator can also edit and message screens before display so that special messages can be generated as requested by the TV operator.

Gary MacLean: "The Atari equipment used is five years old now and is probably one of the most trusted systems in use."

"I performed as faultlessly as ever last time out, despite being used in a very damp atmosphere at some very awkward-to-reach riverside locations."

"In fact it only failed once - when the generator ran out of petrol!"

## CUT PRICE GAMES OFFER ENDS

A HYSTERIOUS mail order operation offering top selling games at rock bottom prices has apparently stopped, just as leading software publishers were urgently investigating its activities.

Money has been returned to people who ordered software packs from All Software Services of Hornchurch, Essex.

Famous titles like Pole Position, Ghostbusters and Jet Boot Jack were mentioned in the promotion which offered the general public as many as 50

games for £30.

One software publisher who sent a postal order for £19 to All Software Services for a pack of 15 games had his money returned along with a slip of paper saying "All Software Services has ceased trading".

"I shall be pleased if this mail order operation has stopped", he said. "I was most concerned that our titles had been mentioned in it and our legal department was ready to act should any infringement of copyright have been involved".

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# String along...

# and pick up some

We saw last month how to write our own programs, however primitive. Now we'll look at some ways of improving them. I don't guarantee that you'll be able to produce spectacular programs by the end of this article, but you will certainly be well on the way to an understanding of Basic.

First, though, let's recap a little: We saw last month that a Basic program consists of a numbered sequence of instructions to the computer.

To enter one of these instructions we simply type the correct line number, followed by the appropriate Basic keyword, then press Return.

As we discovered, because of the line number, the Atari doesn't do what you tell it immediately, but remembers it as part of the program.

To see all the instructions in a program, we type:

## LIST [Return]

To actually get the Atari to carry out the sequence of instructions we type:

## RUN [Return]

To clear a program from memory (and we should do this before entering a new program), we use:

## NEW [Return]

We saw that we tended to enter line numbers in steps of 10 to allow us to fit in other instructions between them if necessary. May we found that we could replace a line with a better version by simply giving the new version the line number of the old one.

```
10 PRINT "PROGRAM"
20 PRINT "15"
30 PRINT "20"
```

Program 1

*Expand your knowledge of programming with PART THREE of MIKE BIBBY's guide through the micro jungle*

Finally, to delete a line completely, we simply type the line number and press Return.

Program 1 is the one we started with last month. Before we continue, type it in and run it, to make sure you know what's going on.

Program 11 is another way of

```
10 FOR A=100 TO 1000:GOTO 10
20 A="PROGRAM"
30 IF A="15"
40 GOTO 20
50 PRINT A$
60 PRINT A$
70 PRINT C$
```

Program 11

achieving exactly the same output. Type it in and try it.

Apart from it being an incredibly long-winded way of doing things, what else is going on?

Well, as you will recall from the first article in the series, the words inside quotes are known as strings — because the computer simply remembers them as strings of letters. That is, it considers HAMSTER as H, followed by A, followed by M and so on, with no idea of the word's meaning.

I don't think that it takes all that much imagination to see that when your computer is printing a lot of output, you might be using the same

string rather a lot.

For example, in a business letter you might use the name of the company fairly frequently — for instance, BBC for British Broadcasting Corporation. Atari Basic allows us to use much the same idea, but more as labels than abbreviations.

For instance, in line 20 of the above program we have labelled the string "PROGRAMMING" with the label A\$.

In computer terms, we have assigned to A\$ the value "PROGRAMMING".

All this means is that from now on whenever I want to use "PROGRAMMING" in my program, I can replace it with A\$. So line 50, which is:

50 PRINT A\$

causes the micro to print out "PROGRAMMING".

Admittedly in this example this technique of labelling doesn't save





## handy jargon

much space or effort, but if the program uses the word "PROGRAMMING" 100 times, there would be a substantial saving in using AS instead of the string itself.

Similarly, line 30 causes BS to label IS and line 40 labels EASY with CS, so that lines 60 and 70 give the appropriate printout.

Notice the following points:

- We have chosen our labels so that they consist of a letter of the alphabet followed by the \$ sign. Actually, we don't have to restrict ourselves to just one letter, as we shall see, but our label must end with the \$ sign, since this warns the computer that we are labelling a string. And the letter we use must be a capital. (We'll see later how to label other things.)
- While I used AS for the first label, BS for the second and CS for the third, this was totally arbitrary on my part — labels don't have to follow alphabetical or any other kind of order.

• Although we use an equals sign (=) to connect the label with what it is labelling, it is safer, as we shall see, not to think of it as an equals sign — think in terms of AS becomes "PROGRAMMING" rather than AS equals "PROGRAMMING".

• We must have the label on the left and what is labelled on the right of the equals sign. A line such as:

**20 "PROGRAMMING" = AS**

just does not make sense to the Atari. Try it for yourself!

• When labelling we put the string inside quotes, as we did previously when using the PRINT statement to print out strings. So line 20 reads:

**20 AS = "PROGRAMMING"**

From now on AS completely replaces "PROGRAMMING", quotes and all, so that when we say

**PRINT AS**

we don't have to use any quotes — they're already there, implicit in the label AS.

All right, but we still haven't explained line 10:

**10 DIM AS(12),BS(12),CS(12)**

Well, it's all to do with the Atari's good housekeeping. Just as, when you throw a party, it's helpful to have an idea of the maximum number of guests you expect, so it's only common sense to tell the Atari how large you think each string is going to be. It can then set aside a suitable amount of memory for the strings.

We do this with DIM — a new Basic keyword that fixes the maximum number of letters or characters to be associated with each label.

For instance, if we had a string label XS and we never wanted it to refer to a string of more than ten characters in length we would have a line such as:

**10 DIM XS(10)**

Notice:

- The keyword DIM followed by a space.
- The label XS followed directly — no space — by the maximum length you want to label, in brackets.

That's what we did in line 10 of Program 8. This time we had three labels to dimension — AS, BS, CS — so we put them all in the same line, separated by commas.

You might also notice that I've been pretty wasteful with my dimensioning, as it's known — I've given each label a maximum length of 12, although, as you'll see from the rest of the program, none of my strings is that long.

I could have got away with:

**10 DIM AS(11),BS(11),CS(11)**

Try running Program 8 with this

## It is good programming practice to include REMs

new line, if you don't believe me. Remember, all you have to do to alter a line is to retype it (starting with the line number of course), then press Return. The new version of the line will replace the old one.

What would happen if we didn't DIM enough room for a string being labelled? Try replacing line 10 with:

```
10 DIM A$(1),B$(2),C$(4)
```

If you've done it properly, when you run it you should get the message:

```
PROGRAMM
IS
EASY
```

As you can see, the label A\$ accepted as little as possible.

All right, but you wouldn't make this sort of mistake, would you? After all you can just look at a program and see how big the strings you're labelling are going to get.

Yes, but the strings you're labelling can change size as in Program 18.

```
10 DIM X$(17)
20 X$="BIG "
30 PRINT X$
40 X$="BIGGER "
50 PRINT X$
60 X$="BIGGEST"
70 PRINT X$
```

Program 18

where what X\$ labels varies from BIG via BIGGER to BIGGEST. Hence another, more common name for these string labels – string variables.

Notice each time you give a string label or variable a value, that value "replaces" the old value. These variables really vary.

Now when we label a string the label refers to whatever is inside the quotes, including spaces, as you will see if you run Program 19.

Notice that our punctuation – semicolons – works for labelled strings just as it worked on its own.

Notice also that we have intro-

duced a new Basic keyword in line 10 – DIM. We use DIM which is short for DIMension, to add comments or headings to our programs.

When the Atari encounters DIM in a line it ignores everything else after it on the same line. This means we can write whatever we want after DIM (provided it is on the same line) without fear of the micro giving us an error message – the Atari doesn't "read" the line beyond the DIM.

If we use DIM to prefix our comments, we can annotate our program. Certainly each main subdivision should have one or more DIM statements explaining what is going on.

Since the Atari ignores the contents of REM statements, you could leave them out of your program entirely and it will work as effectively. However it is good programming practice to include them.

In Program IV I have used a single REM at the beginning of the program, as it is so short. Bear in mind however, that REM can appear on any line in a program.

Now for some jargon. From now on we shall refer to our labels as variables. Don't be put off by the mathematical sound of that – they are *not* just labels. And instead of saying we are labelling, we say we are assigning, as we have mentioned previously. The actual string involved

is known as the value of the variable. So:

```
A$ = "TEST"
```

reads "the string variable A\$ has assigned to it the value TEST. The actual act of giving a variable a value is called an assignment.

To return to the world of actual programs, you can mix and match string variables and actual strings however you want.

Program V illustrates the point:

```
10 DIM PROGRAM V
20 DIM A$(10), B$(10)
30 A$="MY NAME IS"
40 B$="MIKE"
50 PRINT A$;B$
60 PRINT "MY NAME IS";B$
70 PRINT A$;"MIKE"
```

Program V

Notice the space at the beginning of the string assigned to B\$ – you need this otherwise the output looks rather odd. Leave it out if you don't believe me.

As we saw last month, a semi-colon at the end of a line causes the next output to start immediately after the last and not on a new line – as it would do in the absence of the semi-colon. That is, it "glues" the strings together.

The internal semi-colons of lines 60, 65 and 70 do much of the same, "gluing" variables to strings, and so on.

Also, on the subject of grammatical propriety, when we're assigning variables we should use the LET statement. So line 40 should read:

```
40 LET B$ = "MIKE"
```

As you've already discovered, we can omit LET altogether.

Next month, we're on variables and INPUT – which opens the door to effective programming.

```
10 DIM PROGRAM 19
20 DIM A$(20),B$(10),C$(20),D$(10)
30 A$="TEST"
40 B$="TEST"
50 C$="TEST"
60 D$="TEST"
70 PRINT A$;B$;C$;D$
80 PRINT "A12345678901234567890"
90
```

Program 19

# Silicon Chip

## No. 1 FOR ATARI\*

### Atari 520 ST

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g adventures



recent games side by side, how have Level 9 developed? In comparing the two games the first impression is that nothing much has changed in Level 9's presentation. Each location receives a description of the surroundings, plus any useful objects that may be lying around.

The text is often lengthy, in direct contrast to Scott Adams games, where the location details are placed on the screen in a brief and well

defined format. While this gives a Level 9 screen an untidy appearance after a few moves, it does give scope for more atmospheric scene setting.

To demonstrate this it takes only a few moves in *Colossal Adventure* to have visited wide open countryside, travelled along a riverside, followed a stream and spent ages wandering in a maze of caverns occupied by some of the more unsavory elements of adventuring.

Dwarves and pirates seem to abound in this underground wilderness, and the cautious adventurer is wise to arm himself as quickly as possible to prevent his life being lost.

This is mainly due to the fact that on death you are likely to find that your gains to date, ill-gotten or not, have been spread around the adventure just to make things a little less easy for you.

As you can see, to play a Level 9 game takes a good deal of stamina and persistence, their latest offering being no exception. It also demonstrates a movement in adventures which I for one applaud.

Instead of being a glorified treasure hunt, a theme which has been well explored now, *Emerald Isle* offers a specific goal.

In it you are a stranded pilot, who, on route to deliver valuable documents, made the mistake of taking a short cut across the Bermuda Triangle. Hence you start the game suspended by your parachute in a mangrove forest as a collection of forest predators sense an early lunch.

Although escaping is not a great problem, you soon find yourself blundering around until you find a topnotch city. It transpires that the only person allowed to leave the island is its monarch.

This will obviously pose an out-of-work pilot with a few problems, but fortuitously there is a contest to become the ruler, although — as the authors take great pleasure in pointing out — the rules of this competition are not included in the announcement.

Travelling around the city proves to be no real problem once you are dressed for the part, but all is obviously not well.

The clock tower no longer works, despite it being of Victorian design, although Big Ben never seems to

have those problems, and just about every gate in the city is locked.

However, a trip to the beach is easy as the rail system here kneecaps BB into a cooked cat.

On the beach you find the solution to a rather knotty problem that has been troubling the government of late, with the missing Computer's log, as well as a stunning spider, although you may not need to come to a sticky end. As usual, Level 9 retain their unique brand of humor throughout.

At the moment I am in urgent need of a lamp, preferably working, which is doubtless hidden somewhere far off and obscure. To date I have not indulged myself in Level 9's voluminous hint sheet, despite much hair-tearing and cursing, although this probably explains why my score-out of a thousand has yet to reach triple figures!

At 04.25 this has to be the best Level 9 value yet, and I have no hesitation in recommending you to buy this one.

Not such a glowing reference for *Murder on the Zinderneuf*, I'm afraid. Any game purporting to be an adventure but yet requiring a joystick immediately arouses my suspicions. The basic idea, in the guise of a series of thirty-disguised fictional detectives, is to investigate a missing person case about the Zinderneuf, a transatlantic airliner.

This is accomplished by steering your detective, silly name and all, around the ship to search for clues and question suspects in a variety of different tones and persuasive manners until you accuse the murderer. Get enough evidence and they hang. Not enough, or just plain wrong, and you carry on searching.

The manual which accompanies the game is neatly produced, including a map of the rooms on the ship, and ported biographies of the characters involved. Each game takes place in simulated real time, and by reference to the manual you can soon get the hang of which way to go to search a room.

Searching, however, consists of wandering around a room until a message appears to tell you either what you have found, or that there is

ul riddle

THE MURDERER MURDER  
THE MURDERER MURDER  
AND GOTO 140  
END OF MURDER THEN 140  
END POINT "MURDER MURDER MURDER" 1  
END OF MURDER THEN 140  
END OF THE MURDER MURDER AND  
END MURDER  
END OF THE MURDER MURDER AND  
END MURDER  
END OF MURDER THEN MURDER MURDER 140  
END POINT "MURDER MURDER" 140  
END GOTO 140  
END THE END OF THE  
END POINT "MURDER"  
END MURDER 1  
END MURDER  
END OF MURDER THEN POINT "MURDER" 140  
END 2 GOTO END OF THE MURDER  
END OF THE MURDER MURDER MURDER MURDER  
END GOTO 140

nothing of interest. Nothing very adventurous there.

The graphics are clear and the scrolling is also well executed, but overall the game left me with a feeling of playing a scuffed-up Cluedo. At £11.95 for the disc from Aristasoft, I thought this was a little steep, so it's "frustrated Cluedo addicts only" for this one.

Two last comments on the column to date. As you can see, there are numerous problems in adventures, so if you are stuck, don't hurt the cassette through the nearest window, but drop me a line and I'll do my best to help out without actually telling you the answer.

Also, if you find any bugs or problems with a game, let me know. A lot of them can be rather amusing. Just to start you off, Level 9 has a town in Emerald Isle, yet the response to QD LAWN isn't quite what you would expect. Nobody's perfect!

## Housing the Fifteen

THE problem posed in the June issue of how to become governor and make the Fitty Fifteen STOP is difficult even though there are thousands of solutions. The simplest general

method is to modify the program to search through possible combinations, rather like solving the eight queens on a chess board puzzle. Here is one solution:

N1	1,2,3	4,5,6	7,8,9	10,11,12	13,14,15
N2	1,4,7	2,5,8	3,12,15	6,10,14	9,11,13
N3	1,10,13	2,11,14	3,5,9	4,6,12	8,7,15
N4	1,5,14	2,9,12	3,4,13	6,7,11	8,10,15
N5	1,6,11	2,8,15	3,7,10	4,9,14	5,12,13
N6	1,8,15	2,4,10	3,5,11	6,9,12	7,13,14
N7	1,8,12	2,7,13	3,6,14	4,11,15	5,9,10

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EVERY so often, a game comes along that risks of class. **M.U.L.E.** is one of those games. It will delight you, from its catchy theme music to your last screen.

**M.U.L.E.** is a strategic game, involving cunning and a touch of the stock market. "What?" I hear you say. "Not one manoueuvering alien to Mars into oblivion?" Boring.

**M.U.L.E.** is anything but boring. I enjoyed playing the game for hours on end.

The idea of **M.U.L.E.** is that you have been left on a planet, and in order to survive you



must develop the natural resources of the world.

This is achieved by your **M.U.L.E.** (Multiple Use Labour Element)—a robot designed to do all your strenuous mining tasks.

Each **M.U.L.E.** has to be outfitted for developing the different resources, which are food, energy and synthene.

**M.U.L.E.s** are made from androids, which makes it a precious substance. Once outfitted, you must install it in your plot of land.

In the one-player game, you are competing against three computer-controlled players, but you may play against your friends if desired.

After developing your stock, you go to the auction round,



where you can buy or sell your stock to the other players.

This is where all you clever businessmen and women will

## Strategy's the name of the game

strange as you calculate and haggle over prices.

After the auction round has finished, you are then awarded a free plot of land to develop.

You might think it's easy—but just watch out for the pirates who will steal your hard-earned stock.

Also, the storms will strip your **M.U.L.E.s** away. And there are other little problems



that make sure you never have a dull moment.

There are plenty of other features in the game, but it

would take a few pages just to note them down, let alone explain them.

To understand the game at its full potential, you really should read your manual.

**M.U.L.E.** has three levels—beginner, standard and tournament. Each level is challenging and enjoyable.

The game is fun to play and has some nice little graphic touches and sound.

However, one possible improvement could have been the ability to save your game to disc.

This is quality software from Electronic Arts, which is to be expected from this renowned software house.

**M.U.L.E.** will certainly become part of my collection. **Rate: 4 out of 5**

## TRYING HARD, BUT...

THE latest game from English Software, **Kissin' Cousins**, has an interesting innovation—speech. But don't get too excited—there's a previous title of it.

**Kissin' Cousins** is an arcade game in the mould of *Hunchback*, *Popeye* and others of that ilk. You must guide the tiny hero past a series of hazards in order to save the heroine.

Immediately the game has loaded, you'll hear a clear and cheerful voice declaring "English Software presents **Kissin' Cousins**!"

Very impressive. Only trouble is, that's the last time you'll hear that particular phrase unless you restart the game.

The only other speech I encountered was on the title screen, where a dame in distress was shouting "Save me!"

This wasn't so impressive. The voice sounded more like a noisive female impersonator with a sore throat.

Still, this is a step in the



right direction and deserves full marks for effort.

So what about the game itself? Well, I'm afraid it's not one of English Software's best.

The backdrop to the game is a static street with buildings, stores and footings, most of the action taking place on a narrow strip of the screen.

The obstacles on screen are include bushes, hydrants and dustbins with pop-up lists. These are placed at ever-decreasing intervals, so the timing of your jumps is critical.

Just to add to the difficulty, a plane flies overhead drop-

ping large red bombs, and each screen must be completed within a tight time limit.

If you hit an obstacle, get blasted by a bomb, or just run out of time, you lose one of your five lives and must start at the beginning of that screen.

When all lives are lost, the scene scrolls to reveal a large handprint showing "Game Over".

Once you've safely reached the right-hand side, the picture scrolls smoothly to the left to reveal the next screen.

Screen two has wriggling caterpillars as the major obstacle. Later sections include: leaping kangaroos, bats and frogs.

The frustrating thing about the game is that there is no option to start again from the last screen completed. You always recommence right back at the very beginning.

Although it's a fair game, **Kissin' Cousins** lacks variety and excitement. Not one I'd go out of my way to buy, but worth a play.

**Rob Chappell**

## Riveting, no less

**HARD Hat Mack**, by Electronic Arts, is a levels and ladders game. The action takes place on a building site and there are three completely different screens.

To succeed on the first you must climb to the top by filling in gaps in the platforms using steel girders.

While doing so you must avoid fires which are being thrown down from above by an invisible assassin.

Once you have plugged all the gaps, you have to climb each girder in place with a special gun that rips along the levels, looking rather like a spinning top.

To enter your progress there are chains at the end of each platform which you can climb up.

In addition, there is a rampole that you can use to bounce up to the next level, and there is also a lift at your disposal which takes you up three levels.

On the second screen you have to save around collecting lunch boxes.

In order to access the different levels you have to hop on to a girder which is hoisted up and down by a winch.

On the first two screens there is a machine called Vandal, whose sole purpose is to make life unpleasant for you. One touch from him and you're dead.

On the third screen two enemies appear - Vandal and Oke, a robot-like creature. On this screen you must collect boxes and put them into a chute. In the centre there are lifts that Hard Hat Mack can ride to get to the different levels.

The game is in black and white, and as a result the three graphics detail is superb. Naturally the game as a result looks colour, but you can't have your cake and eat it.

It could perhaps have been improved by the addition of



Hard Hat Mack is riveting fun

some more different screens, and a keyboard option would cater for those unfortunate Atariists who haven't got access to joysticks.

Nevertheless the game is extremely addictive and great fun to play. And, if you'll excuse just one pun, if your tastes are like mine you'll stay riveted by hours!

The cassette version costs £9.95 and the disc version is £12.95.

David Andrews

## Given the bird - and loved it

WHEN *Miner 2049'er* was released on an unsupporting Atari computer-owning public some two or three years ago, little could its creators have realised what a phenomenal amount of clones it would spawn.

Every popular machine has since taken its fair share of jumping and climbing games, the best-knowns probably being the Miner 2049'er games available for the Spectrum.

One thing that all these games have in common is that they owe their concept to *Miner 2049'er* - and we Atari owners are sitting in the knowledge that we saw it first.

None - after what is probably the longest ever wait

for a follow-up in computer games. History - comes **Beatty Bob Strikes Back**.

Originally to be called *Scraper Caper*, this game has arrived well over a year after full-colour double-page advertisements for it appeared in American computer magazines. Talk about starting the hype early!

All of this, of course, leads to the inevitable question - was it worth the wait?

The answer must be a resounding YES!

I made arrangements to borrow the cartridge from a (rich) friend (thanks, Nigel who had bought it direct from the States at great expense the pound was just about one for one against the dollar at the time).

The time limit on the loan was to be a maximum of two weeks as he couldn't bear to be parted from it for any longer.

The whole *Beatty Bob* package reeks of shiny American techno-flash, right from the box, which is at least five times bigger than it needs to be, the instructions, which are in the form of a giant full-colour poster, and, fortunately, the game itself.

I inserted the cartridge into the left-hand slot of my trusty Atari 800, switched on and - whew! A grid with birds flying around carrying letters? Could this be the correct game I had loaned?

But sure enough it was. The birds actually fly all around the screen and drop the letters

into the grid and spell out the game title, programming information and other relevant details.

The on-screeny gives access to a user-definable customiser screen which includes the amount of lives for Bob, difficulty level, music volume - you name it, you can change it.

There is even a line called 'special code' which the instructions say little about, only that it allows Big Five programmers access to the games code.

One surprising omission is the inability to enter the game from anything but level one, but this is sorted out after clearing certain levels of the game.

Secret messages are flashed on to the screen with the necessary information to enter the game at higher levels.

On pushing Start, the first screen scrolls smoothly from the bottom to the top of the TV screen in that familiar way that we Atariists know and love.

And, suddenly, there they all are - Bob, the mutants and the transporter that we've all seen before on *Miner 2049'er*.

Then came the first feeling - of disappointment. Was this just going to be a re-run of *Miner*?

Bob certainly looked exactly the same - that old familiar grin on his face and his battered hat peeking jauntily on his head, shuffling along filling in rectangles fit to bust.

It took me quite some time getting through that first screen, but I'm glad I persevered with it - from the second screen on, the action gets far more fast and furious and every screen is absolutely alive with a whole wealth of new and reworked ideas.

I only managed to get to level five and I played the game a heck of a lot in the two weeks that I had it.

Not since *Goldendash* (which I personally rate as the best computer game of all time) have I come across such a 100 per cent addictive game.

It is so alive with great ideas that you'll eagerly play it until two in the morning just to glimpse the next screen, so



you can go to bed and have nightmares about how the hack you're over going to get through it the next day.

Just a quick word about the hi-score screen. It's about the most inventive I've ever seen. Just take a look for yourself.

The only minus point I can think of about the game is that I can't find a way to cheat by jumping into any level.

Typing in the Big Five

phone number to jump levels in *Miner 2049er* was an open secret to most Atari owners. I've got to find the secret on Bourne Box.

I'm sure it's something to do with that special code on the customizer screen.

It's certainly not the phone number this time around—I've tried. And besides, the phone number is used to wrap you out of tricky situations where

you would normally have to wait for the game's timer to count you out.

Incidentally, for those of you who must be wondering at this point—No, I don't work for Big Five Software. I don't know the programmers personally, and I sure haven't got shares in the company—I'm just a dedicated Atari user who loves chess games.

At the time of writing,

*Bourne Box* was only available on import from America, at the horrendous price of £49.95.

But the good news is that US Gold should be bringing it out soon for a lot less.

It'll be the bargain of the century, so beg, borrow, or sell your old Dragon Inc, not your shirt, stupid! But rate up the money somehow and make sure you get a copy.

David Robb

## The hard route to the top

If chess is a little too violent for your delicate sensibilities, if you'd rather not dwindle than attack and capture, perhaps you need *Pensieve* from Penguin Software.

In this game, the object is simply to get from the bottom of the 8 x 8 board to the top while avoiding the computer's pieces.

The computer has 10 different pieces available, some of which move in a different way depending on how you move. The direction arrows always move the way they are pointing, but the other pieces are more devious.

For example, the piece with black and white arrows always moves in the opposite direction to you. The piece which looks like a combinatorial roundabout sign moves left or right if you move up or down, and moves up or down if you move right or left.

The two horse pieces have a chess knight's move, but in a particular direction depending on which way you go.

There are two basic modes—practice and tournament—and you'll need to start in the former. In this, you can choose which pieces the computer has on the board and also their starting positions.

In practice mode it's very easy to win if you're desperate. Simply give the computer a couple of pieces that will do nothing but move out of your way.

Of course, the more interest-



The *Pensieve* pieces have devious ways of moving.

ing games are played in tournament mode. Here you get to specify the skill level at which you play, and this determines the complexity of the playing pieces which the computer chooses for itself.

However tournament mode also requires you to play at least two moves ahead. That is, you specify your next two moves each time.

Your first move is taken, then the computer moves its pieces one at a time. Then this process is repeated with your second move, following which you specify your next two moves.

Once you really get the hang of it you can choose to

play up to four moves ahead. If the computer has a few complex pieces on the board it can get quite tricky trying to see into the future.

You win by getting to the top of the board and you lose by coinciding with one of the other pieces. However none of the computer's pieces lands on another—it makes its own move again.

The computer has the added advantage that its pieces "wrap around". If they hit the edge they reappear at the opposite edge. If your pieces hit the edge they get far away.

While you're learning you can set the speed option to

slow and watch the pieces make their moves. The manual promises that, once you've mastered the moves "a faster speed will allow victory to come quickly". Yes, but victory for whom?

In lower levels *Pensieve* is a little more and you get bored about the victory turn. However once you get involved and move up a few levels it's a real brain-bender. It's then that the fun becomes a true reward.

The feeling to start very simply makes *Pensieve* a very accessible game, but don't be fooled. If it gets you it could change the way you move around the office.

CSM McNaught

We looked at Graphics 1 and 2 last month and saw how they were split screen text modes. We also saw that only half the character set was immediately available — normally the numbers and upper case letters.

Now we'll access the "hidden" half of the character set and see how we can use lower case letters in Modes 1 and 2.

Let's start with one of the little programs from last month. Type in and run Program 1:

```
10 GRAPHICS 1
20 POSITION 0,0
30 PRINT HL;"HEARTS" END
```

Program 1

It should produce our name in orange upper case letters and the word *Hearts* should be in the text window at the bottom of the screen.

The operating system can only see the half of the character set containing upper case letters at the moment. However there is a location in memory which tells the system which half to look at.

Location 756 usually contains the value 324, which specifies the upper case half of the character set. If you'd like to verify this, simply type:

**PRINT PEEK756**

in the text window. The value 324 should appear at the top of the text window.

In order to convert our name to lower case all you need to do is change the value in location 756 to 326. You can do this by entering:

**POME 756,326**

In the text window. Try it now and see what happens. There's our name in lower case as promised, but what are all those hearts doing there?

If you told the two halves of the character set out next to each other, the lower case letters would line up with the upper case letters. That's why ATARI gets changed to start.

The hearts arise from the fact that the space character lines up with the special graphics heart shape. Consequently changing the value of location 756 to 326 causes a heart to be printed wherever a space was printed previously, which in this case means most of the screen.

A screenful of hearts might be

# Redefine cheating

*Part Three of DAVE RUSSELL's series on the Atari graphics modes*

useful on one particular day in February, but for most of the time they tend to cluster up the display.

There are two ways we can get rid of the hearts, one by "cheating" and lying one of the available colours, the other by redefining the character set. With the screenful of hearts, enter:

**SETCOLOR 0,0,0**

and the screen should be blank again. All you've done is change the colour in register 0 to the same colour as the background. Hence the hearts are still there in one sense — they're just printed in the same colour as the background. It's a bit like using black chalk on a blackboard.

Unfortunately although our name is still there, we can't read it because its colour was also defined by register 0. We saw how to change colour last month by using lower case letters to select a different colour register, so we can use this technique now to restore our name.

Press Reset and enter Program 1:

```
10 GRAPHICS 1
20 SETCOLOR 0,0,0
30 POME 756,326
40 POSITION 0,0
50 PRINT HL;"HEARTS" END
```

Program 2

When run it will produce the familiar result in lower case, with the letters now lying green instead of orange because register 1 is selected.

The second method of removing the hearts requires a little more work but introduces a technique which can be put to good use in other ways. It requires us to redefine the character set.

When you turn your mind on the characters are already there because they are held in read-only memory — ROM. As the name implies, we can only read from this sort of memory, we can't write to it or alter it.

Now if the character set was in RAM — random access memory, more properly called read and write memory — we could change it at will. What we must do, then, is move the character set into RAM so that we can change the heart character to something else.

We don't actually move the character set, we simply copy it, just like taking a photocopy. However before we do this we need to know how the micro represents the characters if we're going to change some of them.

If you look closely at the heart shapes you'll see that they are made up of little dots. The micro represents each dot as a bit of information in its memory, and each memory location can store eight bits, or a byte as it's known.

If you've been following Mike Dibby's *Bit Wars* series you'll know that a bit can be either 1 or 0. If it is 1, then a dot gets printed on the screen. If it is zero, no dot is printed.

Each character is represented as

# e that heart

an 8 x 8 matrix of bits, and so requires eight bytes of memory. The bit pattern for the heart shape looks like this:

```
00000000
00110110
00111111
00111111
00111110
00011100
00001000
00000000
```

With not too much difficulty you can see that the 1s form a heart shape against a background of 0s.

Each row of the matrix can also be read as a number by converting the binary representation to decimal. The top row of the heart would be 0, the second row would be 84, the third row would be 127 and so forth.

In order to redefine the heart shape as a space, we need to set the bit pattern of the character to the bit pattern of a space. Fortunately, the bit pattern of a space is easy to remember—it's simply eight rows of eight zeros. All we need to know now is where the bit pattern is held in memory. We'll know that when we decide where we're going to put the character set in RAM.

Program 11 copies the character

set into RAM and redefines the heart shape as a space. However it needs to do some "housekeeping" on the way, so I'll explain what each line is doing.

```
10 GRAPHICS=PAGE(100)
20 POKE 100,GRAPHICS-4
30 GRAPHICS=1
40 CHBAS=RAMTOP+4
50 ADDR=CHBAS+256
60 FOR I=0 TO 255
70 FOR ADDR=ADDR+1:POKE I,0
80 NEXT I
90 CHBAS=4
100 FOR ADDR=CHBAS+256
110 FOR I=0 TO 255
120 ADDR=ADDR+1
130 POKE ADDR,0
140 NEXT I
150 DATA 0,0,0,0,0,0,0,0
160 FOR I=0 TO 255:CHBAS=I
170 POSITION I,0
180 PRINT @I;"NAME: NAME"
```

#### Program 11

The character set occupies 1k of memory, so we need to set aside this amount of RAM and protect it in order that the rest of our program doesn't interfere with it. The easiest way to do this is to move the top of memory down by 1k and put the character set

in there. If we tell the mixer that we've done this, it will do the necessary juggling for us.

Memory is organized in 1k (or 256 bytes) pages and so we need four pages of memory for the character set. Memory location 100 holds the current position of RAMTOP, the top of RAM memory, so line 10 looks at the current value and line 20 moves the value down by 4 pages, giving us the necessary 1k.

Before we move the character set we must tell the mixer that we've moved RAMTOP, otherwise we might write over the display list. The easiest way to do this is to issue a Graphics command, hence line 30.

We'll call the beginning of the character set CHBAS. Line 40 tells the mixer where CHBAS is to begin, with line 50 giving the actual location.

In ROM the character set begins at location 57344, so the loop from line 60 to line 80 pokes a value into ADDR corresponding to the value held in 57344.

The loop counter increments by 1, so next the value held in 57344+1 is poked into ADDR+1. This loop is carried out 1024 (or 1k) times, resulting in a copy of the character set being poked into RAM and starting at ADDR.

The heart is character number 84 and each character requires eight memory locations. Since we know that the set begins at ADDR, we can work out that the heart begins at ADDR + (84\*8). Lines 90 and 100 provide the program with this information.

For each of the eight bytes of the heart character in turn the loop from 110 to 140 writes a 0, as taken from the data in line 150. This replaces the heart with a blank.

Lines 160 to 180 give us our old favourite message, but this time it's in lower case orange.

If you use this routine in your own programs, use:

**POKE 100,CHBAS**

to access the upper case characters and:

**POKE 100,CHBAS+2**

to access the lower case characters. The advantages of this technique



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Column 1		Column 2		Column 3		Column 4	
No. CHR	Hex. CHR	No. CHR	Hex. CHR	No. CHR	Hex. CHR	No. CHR	Hex. CHR
0 space	20 0	32 @	40 P	64 Q	80 S	96 +	112 p
1 !	21 1	33 A	41 Q	65 R	81 T	97 =	113 q
2 "	22 2	34 B	42 R	66 S	82 U	98 %	114 r
3 #	23 3	35 C	43 S	67 T	83 V	99 &	115 s
4 \$	24 4	36 D	44 T	68 U	84 W	100 *	116 t
5 %	25 5	37 E	45 U	69 V	85 X	101 +	117 u
6 &	26 6	38 F	46 V	70 W	86 Y	102 ^	118 v
7 '	27 7	39 G	47 W	71 X	87 Z	103 _	119 w
8 (	28 8	40 H	48 X	72 Y	88 [	104 `	120 x
9 )	29 9	41 I	49 Y	73 Z	89 \	105 ~	121 y
10 *	2A 0	42 J	50 Z	74 [	90 ]	106 {	122 z
11 +	2B 1	43 K	51 [	75 \	91 ^	107 _	123 {
12 ,	2C 2	44 L	52 \	76 ]	92 _	108 `	124
13 -	2D 3	45 M	53 ^	77 ^	93 a	109 a	125 }
14 .	2E 4	46 N	54 _	78 a	94 b	110 b	126 ~
15 /	2F 5	47 O	55 ~	79 b	95 c	111 c	127 ~

A. In Mode 0 these characters must be preceded with an Escape, CHR\$(27), to be printed.

Table 1: Internal character set

over the colour-changing "clear" method are that all the colours are available and you can redefine any of the characters. All you need to know is the internal character number of the character that you want to change.

For a simple demonstration of redefining the font to something visible, change all the Os in line 160 to 1s.

Last month we saw how in Modes 1 and 2 the COLOR command selects the character to be PLOtTied. By adding 32 to the character, we produced a different colour but didn't say where the number 32 came from.

Now that we've seen how to use location 768, we can use the COLOR/PLOT combination to produce multi-coloured messages. In

order to do this you'll need to use Tables 1 and 2, which are adapted from pages 55 and 56 of the Atari Basic Reference Manual. (Note that Table 2 corrects an error in the original.)

Find the character you want in Table 1. If it is in column 1 or 2 it is part of the upper case set. If it is in column 3 or 4 it is part of the lower case set. Remember that at the level we're operating we can't mix upper and lower case characters.

Suppose we want to plot an A in the colour contained in register D (range). Table 1 tells us that A's character number is 33 (column 2) and Table 2 tells us that in order to plot column 2 characters in register D colour we must add 32 to the character number.

If we'd wanted to plot the A in register 3's colour (purple), Table 2 tells us that we would have to add 192 to the character number.

The registers contain their default values but we can alter them using the SETCOLOR command as we saw in the May issue of Atari User.

To illustrate the use of the conversion factors type in Program 4 while you're still got Program 3 in memory. It overwrites lines 130 and 160 and adds lines 190-230, using the same technique as we used last month.

```

170 FOR K=1 TO 20
180 B=0:G
190 C=0:G
200 PLOT 440,G
210 B=0:G
220 B=48:48,192,192,72,32,
230 192,312, 815:G

```

Program 4

It'll leave you to play with the actual colours displayed by changing the contents of the registers via SETCOLOR. You can get some nice effects with a well-placed FOR ... NEXT loop.

		POKE 768,234		POKE 768,236	
Mode 1	SETCOLOR 0	+32	+32	-32	-32
	SETCOLOR 1	None	+64	-64	None
Mode 2	SETCOLOR 2	+160	+160	+96	+96
	SETCOLOR 3	+128	+192	+64	+128

Table 2: Character colour assignment

# Antic ... the reason Atari graphics pack such a mighty punch

**MIKE ROWE**  
begins a series on how to  
produce spectacular displays  
with an Atari

ONE of the Atari's most renowned and spectacular features is its graphics capability. The machine has 16 different graphics modes and can display up to 16 colours from Basic (256 using machine code).

This is more than any of its rivals and more than many computers costing thousands of pounds. The reason the Atari is able to perform these feats is the inclusion of a chip called Antic to look after screen display.

This is a microprocessor in its own right and runs alongside the 6502 main microprocessor, freeing that for the user program. In addition there is the GTIA chip, which is also a microprocessor. This creates the famous Atari player-missile graphics and interfaces the computer to the TV display.

For those of you who are new to your Atari the 16 modes consist of five modes that display text and 11 modes that display graphics. These are shown in Figure 1.

You may have noticed that there

are two kinds of mode number, Basic and Antic. The Basic number is that used in a graphics call from a Basic program. For example Graphics 0 gives you the standard 40 x 24 text mode.

The Antic mode number is the one stored in memory to be used by the Antic chip to tell it what kind of screen to display. This is calculated from the Basic mode number and stored in the correct location in memory by the computer's operating system — the Antic number of Basic graphics Mode 0 is in fact 2. Using the Antic mode numbers directly without a Basic graphics call will be explained in later articles.

Don't ask me why Atari had to make the two numbers different, but they did and we're stuck with it. From now on, when I refer to graphics modes I mean the Basic mode and if I want to refer to the Antic mode I will specify Antic.

How does the Antic chip work? A television picture is created by a beam of electrons hitting a fluorescent screen on the inside of your TV

Basic mode number	Antic mode number	Text or graphics	Number of colours	Columns	Rows full	Rows split	Bytes of memory needed
0	3	TEXT	2	40	24	—	593
1	6	TEXT	4	30	24	30	513
2	7	TEXT	8	30	12	16	361
3	8	GRAPHICS	4	40	24	30	373
4	9	GRAPHICS	2	80	48	40	527
5	10	GRAPHICS	4	80	48	40	1017
6	11	GRAPHICS	2	160	88	80	2028
7	12	GRAPHICS	4	160	88	80	3848
8	18	GRAPHICS	2	320	160	160	7900
9	19	GRAPHICS	1*	80	160	—	7900
10	18	GRAPHICS	8	80	160	—	7900
11	19	GRAPHICS	16	80	160	—	7900
12	4	TEXT	5	40	24	30	1152
13	5	TEXT	5	40	12	10	888
14	12	GRAPHICS	2	160	160	160	4288
15	14	GRAPHICS	4	160	160	160	8738

\* = 16 Shades of 1 colour

Note that graphics modes 12-15 are available directly from Basic only on the SLA. They can only be obtained on the 400/800 computers by creating the mode yourself.

Figure 1. Graphics modes

tube (oversimplified). The beam is made to scan horizontally in sequential lines across the screen and the whole screen is covered 60 times a second.

A normal TV picture consists of 625 of the lines. In fact it consists of 312 interlaced, alternating lines. The computer display, to avoid oversampling the TV and losing data, consists of only 192 lines, leaving a gap at top and bottom of the screen.

Attic is able to control each scan line individually and up to 320 individual pixels horizontally. A pixel is a single point on the screen created by the computer and therefore the smallest dot it can make.

In between each horizontal scan of a line there is a small delay – the horizontal blank. Also between each time the screen is drawn there is another delay – the vertical blank. More of these later.

The higher resolution modes (192 vertical resolution, say Graphics 8) use one scan line per horizontal row of the screen. However other modes use up to 16 scan lines per line of the graphics mode.

The scan lines used are:

Basic mode	Vertical resolution	Scan lines/ mode line
0	24	8
1	24	8
2	12	16
3	24	8
4	48	4
5	48	4
6	96	2
7	96	2
8-11	192	1
12	24	8
13	12	16
14	192	1
15	192	1

The next question is, how does Attic know what to display? The answer lies in the display list, a small machine code program interpreted by Attic to give the display. It tells the chip two main things:

- The Attic graphics mode number for each line.
- The memory location of the screen display.

It is normally created and manipulated by the computer's operating system and the Basic programmer can forget it.

The whereabouts of the display list



'Stored in a rather complicated way ...'

is stored in rather a complicated way, in memory locations decimal 560 and 561, because a computer does not work in decimal (base 10) as we do. It works in binary numbers (base 2).

These are often expressed as hexadecimal (base 16) – see Mike Biley's 88 Wise article on Page 46 for an explanation of this.

Every memory location in the computer can store a number between 0 and 255. Therefore to express numbers greater than 255 you must use two memory locations. So to store a number such as 43000 you must split it into two parts. This is done by firstly finding the number of times 256 will divide into it and secondly the remainder.

The first number is known as the high byte of the number and the

remainder is the low byte. They are stored in memory in the order low byte, high byte. For example, for 43000 you get 43000/256=164 remainder 16. The high byte is 164 and the low byte 16.

If 43000 was the location of the display list then 560 would contain 16 and 561 would contain 164. If there is no remainder then 0 must be stored in 560.

Conveniently, to find where the display list is located you multiply the number in location 561 by 256 and add this to the number in location 560, that is  $PEEK(561)*256 + PEEK(560)$  gives the location of the display list.

Most display lists are very short.

Decimal	Hex	
112	70	13 lines
112	70	1 each of 8 blank
112	70	1 each line
66	42	=64 (LMS instruction)
		+2 (Graphics 0 line)
64	40	Screen memory location
196	9C	(=64+16*7256)
2	02	120 lines the same
		(i.e. 23 Basic Graphics 0 lines)
66	42	=64+1 (end of display list & Jump to
32	20	Memory location of start of list
196	9C	(=32+16*7256)

Figure 11: Graphics 0 display list

# Display List

usually less than 100 bytes. The display list used for Graphics 0 is typical and is shown in Figure 8.

To some extent, the display list is fairly self-explanatory, however a few things need expanding. Firstly, the LMS instruction. This means Load Memory Scan and tells Arlec to look at the next two instructions to find where in memory the screen should be displayed from.

The above display list has only one LMS instruction but a display list can have several of these pointing to different memory locations, and can even have a different LMS for each mode line.

Therefore any mode number can be added to an LMS instruction to tell Arlec to look for its display data wherever you wish. The above display list starts with three lines, each of eight blank scan lines to give 24 blank scan lines at the start of the list.

All the standard graphics modes start with this. The number 112 (83Dh) is only one of several "blank line"

instructions:

Decimal	Hex	Number of blank scan lines
112	70	8
88	80	7
80	50	6
64	40	5
48	30	4
32	20	3
16	10	2
0	00	1

The end of the display list can be split into three numbers starting with a 65 (541h). This can be divided into 1+64. The 1 tells the display list to jump and the 64 is an LMS telling Arlec that a memory location follows. The next two numbers are therefore the memory location that the list jumps to, in this case the start of the list. These two numbers will be the same as in memory location 580 and 581 respectively, as they point back to the beginning of the display list.

Other instructions may also be included in the list and the following

table gives the instruction codes that can be included in a display list by adding it to the Arlec mode number. We'll see more of these in later articles.

Decimal	Hex	Instruction
16	10	Horizontal scroll
32	20	Vertical scroll
64	40	LMS
128	80	Jump to the display list interrupt

This is all very interesting, I hear you say, but of what use is it and do I really need to know all this? Well, if you are happy to have just the 16 simple modes provided then no!

However, much more spectacular and attractive displays become available if you can understand this and know how to alter things to your heart's desires. This is done by creating your own custom display list and mixing modes on the same screen and by creating things called display list interrupts.

More about these next time.

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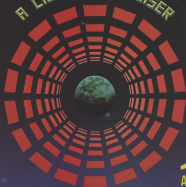
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THE NATURE OF THE BEAST

At the heart of all the Atari computers, except the ST range, is the 6502 central processing unit, CPU for short, which is responsible for keeping your mine working. It does this by executing complex programs which are contained in memory.

Machine code programs consist of binary numbers, each having a different meaning to the CPU. Now we humans aren't much good at making sense of a series of numbers, but fortunately a disassembler translates these numbers into assembly language.

It's not exactly the Queen's English, but is a lot easier to understand.

The next thing we need to know is the location of the machine code programs which keeps the Atari working — this is known as the operating system or OS.

The OS starts at location 55298 (\$0800) and ends at 85535 (\$FFFF). So if you're in need of some machine code routines to examine then 55298 is a good place to start.

Don't expect to understand it though. It's fairly complex.

Another large section of machine code programs is the Basic interpreter. This can be found in locations 40860 (\$A000) to 49181 (\$BFFF). No matter what language you program in, it always gets executed by a machine code routine — and you can have a lot of fun trying to fathom out how it works.

Program 1 is the disassembler.

```

0011 - immediate
0123 - register
001 - left page
0 - second byte
4 - logical (shifting)
0123,4 - pre-indexed indirect
0001,2 - post-indexed indirect
011,2 - left page,4
0123,4 - register,4
0112,3 - destination
0113 - logical
01113 - indirect
011,2 - zero (ZPF)

```

Figure 1

# Get right to the heart of your mine

KEVIN EDWARDS shows how to examine machine code by employing a disassembler

Type it in and see it. It uses a simple machine code routine to convert a decimal number into hexadecimal. You can see what it does by disassembling it.

When you run the program the message "wait a moment..." will appear. This is printed while the program reads in the data statements.

After this you will be prompted for the start location. This must be a number between 0 and 85535 (0 and \$FFFF).

Let's assume 40860 (\$A000) has been entered. The program at the address will be disassembled. You'll get something like this:

40860 05 0A	LDX #0A
40861 10 04	BNE #0000
40862 05 04	LDX #00
40863 10 05	BNE #0000
40864 02 07	LDX #007F
40865 76	TIJ

The first number is the address of the program being disassembled (in hex, as with all numbers printed). The next number indicates the instruction type (the command byte). This can be followed by 0, 1 or 2 bytes which give additional information about the instruction — this specifies a memory location or constant used by the command.

Next, the mnemonic for the instruction is printed. A mnemonic is an abbreviation for the type of operation the command performs. For example, LDA means Load Accumulator, and BNE means Branch if Not Equal. If the command byte is invalid three question marks will be printed instead.

After the mnemonic comes the addressing mode. This indicates the way in which the command is to be used. For example, LDA \$FF means Load the Accumulator with the contents of location \$FF. Figure 1 gives a list of the addressing modes available, where 000 and \$0000 are hexadecimal numbers.

Not all of the addressing modes are available for each command. This is why large amounts of data are needed to indicate which are valid. It would be much simpler to program if every command allowed every addressing mode.

The program will continue disassembling memory until the end of memory is reached (\$5535-\$FFFF) or the Q key is pressed.

Pressing S stops the disassembly and requests another start address. You can stop and start the output from the program by pressing Control-T. This is very useful if you're working your way through a complex routine where you need extra time to think.

When you've finished using the program you can exit by pressing Break.

Let's take a look at how the disassembler works. All of the mnemonics are held in the string MNS. The mnemonic data for all the 256 commands are in the array MVALS(n) — where n is the command number.

So by accessing the array MVALS we can find the corresponding mnemonic number for the command. Multiplying this by three results in the offset for the three different mnemonic characters in the string MNS. Extracting this from the string

# the r micro

examine the CPU's  
assembly routine

gives us the desired mnemonic. This is done in lines 210 and 220.

Next we must find which addressing mode is being used and print it out. The addressing modes for the commands are found by examining the array ADDR(n) - n being the command.

One of 12 subroutines is called



```

20 DIM DIMENSION$
30 DIM BY DIMS ADDRESS
40 DIM DIM ADDRESS
50 DIM ADDRESS$
60 IF "PC" = "PC" THEN GOTO 100
70 DIM DIM ADDRESS$
80 DIM DIM ADDRESS$
90 DIM DIM ADDRESS$
100 DIM DIM ADDRESS$
110 DIM DIM ADDRESS$
120 DIM DIM ADDRESS$
130 DIM DIM ADDRESS$
140 DIM DIM ADDRESS$
150 DIM DIM ADDRESS$
160 DIM DIM ADDRESS$
170 DIM DIM ADDRESS$
180 DIM DIM ADDRESS$
190 DIM DIM ADDRESS$
200 DIM DIM ADDRESS$
210 DIM DIM ADDRESS$
220 DIM DIM ADDRESS$
230 DIM DIM ADDRESS$
240 DIM DIM ADDRESS$
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```

## Disassembly

depending on the previous result – see lines 230 and 240. Figure 8 shows the addressing modes and corresponding numbers used by the `asm386.c`.

Another array, `BYTESIZE`, indicates the number of bytes taken up by each addressing mode. This is needed so that the program knows how many bytes to print after the address and by how many the memory address is to be incremented.

As I mentioned, the disassembler has its own machine code routine at locations 10554-10560. This is

responsible for converting a decimal number into hexadecimal ASCII characters. It is needed because Atari Basic does not support any command to print numbers in hexadecimal.

The rest of the program is quite unexcited forward.

Now it's up to you. You can begin by disassembling all those brilliant games to see how they work. Certainly, one of the best ways to improve your programming is to work out how other people's programs achieve their effects.

- 0 - Invalid op
- 1 - Invalid
- 2 - Invalid Page
- 3 - Accumulator
- 4 - Invalid
- 5 - Pre-indexed indirect
- 6 - Post-indexed indirect
- 7 - Invalid page
- 8 - Invalid op
- 9 - Invalid
- 10 - Invalid
- 11 - Invalid
- 12 - Invalid

100

Age Group	No opinion	Dislike	Like	Love
18-24	~45%	~35%	~15%	~5%
25-34	~40%	~30%	~25%	~5%
35-44	~35%	~25%	~30%	~10%
45-54	~30%	~20%	~35%	~15%
55-64	~25%	~15%	~40%	~20%
65+	~20%	~10%	~45%	~25%

<b>MNS</b>	String containing the mnemonics.	<b>ODD</b>	Command byte for current instruction.
<b>MINUM(255)</b>	Mnemonic numbers for each command byte.	<b>A</b>	General purpose.
<b>ADM(255)</b>	Addressing mode for each command byte.	<b>LOOP, LOOPF, LP</b>	General loop variables.
<b>BYT(12)</b>	Number of bytes taken up by each addressing mode.	<b>SPBT</b>	Number of bytes used by current instruction.
<b>START</b>	Address currently being disassembled.	<b>NUM1</b>	An 8 bit number which is to be printed out in hexadecimal.
		<b>NUM2</b>	A 16 bit number which is to be printed out in hexadecimal.

[illegible][illegible][illegible]

THE *Only* REALISTIC

# BASKETBALL

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OR A FRIEND • 4 SKILL



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OLD favourites are always the best, so here's one of the oldest—Bomb Run. It's a fast, colourful, exciting Atari version of one of the classics.

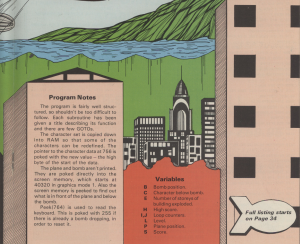
Your plane is running out of fuel and losing altitude at an alarming rate and there's nowhere to land. The only solution is to flatten the deserted city below and create a landing strip using your cargo of bombs.

The controls of your plane have lost power and no longer function, but pressing the spacebar will release a single bomb. When it's exploded the next can be dropped.

There's a lively tune to accompany the instructions page and appropriate sound effects during the main game. Level 1 is the easiest and if you manage to land you start again on the next level with even taller buildings. The highest score is remembered, so there's always the challenge of trying to beat your best.



Bombing the deserted city to make a landing strip is your only hope of survival in this exciting arcade-style challenge by **ROLAND WADDILOVE**



### Program Notes

The program is fairly well structured, so shouldn't be too difficult to follow. Each subroutine has been given a title describing its function and there are few GOTOs.

The character set is copied down into RAM so that some of the characters can be redefined. The pointer to the character data at 768 is poked with the new value - the high byte of the start of the data.

The plane and bomb aren't printed. They are poked directly into the screen memory, which starts at 40000 in graphics mode 1. Also the screen memory is poked to find out what is in front of the plane and below the bomb.

Peek(764) is used to read the keyboard. This is poked with 255 if there is already a bomb dropping, in order to reset it.

### Variables

- B Bomb position.
- C Character below bomb.
- E Number of stories of building exploded.
- H High score.
- I,J Loop counters.
- L Level.
- P Plane position.
- S Score.

Full listing starts on Page 34

[illegible][illegible][illegible]



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We already know how skilled and creative Atari users are, and we look forward to receiving your programs and articles for publication in future issues of *Atari User*. However before you send your masterpiece off to us there are one or two points that you ought to bear in mind to make all our lives easier. We call them the seventeen commandments...

# The Seventeen Commandments

WHILE not wanting to put programmers' creativity into a straightjacket we've found that life can be made a lot easier for the magazine, our readers and the programmers themselves if we stick to certain standards.

It has also occurred to us that it's no good us just knowing what we want, we have to tell you, our potential contributors. So here are our 17 commandments. Don't be too desecrated by the list - it's mostly just common sense and good programming practice.

● Send us your programs on tape or disc. There's no point in just sending a listing and asking if we're interested. You can't expect us to evaluate a program from merely reading a listing. We may be good, but we're not that good! A cassette or disc with the program on it is a must.

We don't use two part programs in the magazine. Games in two files may look professional but they're the kiss of death as far as the magazine is concerned. Too much can go wrong when people type them in.

● Avoid variable names that lead to confusion such as I and L, O and 0 and try to use meaningful variable names as well - `AJENS` is far more understandable than `AL`.

● Tell us what the program is supposed to do and refer to it by name. You'd be amazed at the number of programs we get where the author forgets to tell us what it is all about.

In any subsequent correspondence, reference to "my program"

can cause problems by its vagueness. Okay, we'd have the program on record somewhere, but life would be a lot easier all round if its author were less modest and admitted he was the genius behind "Mega-Invader".

● Label everything with both the program's name and your own name and address. And put the word **ATARI** on it somewhere. You won't appreciate the reason for this until you produce as many magazines as we do. Keep your own copy of it, too. So far the only existing copy of one particular classic game hasn't disappeared in the post - but there's no reason to run the risk of yours being the first.

If it's a game let us know how to "cheat" so we can test out the higher levels. We're getting on a bit here and our reactions aren't as good as they used to be. (Not that they were up to much when they were as good as they used to be...)

And an adventure-type game or whatnot should come with a map of the rooms and any other aids about you possess. Much as we'd like to, we just don't have time to guess the name of Rumplestiltskin's brother, no matter how much we admire your ingenuity. (Anyway he works in our articles.)

● Put more than one copy of the program on your tape or disc. And if you want the cassette or disc back let us have a stamped addressed envelope with the name of the program on it.

You won't appreciate this unless you've run a computer magazine, but please send each different program on a different cassette or disc. If not, we just can't handle them. The rule is, one program per cassette or disc - though recorded several times on it.

● Let us have a printed listing if possible. Screen dumps or off-screen

photos are much appreciated, though not vital. Diagrams are always of use. Often a point that's difficult to put into words becomes clear as crystal when you sketch it out.

● Give a description of the program, what it does, why you wrote it, and outline the way it works and its variables and subroutines.

If it's a game let us have a plot. You'll get an idea of the sort of thing we need by reading the introductions to one or two of our games.

Maybe you could also give a few ideas for its improvement or expansion. Even if you can't get your upgrades to work, there's a good chance that someone among our very talented readers will.

Every subroutine ought to be titled clearly with a **REM** and should be referred to by it. Again, make the title meaningful. Also when you **GOSUB** use a **REM** to indicate which subroutine you're using. For example:

```
100 GOSUB 1000: REM Move man
```

```
:
```

```
:
```

```
:
```

```
:
```

```
1000 REM *** Move Man ***
```

```
:
```

```
1100 RETURN
```

As first this may seem to be far too much fuss, but it's not just for the readers' benefit. As your programs grow you'll find that such **REMs** more than repay the effort by allowing you to keep track of your work.

When you write out your list of subroutines I'll try to do it in the form:

```
100 example :Shows how we  
                want...  
200 delay :Holds things up...  
where the line numbers refer to the
```

line where the subheadline is defined. Again, this helps by making things clearer to our readers — and you!

We don't expect your program descriptions to be classics of English literature, but it does help if they make sense and are easy to follow. Try reading them out loud — you'll be amazed how much such a simple technique can improve your writing.

Also if you get stuck to put something into words try this trick: tell someone what it is you're trying to put into words — then write it down. Before you reject this hint, try it — more than one professional writer owes his career to it.

- It is good practice to number your program, starting at 10 in increments of 10. This way a missing line stands out like a sore thumb.

- Make sure that the program actually works. Try it out on your friends for their criticism (a painful though it may be). The acid test is to ask them to type it in. And — when you find yourself muttering through clenched teeth, "How could anyone be that stupid?" (the answer is "regularly") — cast out the mote in your own eye and alter your program to take account of the feedback.

It's not easy to do, as the all-too-frequent blood tests among the editorial staff have testify, but it's worth it.

Instructions can make or break a game. Make sure that your's really do instruct. They should be complete and it helps if the spelling and grammar are correct. Apart from causing confusion, such errors also make programs look amateurish.

As well as misspellings, bad grammar, split words and general unreadability are all to be avoided.

Following even the simplest program can cause problems for the most experienced programmer — don't add to them unnecessarily.

- Please do put lots of nice explanatory REMs in your programs. A couple of REM statements with nothing after them at the beginning of the program gives us room to put in our message without messing up all the line numbers you have referred to in your program description.

- Double space all your written

matter. This means leaving a blank line between each line of text — it's vital from our point of view. Try to follow our style. We have our own ways of doing things. We talk about modes in general but Mode 1 is particular. We press the Return key, not the RETURN key as you might expect.

Just look how we do it in the magazine. Our programs are Program 1, Program 11, and so on, our diagrams Figure 1, Figure 11.

- Try to avoid long multiple lines if

**If you follow these rules when you submit a program you'll stand a better chance of having it published**

you can. Remember, people will be spending hours typing your programs into their machines, and long lines are harder to debug.

- Please, when you send us your work, include a separate page telling us that it is your own work, it has not been offered elsewhere and we have your permission to print it, if you don't, we'll have to return it.

- It's always nice if a program can have an alternative key or joystick option.

- One of the major causes of programs crashing is because the user inputs something the program

wer wasn't expecting. All right, the idiot shouldn't type in —999 when you ask him his age, but believe me, they will, out of their generosity — particularly if the program is educational. There is something about CAL programs that brings out the devil in us all...

- Be try out all the unlikely options — if you don't, some poor user will.

Actually it takes a lot of skill to write proof a program, as it's deliciously known in the trade.

Often you're so involved in getting the program to work as if it's supposed to that you just can't make the mental leap needed to see it as the passively malevolent reader does. So try it out on your friends!

- Another intention for a reader is when he sees something like:

**PRINT"**

Exactly how many blanks is he supposed to enter?

Use:

**PRINT" "":REM 4 BLANKS**

- Tell us who you are. We like to know your Christian name and also it's interesting to know your age and profession. After all, we might reject your program, but if we know you wrote a letterbox letter we'd have been able to send you Obacuracoth's "Fertile fellocks on the Atari" for review.

Also a telephone number — both home and work — with the correct STD code is really useful, and can save a lot of time.

Then under the 17 rules, if you follow these when you submit something to us you'll stand a much better chance of having it published. More importantly, you'll become a far more professional programmer.

And the better you become the more satisfying it is.

Contributions should be sent to:  
Features Editor, Atari User, Europa House, 58 Chester Road, Haver Grove, Chesham SA7 5NT.



## Tickle the ivories..

TURN your Atari into a simple electronic organ with this easy-to-enter Basic program from W.B. HILTON. When you run it, the A to I keys become the white notes while W, E, T, Y, U, O and P supply the blacks.

In no time at all you'll be playing your own Atari masterpiece and, if you're feeling ambitious, you could even supply a graphics keyboard. Let's see (or is it hear?) your creations at Atari Meet, Sounds like it might be fun.

1 REM ATARI KEYBOARD

2 REM BY W.B.HILTON

3 PRINT "ORGANIZER"

4 ACPOKE 1740

50 IF W=0 THEN GOTO 10

60 GOTO 10

70 PRINT "WELCOM"

80 GOTO 10

90 IF W=0 THEN GOTO 10

100 IF W=0 THEN GOTO 10

110 IF W=0 THEN GOTO 10

120 IF W=0 THEN GOTO 10

130 IF W=0 THEN GOTO 10

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160 IF W=0 THEN GOTO 10

170 IF W=0 THEN GOTO 10

180 IF W=0 THEN GOTO 10

190 IF W=0 THEN GOTO 10

200 IF W=0 THEN GOTO 10

210 IF W=0 THEN GOTO 10

220 IF W=0 THEN GOTO 10

230 IF W=0 THEN GOTO 10

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1190 IF W=0 THEN GOTO 10

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**FRUIT SALAD (16K)** Mastermind type game using coloured graphics "PUZZLE". The game is not only a challenge for adults but with the "Fun Graphics" and "Total joystick input" it is also an attractive accompaniment for younger children. For 1 or 2 players. **£2.95.**

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**TRICKY PUZZLE (16K)** is the latest program from P.P. Software - you have the job of picking fruit from the orchard whilst avoiding the various snakes. (Telephones, jotted plans, chessboards and more). Total ML game action with super smooth movement. Even the worst games players can't lose at this price. **£2.95.**

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"Argus" issue 120

Pictures included in P.P.

Shoppers and P.P.'s to:  
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Please send SAE to find an example of your work which will be returned unopened.  
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Peter Davidson, Software Manager, Database Software,  
Europe House, 88 Charter Road, Hazel Grove,  
Stockport SK7 5NY.

# Atari DOS 2.5

**BEFORE** telling you about Atari's new DOS, let's first explain for cassette owners what DOS is. It stands for Disc Operating System, and its job is to handle the storage of information on disc.

When you store anything on cassettes, you can just use **SAVE** and **LOAD**, and the computer will do the rest. So why the need for an extra DOS for disc drives?

The reason is one of memory. The disc handlers have lot's more work to do than the cassette handler, and therefore take up about 5k of memory.

Atari decided, quite reasonably, that owners who had only a cassette recorder be more than a little upset at losing an extra 5k for something that they would never use. Thus, DOS is stored on disc, and will automatically load into the computer when you switch on.

Atari have released three versions of DOS so far, and a fourth is now available. DOS 1.0 took up 5k of memory, and was soon replaced by DOS 2.0. This has a case of 5k which loads into memory on power-up, and a menu taking up a further 4k, which only loads when you type "DOS".

DOS 2.0 has become the standard for all third-party DOS manufacturers, and was well established when Atari came along with the new 1050 drive and the all-new DOS 3.

This offered extra storage space, but was very poorly received because it was clumsy to use, incompatible with DOS 2.0 discs, and very wasteful of space. Even a spokesman from Atari admitted that it was "a bit of a dog".

Thankfully, Atari have backed

**Taking a long hard look at Atari's new operating system, ANDRE WILLEY reports that it's very friendly and makes the most of enhanced density's extra storage space**

down, and called in Bill Wilkinson, of Optimized Systems Software, to write a revised version of DOS 2.0 to handle enhanced density.

DOS were responsible for the original Atari DOS, Basic and Assembly/Editor Cartridge, and have since upgraded these products themselves into the excellent DOS-XL, Basic-XL and Mac/85.

They have also released what I consider to be simply the best language available for the Atari - Action! Thus, the news that DOS were doing DOS 2.5 hit the Atari community in much the same way as the music world would take the news that the Beatles were re-forming.

I have been using a pre-release copy of DOS 2.5 for about a month now, and it seems to do all that's claimed for it. It is very user-friendly without being tedious to use, completely compatible with DOS 2.0, and capable of using the extra storage space of enhanced density. The main

menu will prompt you with the following one-letter commands:

- A. Directory of files on disc.
- B. Return to Basic (or cartridge).
- C. Copy files from one drive to another.
- D. Delete files.
- E. Rename files.
- F. "Fast" files.
- G. "Unlock" files.
- H. Write DOS files to disc.
- I. Initialize disc (format).
- J. Make duplicate copy of a disc.
- K. Save a block of memory (not Basic programs).
- L. Re-load a saved memory block.
- M. Run a machine code program.
- N. Make a MEM.SAV file (see below).
- O. Duplicate files on single drive.
- P. Format (single density only).

DOS 2.0 owners will recognise all but the last option, though some of the others have been slightly altered. Drive density is automatically selected, which means that when you type I for Initialize disc, the computer will detect whether you have a drive capable of enhanced density, and format the disc accordingly.

Should you wish a disc to be formatted for later use on an old 810 drive option F will format a disc in single density regardless of the drive type. Whenever you load a formatted disc into a 1050 drive it will sense the type - so discs can be swapped about as you wish.

The duplicate disc option L3 will format the new disc before copying, thus ensuring an accurate copy, no matter what density the original was

recorded in.

One interesting point is that any files you create on an enhanced density disc which would be beyond the end of a DOS 2.0 single density disc will show up with < > brackets around the filename, meaning that they will be invisible on a DOS 2.0 directory.

Getting a directory list of files from your master disc will show the following:

```

* DOS      SYS 037
* DUP      SYS 042
* RANDISK  COM 028
* SETUP    COM 070
* COPY32   COM 098
* DISKFIX   COM 057
* DOSMAN    019
* MINIMAN   147

```

**573 FREE SECTORS**  
(On 270 FREE SECTORS in single density)

The asterisks before each filename indicate that all of the files are "locked", which simply means that DOS will not allow you to delete them without first telling it to "unlock" them again.

The numbers after each name tell you how many sectors long that particular file is — one sector is the smallest length a file can be, and can contain up to 128 bytes. Thus, the file RANDISK.COM takes up 1152 (or 9 times 128) bytes of disc space.

In enhanced density, a disc has a total of 1010 sectors available, which the directory shows as 899+, to ensure compatibility with DOS 2.0. In single density mode you will get the same amount of free space as with DOS 2.0 — 707 sectors.

The file DOS.SYS which, somewhat surprisingly, is two sectors shorter than on DOS 2.0 is the segment of DOS that loads on power-up, and DUP.SYS is the segment called up when you type "DOS".

This has the disadvantage that when you call DOS on either DOS 2.0, 2.5 or 3, your program will be lost. Therefore you must either SAVE your program before calling DOS, or put a MEM.SAV file on your disc — using menu option W — which will automatically save the program for you before DOS is called and restore

it again afterwards.

The other files on the master disc are a series of useful utilities. The most interesting of these is RANDISK.COM. This allows you to use the extra 64K RAM on the 130K6 in the same way as you would normally use a second disc drive.

The advantage of this is that it is dozens of times faster than a disc drive, and with DUP.SYS and MEM.SAV set up on the RANDISK (which is handled by RANDISK.COM), calling DOS is virtually instant (see Table 6).

You get a total of 409 sectors on this "disc", and it is perhaps the most powerful and useful feature of DOS 2.5. The catch — there's always one, isn't there? — is that the contents of RAM are lost when you switch off the computer, which means that you must always finish a session by saving anything that you want to keep back on to a real disc.

SETUP.COM allows you to change the system configuration — number of drives allowed, buffer areas, read-after-write verify mode and so on. It can also create an AUTOEXEC.SYS file for you, which will run a basic program and/or set up the BB-232 handlers for modem use when you boot the disc.

COPY32.COM is a utility which will allow you to transfer files from a DOS 3 disc back on to DOS 2.5. It will allow you to view the directory of the DOS 3 disc first, and then choose which files to copy.

DISKFIX.COM is a handy little program which is designed to get you out of trouble if you do something silly to a disc. It is more than a little frustrating to find that, in a fit of temper, your little brother has just erased the last three months' work on your latest Space Invaders program. Thankfully, DISKFIX allows you to unerase the file again — while you un-erase your brother.

On DOS 2.0 and 2.5, the rename option would allow you to give two files the same name. This was fine until you wanted to separate them again, and you found that if you tried to delete, rename, copy — or anything else — one file, then both would be affected. DISKFIX allows you to give both files different names again.

Another problem can occur if you

break out of a disc write, which can corrupt the VTOC Table. In plain English, DOS might not know how many free sectors the disc has, and even if you could only see a couple of files on the directory, DOS may show considerably fewer free sectors than it should — thus reducing the amount of data you can store.

DISKFIX will verify each file on the disc, check its length, and recalculate the correct amount of space.

The last two files on the disc contain an ASCII/Writer document and a Basic program for those without a printer. These will print a copy of an 11-page "Mini-Manual" to DOS 2.5, giving details on general use, compatibility with other DOSs, and the use of the utility files.

The icing on the cake as far as this "Super-DOS" goes is that you can get it free. If you contact Atari's Help-Line (Monday-Saturday, during office hours, on 01-326 7770) they will give you the details of your

DOS TYPE	Initial Load time to Basic	DOS
DOS 1	15	
DOS 2	10	
DOS 2 with MEM.SAV	10	
DOS 3	12	
DOS 3 with MEM.SAV	13	
DOS 2.5	10	
DOS 2.5 with MEM.SAV	10	
DOS 2.5 (130K6) MEM.SAV in RANDISK	18	
DOS 3.1	15	
DOS 3.1 with Basic-3.1	24	

Table 1: DOS Comparisons



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# Microbyte



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Independent User Group

ONE of the first things you  
have to think of when you  
log onto Telecom Gold is a  
password. The trouble is  
that it's not easy thinking  
of one that's simple to  
remember yet hard for  
someone else to guess.

So this month we'll be  
looking at a program that  
uses the Atari's string  
handling capabilities to do  
our thinking for us.

```

30 REM PASSWORD GENERATOR
35 REM TERRY ROBERTS
35 OVER 20,4,4,4,4
40 REM PASSWORD(100) REM SETS 100-1000
   PICKED
50 PRINT "How many letters?"
55 INPUT NUMBER
70 IF NUMBER < 8 NUMBER=8 THEN GOTO 80
80
85 SET="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
90 FOR LOOP=1 TO NUMBER
100 GOTO 200
105 NEXT LOOP
110 PRINT "PRINT "AND PASSWORD(1) IS "
   (PASSWORD)
120 GOTO 200
140 IF PENDING THEN GOTO 80
150 PRINT "PRINT "THEY CAN BE "TYPE
   (SOUND)
160 END
200 REM PICKS ONE LETTER FROM SET
210 PICK=SET*(INT((RND*(100-1))+1))
220 REM ADDS IT TO GROWING PASSWORD
230 PASSWORD(LOOP)=PICK
240 RETURN
260 REM REVEALS INPUT
270 PRINT "PRINT "DO YOU LIKE THIS IN
   (SOUND) ENTER ANY"
280 GET BE,ANSWER=IF ANSWER=0 AND 60
   (SOUND)=0 AND ANSWER=120 AND ANSWER=1
   18 THEN GOTO 210
290 IF ANSWER=90 ANSWER=120 THEN FT
   (SOUND)
300 RETURN
    
```



# Micro Scope

No. 3  
Password  
provider

**10,20** These are just REMs telling humans what the program is called and who wrote it.

**30** Opens the keyboard up as a means of input while the program is running. We'll be using this in the subroutine that starts at line 300.

**40** Dimensions three string arrays.

**50,60** Ask for the number of letters you want in the password and store your reply in NUMLEN.

**70** An example of what's known as a megatrip. Here the comparisons make sure that you don't want a password with either a negative number of letters or more than 10. If you do, you're asked again until you give a number that's in range.

**80** Uses SETS to hold the letters that the password will be picked from. Here they are the alphabets. The more cryptically minded could use other selections of letters.

**90-110** Make up a FOR . . . NEXT loop with control variable LOOP. This loop cycles once for every letter of the password, calling the subroutine at line 200 each time. The result is a potential password stored in PASSWORD.

**120** displays the putative password.

**130** Calls the subroutine at line 300. This checks

whether or not you like the password. If you don't the program produces another until you're satisfied.

**140** If the flag variable PWSH is not equal to 1 then the GOTO sends the program back to pick another password. Notice that PWSH hasn't been previously assigned and so initially takes the value 0.

**150** Displays your final choice.

**160** The END stops the program crashing into the following subroutines.

**200** The start of the subroutine is labelled with a REM for clarity.

**210** This randomly slices off one letter from SETS and stores the result in PICK2.

**230** Adds this letter to PASSWORD.

**240** RETURNS control to the statement after the GOSUB.

**300** Start of the keyboard routine.

**310-320** Ask if you like the password and megatrips the results. If the reply isn't Y, y, N or n the GOTO ensures that the user is asked again.

**330** If the reply was Y or y the flag variable PWSH is set to 1. This means that the GOTO of line 140 will be ignored and the main loop will come to an end.



HAVE you ever noticed how slow the Atari's power function is? If you haven't try typing `PRINT 1 ^ 1 ^ 1 ^ 1 ^ 1 ^ 1` at the keyboard. Compare this with `PRINT 1*1*1*1*1*1`.

The difference in speed is astounding, and caused me to wonder if there is a better way to raise one number to the power of another.

Not surprisingly, there is. In fact the built-in function is so slow that it is possible to write a Basic routine which outperforms it.

Program 1 illustrates this:

```
10 POWER
20 IF END THEN GOTO 30
30 PRINT POWER:POWER:GOTO 20
```

*Program 1: Simple power routine for Atari II*

To compare this routine's performance with that of the built-in operator, enter it together with our "test bed" listing, Program IV. Add the following line:

**10 GOTO 100**

If you now run the program it will print out a table of timing information for the power routines. The times are given in seconds, and are times for 10 iterations.

Note that the times for the built-in function remain fairly constant regardless of the power to which the number is being raised, while the times for the Basic subroutine increase as the power increases.

When the power reaches 14 the built-in operator begins to outperform the subroutine. If you want to try the subroutine out or use it in your programs, it is used as follows. To raise X to the power P let X=number; P=power; `GOSUB 10`; X=POWER

# The POWER be with you

## Put your Atari's power calculating capabilities into overdrive with FRANK O'DWYER's routines

where  $X$  is the number to be raised  
 $P$  is the power to which it is to  
be raised  
POWER is the answer re-  
turned by the subroutine at  
line 20.

Note that  $P$  must be a positive  
integer—0, 1, 2, 3, 4, 5 and so on.  
It is possible to improve upon the  
performance of the simple routine in  
Program 1 by using a squaring  
technique as follows:

To raise  $X$  to the power of 3, write  
 $X = (X^2)^{1.5}$

To raise  $X$  to the power of 5, write  
 $X = (X^2)^{2.5}$

The routine given as Program 11  
applies this technique, and outper-  
forms the built-in function for most  
medium powers  $P$ . Combine Program  
11 along with Program IV and the line  
10 shown above as before to obtain  
timing information.

```

10 IF P=0 THEN PRINT:GOTO 20
11 POWER=X
12 IF P=1 THEN GOTO 20
13 IF P=2 THEN GOTO 20
14 IF P=3 THEN GOTO 20
15 IF P=4 THEN GOTO 20
16 IF P=5 THEN GOTO 20
17 IF P=6 THEN GOTO 20
18 IF P=7 THEN GOTO 20
19 IF P=8 THEN GOTO 20
20 PRINT POWER

```

Program 10 Fast power routine  
for small to medium  $P$

Note how the squaring technique  
leads to an improvement in perfor-  
mance for powers of 16 and 32. In  
fact performance will be best at  
powers of 0, 1, 2, 4, 8, 16, 32, 64 and

so on, and will steadily deteriorate as  
powers increase.

Note also that for some powers,  
the built-in function outperforms the  
subroutine. This is not important,  
since on average powers will be small  
and the subroutine will outperform  
the built-in operator, again on  
average.

This routine is a good all-round  
performer, and works equally well for  
small powers of  $P$ , as it does for  
medium powers up to about 24.

A further improvement can be  
made to the squaring technique by  
applying it in recursive fashion. To  
compute  $X^N$ :

Step 1: Compute  $X^2$

Step 2: Compute  $X^4$

Step 3: Compute  $X^8$

Step 4: Compute product of above  
results, and multiply by  $X$ .

```

10 REM THIS ROUTINE USES A  
11 RECURSIVE METHOD TO COMPUTE  
12 THE POWER OF X TO THE POWER  
13 OF P. IT IS A FAST ROUTINE FOR  
14 SMALL TO MEDIUM P. IT IS A  
15 FAST ROUTINE FOR SMALL TO  
16 MEDIUM P. IT IS A FAST ROUTINE  
17 FOR SMALL TO MEDIUM P. IT IS  
18 A FAST ROUTINE FOR SMALL TO  
19 MEDIUM P. IT IS A FAST ROUTINE  
20 FOR SMALL TO MEDIUM P.

```

Program 11 Recursive power  
routine for large  $P$

Program 11 gives a subroutine to  
implement this technique, using a

stack to hold intermediate results.  
Notice that the routine calls itself in  
line 60. Amazingly, this routine will  
outperform the built-in operator  
despite its complexity and the  
overhead associated with the stack.

However it does not really begin to  
outperform the squaring technique  
until powers of 32 and above are  
reached. This routine is therefore the  
best one to use if high values of  $P$  are  
anticipated. Again, combine Program  
11 with Program IV to obtain timing  
information.

```

100 PRINT "POWER, X=1000, POWER=1000"
101 PRINT "POWER=1000, POWER=1000"
102 PRINT "POWER=1000, POWER=1000"
103 PRINT "POWER=1000, POWER=1000"
104 PRINT "POWER=1000, POWER=1000"
105 PRINT "POWER=1000, POWER=1000"
106 PRINT "POWER=1000, POWER=1000"
107 PRINT "POWER=1000, POWER=1000"
108 PRINT "POWER=1000, POWER=1000"
109 PRINT "POWER=1000, POWER=1000"
110 PRINT "POWER=1000, POWER=1000"
111 PRINT "POWER=1000, POWER=1000"
112 PRINT "POWER=1000, POWER=1000"
113 PRINT "POWER=1000, POWER=1000"
114 PRINT "POWER=1000, POWER=1000"
115 PRINT "POWER=1000, POWER=1000"
116 PRINT "POWER=1000, POWER=1000"
117 PRINT "POWER=1000, POWER=1000"
118 PRINT "POWER=1000, POWER=1000"
119 PRINT "POWER=1000, POWER=1000"
120 PRINT "POWER=1000, POWER=1000"

```

Program 12 Comparison routine  
for power subroutines

A useful benefit of each of these  
subroutines is that apart from in-  
creased speed they also bring  
increased accuracy in comparison to  
the built-in operator.

Try typing `PRINT 3.2` at the  
keyboard. On some machines the  
answer given is 3.88888888 instead  
of 4. The subroutines I give do not  
suffer from this problem.

Now can anyone come up with  
routines which work for negative  
values of power and fractional values,  
for example  $X$  to the power of 3.2?

**MIKE BIBBY continues his explanation of the fundamentals of the Atari's workings**

As we have mentioned in previous articles, the Atari — and all other machines based on the 6502 microprocessor — handles its binary numbers in groups of eight bits at a time. Such a group of eight is called a byte.

However, while handling eight bits at a time is satisfactory from the machine's point of view, from the human side of things it's rather difficult to manage. Those 1s and 0s are far too prone to error. Look at Table I for instance. It contains an error — can you find it?

It's all too easy to slip up when handling binary numbers — a single 1 in the wrong place and all is lost! To make things easier to deal with, when I am copying out binary numbers I put a wavy line between bits 3 and 4 to split the byte into two equal groups of four.

For example, if I were copying:

%1000111110 = 14.31

I would write:

%1000|1111

Actually, splitting the byte into two groups of four bits is standard practice — each group of four bits is called a "nybble", would you believe?

It's not too hard to see that the biggest number you can represent in a nybble is 15, and the smallest is 0.

%1111 and %0000

respectively. After all, you've only got four bits to play with!

So we can split up our byte into two nybbles of four bits each. Now when we split up a binary number in this manner we call the left-hand nybble the most significant nybble (MSN) and the right-hand nybble the least significant nybble (LSN).

We have already created one new number system — the binary system.

%10110011 = 187  
%10101101 = 173  
%10001111 = 151  
%11110110 = 246

Table I

# Hexadecimallys you get two nyb out of every byt

Let's design another one that combines the advantages of the binary system with those of the binary. That is, it will be easy to read and write, yet will still allow us to perceive the binary manner in which the machine handles things.

The system we want is called hexadecimal. This consists of using our standard digits 0 to 9 for the numbers zero to nine respectively, and the letter A to F for the numbers 10 to 15. In this way it allows us to code the numbers available in a nybble (that is, 0 to 15) with just one digit. This digit will be in the range 0 to 9 or A to F.

It may take a while to adjust to the idea of using letters of the alphabet for numbers, but it soon becomes second nature. You just have to get used to counting:

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

Remember, there are 8 people in a cricket team, 9 in a rugby league team and F in a rugby union team. There are C months in a year, and E days in a fortnight.

Now just as we prefix all our binary numbers with %, we prefix our hexadecimal numbers with \$, to avoid confusion. So \$F means 15, while \$8 means 8.

Studying Table II will really pay dividends — I suggest you practice writing down bit patterns of nybbles and their hexadecimal equivalents

and it becomes second nature.

Given that we can encode a nybble in one hexadecimal digit, and that a byte consists of two nybbles, it should readily be apparent that we can encode a byte as two hexadecimal digits side by side, for example:



That is:

%10101001 = \$AB = 188

You just split the byte up into two

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Table II

# y speaking, ybbles yte

nybbles — a left hand and a right hand nybble, encode each as a hexadecimal number, then put the two side by side.

You can go from hexadecimal to binary just as easily:



That is:

$$\$8D = \%10001101 = 141$$

Although you have probably never thought of it in these terms, you are well aware that the value a digit represents depends on the column it is in. The number 230 is not as large as 320, though both numbers contain the same digits.

In hexadecimal coding too, the column a digit is in is important. For example, \$10 is far greater than \$01. In binary each column is worth twice the preceding one. In decimal, our usual number system, each column is worth 10 times the preceding one. In hexadecimal, each column is worth 16 times the preceding one.

Believe it or not, the columns in a four digit hexadecimal number, from greatest to least, are worth 4096, 256, 16 and 1 respectively.

This means that:

$$\$1101 = 4096 + 256 + 1 = 4353$$

For the moment let's concentrate

on the two digit, that is, two column, hexadecimal number, as these are all we need to store our bytes in. In this case the left-hand column is the "thousands" column, the right hand the units column.

So:

$$16 \text{ } 1$$

$$\$21 = 2 \times 16 + 1 = 33$$

$$16 \text{ } 7$$

$$\$20 = 2 \times 16 + 0 = 32$$

$$16 \text{ } 8$$

$$\$80 = 8 \times 16 + 0 = 128$$

$$16 \text{ } 9$$

$$\$C0 = 12 \times 16 + 0 = 192$$

To translate a two digit hexadecimal number into decimal simply multiply the number in the left-hand column by 16 and add it to the number in the right-hand column — remembering to translate A to F if necessary.

The second column has the value 16 since the first column can only handle numbers up to 15 (\$F) — the largest you can fit into a nybble (\$F1111). After 15, you have to use a second column for 16, that is \$10.

Just as in decimal, we "carry" at 10 since the largest value our columns can handle is 9, so in hexadecimal we carry at 16, since the largest our columns can handle is 15 (\$F).

It is the fact that we carry at 16 that gives this number system its name "hexadecimal" — hex "hex" stands for 6, "decimal" for ten. "hexadecimal" = 6 + 10 = 16.

Given a second column \$10, as we have seen is 16, 17 will be \$11, while \$12 is 18 and so on until we reach \$1, which is \$1F.

We have then run out of legal digits for the units column, so if we want to go on to \$2 we had better give ourselves another 16, and set the units column back to zero, that is \$20.

Another way of looking at the second column is that it comes from the most significant nybble. To turn the least significant nybble into the

most significant nybble, we have to shift it over to the left four times.

If you cast your mind back to last month, this is equivalent to multiplying it by two four times in succession, that is  $2 \times 2 \times 2 \times 2 = 16$ . This is why a hexadecimal digit representing the most significant nybble is 16 times larger than the same digit representing the least significant nybble.

The largest number you can store in a two-digit hexadecimal number is \$FF =  $15 \times 16 + 15 = 255$ . This is, of course, the same as the largest number we could store in a binary byte — we often refer to a two digit hexadecimal number simply as a byte.

To obtain the hexadecimal equivalent of a positive integer (whole number) less than 256, we divide it by 16. The quotient is the left hand digit, the remainder the right hand, transferring into A to F where necessary.

For example:

$$1744:16=10 \text{ R } 14$$

That is:

$$\$A \text{ R } \$E$$

$$\text{Hence } 1744=\$AE$$

Anyways, here's a program that will convert from decimal to hexadecimal for you. The workings shouldn't be too hard to follow.

Since you've understood it, how about writing one that will convert from hexadecimal to binary?

■ That's all for now. Next month we'll be looking at ways of combining binary numbers.

```

10 DIM ARRAY(10) AS B
20 DIM DEC(10), HEX(10) AS
30 DIM $HEX(10) AS $
40 PRINT "Enter a 0 - 255 4":
50 INPUT NUMBER
60 IF (NUMBER<0)OR(NUMBER>255) THEN GOTO 10
70 DIM $DEC(10) AS $
80 LET $HEX=""
90 LET $DEC=""
100 GOTO 110
110 IF (NUMBER=0) THEN $HEX="$0"
120 IF (NUMBER=1) THEN $HEX="$1"
130 IF (NUMBER=2) THEN $HEX="$2"
140 IF (NUMBER=3) THEN $HEX="$3"
150 IF (NUMBER=4) THEN $HEX="$4"
160 IF (NUMBER=5) THEN $HEX="$5"
170 IF (NUMBER=6) THEN $HEX="$6"
180 IF (NUMBER=7) THEN $HEX="$7"
190 IF (NUMBER=8) THEN $HEX="$8"
200 IF (NUMBER=9) THEN $HEX="$9"
210 IF (NUMBER=10) THEN $HEX="$A"
220 IF (NUMBER=11) THEN $HEX="$B"
230 IF (NUMBER=12) THEN $HEX="$C"
240 IF (NUMBER=13) THEN $HEX="$D"
250 IF (NUMBER=14) THEN $HEX="$E"
260 IF (NUMBER=15) THEN $HEX="$F"
270 IF (NUMBER=16) THEN $HEX="$10"
280 IF (NUMBER=17) THEN $HEX="$11"
290 IF (NUMBER=18) THEN $HEX="$12"
300 IF (NUMBER=19) THEN $HEX="$13"
310 IF (NUMBER=20) THEN $HEX="$14"
320 IF (NUMBER=21) THEN $HEX="$15"
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2650 IF (NUMBER=254) THEN $HEX="$FE"
2660 IF (NUMBER=255) THEN $HEX="$FF"
2670 PRINT $HEX
2680 GOTO 40

```

Program 1





# The great adventure has begun...

"When we launched Mycelink we naturally expected it to generate quite a large degree of interest among fitness enthusiasts. What we didn't expect was what actually happened — a thousands of applications to join."

They poured in from all parts of Britain, and even more surprisingly from places as far away as Tasmania.

For the computer buff it's the thought of joining one big family of like-minded enthusiasts. Through the Chat facility he can "talk" in real time to people who are using the same macro as himself, discussing common problems and sharing hints and tips.

And as Microsoft is part of Telecom Global and Dialcom - the largest electronic mail service in the world - we can also communicate quickly and cheaply with other enthusiasts in many other countries.

For the businessman, Micro is immediately provides an office tool that he might not have been able to afford before. And his fingertips are the same facilities that are enjoyed by every leading British business - all of whom are subscribers to Telecom Gold.

For a once-only payment of £110 he can turn his micro into a telex machine - which normally would cost him £2,500. He can send a telex message for as little as 5.5p, and even that is reduced by 10 per cent if he defers transmission until after 18.00.

1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 26

computer, able to tap its tremendous power and versatility and to run giant number-crunching programs that can only be run on a mainframe.

He no longer need be tied to his office. He can use his micro from home—or golf club. And if he's not too confident about his spelling, he can run his letter or telex message through the sophisticated Spell program before sending it off.

One of the many advantages of an online service like MicroLink is its flexibility – its ability to cope quickly with changing needs.

Although it is only a few weeks old, new facilities are being continuously introduced to provide users with an even more comprehensive service. Among the latest are a definitive guide to all UK bulletin boards, which can be updated daily as new boards open up, or phone numbers or hours of access change.

And there's a review of the computer magazines, so you can see what subjects are being covered in their current issues.

Finally, why should the Tasmanians, of all people, want to join MicroLink? As they live right on the other side of the world, won't it cost a fortune to communicate with the UK?

Not so. Because Tasmania is part of the international PDS network, instead of paying the normal telephone call rate of 94¢ a minute, they can call Microlink over PDS for just 1¢ a minute.

For callers in Europe it's even cheaper – just 2.2p a minute. With incentives like this, we expect Microsoft to prove itself a truly internet-friendly company.

**NEED  
MORE?**

**PAGE 6**

**TWO  
YEARS OLD  
AND  
STILL GOING STRONG**

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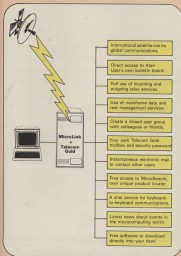
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For the first time, it combines the enthusiasm of many thousands of computer users with the power and versatility of Britain's national database, Telecom Gold.

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Communicating the MicroLink way is ultra-fast - and much cheaper than you might expect. Wherever you live, you get direct access to the Telecom Gold computer at local call rates.

With your own electronic mailbox you can send a message to one destination - or to 5000 - for less than you would pay for a first class stamp.

You can send and receive telex messages worldwide, or have a two-way chat with other users in real time.

And the cost of using MicroLink? Just £3 a month. Plus small additional access charges as detailed overhead.

Join MicroLink now - and let you and your Atari be in the forefront of the new revolution in communications!

These are some of the innovative features  
you'll be able to use when you join...

# MicroLink

## What facilities you can use - directly from your micro:

- Access at any hour of the day or night to Microsearch, our exclusive product locator, which is constantly updated by Britain's major distributors. Powerful, easy-to-use keyword searching means you should find what you want within seconds.
- Direct contact, via electronic mail, with other users throughout the world. And because you're connected via PSS, and not the normal phone links, it's usually much, much cheaper.
- Full use of the closed user group bulletin board - with a special section for Atari users.
- Full service of news about new products and events. All presented in easy-to-read form to keep you right up to date with what is happening in the world of microcomputing and communications.
- Send and receive mailbox messages of any length with other Telecom Gold mailbox users, the number of which is rapidly growing.
- Send and receive telex messages, both within Britain and all over the world.
- Send telemessages to any address in the UK, if sent before 10pm they will get guaranteed delivery the next working day, including Saturday (This service commences shortly.)
- If you live outside the 01- local call area, use of PSS at local phone call charges, including access to the International Dialcom system. (This covers nearly 90 per cent of the population of the UK.)
- Use, should you require it, of the Telecom Gold mainframe for storage of your own data.
- Encouragement to combine with friends or colleagues to set up your own closed user group within MicroLink.
- Provision of free telesoftware, which you can download into your Atari.

## What you will receive when you join MicroLink:

- Free registration on Telecom Gold - and your own private mailbox.
- Free password, which you can change at any time you like. This gives you a high level of security in order to preserve confidentiality, and is known only to you.
- Free instructional manual to introduce you to Telecom Gold and its many services.
- Free Help facility should you require additional assistance.
- Free newsletter to keep you informed of future developments in this ever-expanding service.

## What you need to access MicroLink:

- Any personal computer, portable computer, hand-held device or electronic typewriter with communications facilities.
- Appropriate communications software.
- Modem (you can use 300/300, 1200/75 or 1200/1200 baud as you wish).

## What will it cost?

- Monthly standing charge of £3 (compared to Telecom Gold's normal £10 a month minimum charge).
- Connect charges: 3.5p a minute (cheap rate); 20.5p a minute (standard rate). Plus 3p a minute PSS charge if calling from outside the 01- call area.
- Once-only telex registration fee (if required): £10.
- Outgoing telex: 3.5p per 100 characters (UK), 11p (Europe) and 16.5p (USA).
- Incoming telex: 50p.
- International mail: 30p for first 2,048 characters, then 15p for each additional 1,024 characters.
- Telemessages: £1.25 for a maximum of 360 words or 36 single spaced lines.
- On-line databases on Telecom Gold: charges as indicated at time of log-on.

To secure your immediate registration, complete the form opposite and return it to  
MicroLink, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.



This contract is made between **Children's Publications Ltd**, of Europa House 68 Chester Road, Strand Green, Brighton BN2 3PP (CPL) and the subscriber whose name and address appear below.

Whereas CPL has agreed with British Telecommunications plc (BT) through its agent Telecom Gold Limited to sell and distribute the Mosaic and Service (the Service) and BT through Telecom Gold Limited has agreed to supply the Service to customers of CPL.

It is agreed as follows:

1. **Access**

CPL shall ensure to the subscriber such access to/and facilities to/and use of the Service and persons associated with the subscriber, access to use the Service.
2. **The Service**

The Service shall be BT's Telecom Gold/Children's Service and shall comprise such services and facilities as CPL, or BT, in its discretion from time to time, considers appropriate, subject to the supply by BT of such services and facilities.
3. **Changes**
  - a) The subscriber shall pay for all charges attributable to the connection to, and/or use of the Service, and/or from the time to time of any facilities number issued by CPL, or the Subscriber, all charges are payable on demand.
  - b) CPL, and prior to the Subscriber not less than fourteen days written notice of any alteration to the applicable charges for the Service. The charges applicable in the state of the Subscriber are set out below.
  - c) Subject to any provision of this contract's liability for charges for services shall commence, prior to BT within the customer to the contrary, calculated from the first day of the month in which BT first makes service available to the customer.
4. **Limitation of use**
  - a) The Subscriber shall not use, or permit any person to use the Service, otherwise than in accordance with instructions given by CPL, or BT, relating to the time being and to particular, shall not use the Service for the purpose of sending abusive, offensive, indecent or menacing communications, or for sending communications which cause annoyance, harassment, or nuisance to others.
  - b) The Subscriber shall not permit any person to use the Service by means of a facilities number issued by CPL, unless the name and relationship of that person to the Subscriber has been disclosed to CPL.
5. **Termination**
  - a) This contract may be terminated by either party giving not less than one month's written notice, such notice to expire on the last day of any calendar month.
  - b) CPL may terminate this contract without notice if the Subscriber shall:
    - i) fail to pay any sum payable under the contract or payable under any other contract with CPL, to which the Subscriber is a party
    - ii) be adjudicated bankrupt, enter into liquidation or arrangement with its creditors, or its business is appointed or any part of the Subscriber's assets and/or discharged within seven days, or if any judgment against the Subscriber remains unsatisfied for more than seven days
    - iii) fail to comply with any term of the contract, or any instruction given by CPL, or BT under clause 4 of this contract
  - c) CPL may terminate this contract without notice in the event that BT ceases to agent Telecom Gold shall cease to supply the Service.
  - d) Other contract law in compliance with any provision of the contract shall nevertheless continue to bind the parties in all circumstances and/or become due for service provided during any period of such failure.
6. **Assignment**

The subscriber shall not, without the written consent of CPL, assign the contract, or any rights or obligations arising under the contract.
7. **Limitation of liability**
  - a) In the event of a fault within CPL, or BT has no obligation duty or liability to correct, limit, indemnify or otherwise to compensate or otherwise to pay for or to ensure reasonable skill and care.
  - b) In any event it is acknowledged that neither CPL, or BT is liable in contract, tort, negligence or breach of statutory duty or otherwise for loss suffered by the subscriber direct or indirect of profits, business, or anticipated savings or for any indirect or consequential loss.
  - c) In any event CPL's liability is limited to (including negligence or breach of contract, duty or otherwise arising by reason of or in connection with this contract or otherwise otherwise shall be limited to £250,000 for any one incident or series of incidents, and £1m for any series of incidents related or unrelated in any period of 12 months.
  - d) CPL shall not include or incur any liability for death or personal injury, where such arises as a result of the negligence of CPL, or its employees.
  - e) The Subscriber shall indemnify CPL against all loss, actions, proceedings, costs, claims, and damages arising from:
    - i) any breach by the Subscriber of its obligations hereunder
    - ii) if the use of the Service by third parties by means of any facilities number issued to the Subscriber.
  - f) CPL shall not be liable for any loss or damages arising through any service termination (CPL or its agent Telecom Gold Limited) unless supply of facilities to supply the Service to CPL. Notwithstanding anything to the contrary contained herein, the supply of facilities to service shall commence and/or subject to the standard terms and conditions of BT from time to time and of which the subscriber shall be deemed to be aware.
  - g) Neither party shall be liable for failure to perform its obligations if the failure results from Act of God and Act of Government or other Authority or Statutory requirement, the operations, accident, power failure, technical disputes, instability or other circumstances or anything beyond each party's reasonable control.
  - h) CPL, except liability hereunder for direct loss, hereby, the subscriber shall not be responsible for any loss or damage caused by CPL, or its employees or the provision of access to the service up to an aggregate maximum of £1,000 for a full week to one month coverage unless a charge to the subscriber over the previous 12 monthly period, whichever is greater, has in advance provided/has been, shall be liable to liability for any loss suffered by the subscriber or by any other person arising from negligence or otherwise.
8. Any notice, consent or other communication required to be given hereunder by either party to the other shall be made in writing and shall be sent by first class post to the address of the other as set out herein, and shall be deemed to have been received 48 hours from the time of posting.
9. This agreement constitutes the entire agreement between the Subscriber and CPL, in respect of the Service, and no representation, statement, warranty or condition or otherwise contained in this agreement or incorporated herein by reference, shall be binding upon CPL, as a warranty or otherwise.
10. This agreement shall be governed and construed in accordance with the law of England, and the English Courts shall have exclusive jurisdiction to determine any dispute arising hereunder.

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The modem is the amazing Miracle Technology WS2000. One of the most powerful on the market, it provides all the facilities you require. Yet it's simplicity itself to use. Just plug it into a standard British Telecom jack and you're away!

The package also features the superb Datsat serial interface, which links the modem directly to the Atari's peripheral port without the need for the 850 serial interface.

The best hardware deserves the best

software to drive it, and with the specially written Multi-Venuser program the package is complete. It supports all the standard baud rates – 1200/75, 75/1200, 1200/1200 and 300/300 full duplex.

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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**



## Go Space-hopping with your Atari – plus a little help from TeleLink

TeleLink, Britain's pioneering communications magazine, is full of helpful advice about all the fascinating things you can do when you link your Atari to your telephone.

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TeleLink deliberately steers away from technicalities to present the facts in vivid detail – to help you play YOUR individual part in the communications revolution that is going to change all our lives.



## HELP NEEDED ON HELP KEY CODE

At the first stage of Angel's therapy explained how to identify the threat type in a basic movement.

Is it possible to disable the Start key in the same way, so that a basic program cannot be started?

Alvin: If you followed me, you can see the Index, Option, and Stock keys. I know the stock for those things, but I don't know for the other two.

Finally, I am writing a Basic program using the `ADD` and `SUB` commands.

I know that it is possible to take your story off a shelf and read it.

It is possible to then change the information in that byte and replace it in the same place in the same file without changing any of the other bytes in that file? (Yes, I mean - A.M. Bishop, Chomsky, Hoots)

■ **Location:** F02 (B20C) is updated each time the Help key is pressed. The values obtained are as follows:

```

B7 = HELP help
B8 = CSAP HELP
B9 = CSAP HELP

```

The operating system will not clear the value for you, so it will remain in location 732 until you F09E is to zero, or the Help key is pressed in a different combination.

To change single bytes within a file, the user must first

[illegible]

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

**10-00000000.00000000**

This will set up the file ready to read the first byte of data. You may now PUT or GET bytes as you wish. If you PUT bytes they will overwrite the existing data.

So if you want to read a byte then change it, **MOVE** the file position first, then call **getc**.

If it is a byte you wish to change, **PUSH** yourself back again, and **PULL** your new data. For example, the program above will change all bytes in a file with a value of 0 to a value of 1.

This method will work with 000 2 or 3, as it uses absolute, rather than relative, addresses.

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of the file using this method, as  
Appended mode is the only way  
in the file.

For an answer to your question on fleet protection, see next month's issue, where there will be an article on protecting your fleet purchases from online sales.

1000

FROM the use of teacher-like me who prefer lectures to dry-board control, I have changed these programs into a track Squash in the first issue of direct class for

```

1000 50000000
1000 IF 5-7 AND 0-24
      THEN GOTO 1000
1000 IF 5-11 AND 0-1
      THEN GOTO 1100

```

Does your home changed? These lines, you will find that you will be able to use a variety of other lines.

Is it possible to disable the Reset button, if not, is there a program or a PCMCIA command for the PC card? I would be very grateful if you could help me. — Tim Kustin, Brockton, Illinois

■ Yes, the Forest has been disabled. See the reply to Mr. Watson above.

## Squash swap

AMAZINGly typed the Attack Squash taking from Ariel Lane into my ROOM I suddenly realized that there is very little that beats the more than a good game of squash, as I am about converting this program to something more interesting.

The dining ladies of a hotel in the Atlantic South City will probably be surprised to learn that I find in packages a new bit more delicious.

As in the French program, every time a ball is hit the ball comes up over the

Each brick of the diamond wall must be 3/4" thick to eliminate a flatbed across the joint and the desired 3/4" space is further guaranteed.

There are no patients awarded for hitting the ball with the bat, which means there is a maximum score of 734.

© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 399–406

## Keep your guitar in tune

I AM writing to say how pleased I am with your new magazine. It really is nice to see Alan's coming back on the scene. It deserves

<sup>2</sup> Evidence is still progressing which I find quite useful when I attend the college of my studies.

Explain always the change, and if you  
cannot find any evidence to

I am sure many readers want a guitar but perhaps do not want a fender or gibson. This little guitar does help to keep you in constant contact.

These findings suggest that the use of a single, standardized, and validated measure of self-esteem may not be sufficient to capture the complexity of self-esteem in the workplace. Future research should explore the use of multiple measures of self-esteem to better understand its role in organizational behavior.

8000] and the 400]. I don't know if it's literally the same, if not a slight adjustment to the data line should correct things.

Keep up the good work. —  
Bruce Barker, Canterbury,  
Illinois.

```

60 REM Center Tuning dial
70 REM by Bruce Burke
80 GOTO 10
90 OPEN "L",L,"R"
100 PRINT "POWER " GOTO 1000
110
120
130 PRINT "POWER " Press any key for L,R
    ,L,R,L,R
140 FOR C=1 TO 5

```

```

70 READ 6
100 GOTO 11,NUMBER
110 NUMBER = 1,4,10,0
120 PRINT :PRINT "Trying no. "
130 PRINT 6
140 GOTO 11,NUMBER
150 GOTO 10
160 END
70 DATA 47,42,30,107,147,191

```

same as in the Squash program — the left/right arrow keys move the ball left and right respectively.

The most interesting aspect of this listing, from a programming point of view, is probably the use of the LOCATE command in line 78: the ball is over a blank square, a hollow rectangle or a solid rectangle, returning a value in Z that is used to determine the score increment.

Line 822 turns a hollow rectangle into a solid rectangle and lines 867 to 885 show the BRKBS that make up the breakout wall.

Lines 1471 to 1479 define the baseline rectangle brick shape and lines 2000 to 2070 increment the score as required and produce the new sound effects.

Line 230 stops the bar going higher than the breakout wall as it moves up the play area.

Lines 270 and 370 repeat the ball counter and score

```

230 R=0
240 POSITION 4,21
250 POSITION 5,21
261 FOR Z=1 TO 6
262 FOR X=1 TO 20
263 POSITION 4,Z:PRINT "BLK";
264 NEXT X
265 NEXT Z
266 IF Z=0 THEN PRINT "BLK";GOTO 624
267 IF Z=1 THEN G=H+2:GOTO 1000
268 LOCATE 4,8:Z
269 IF Z=0 THEN G=H+2:GOTO 1000
270 IF Z=1 THEN GOTO 1000
271 FOR Z=1 TO 6:PRINT "BLK";
272 POSITION 4,Z
273 FOR X=1 TO 20:PRINT "BLK";
274 NEXT X
275 FOR Z=1 TO 6:PRINT "BLK";
276 NEXT Z
277 FOR X=1 TO 20:PRINT "BLK";
278 NEXT X
279 GOTO 1000

```

as now it looks prettier that way.

Line 700 stops the ball leaving the play area and line 743 finds out what the ball is laying over — Z=20 if ball lays over a hollow brick and Z=21 if ball lays over a solid brick. Line 743 sends the pro-

gram to send out the score if a level has been hit and line 745 stops it going out of range.

Line 749 is just line 740 of the Squash program, but is not necessary to move it.

I hope you like this little addition to the Atari Squash program.

I would just like to suggest, especially now that you have published these, that you include many machine code programs that are often noticeably lacking in many magazines. — Anthony Smith, Huddersfield, West Yorkshire.

## Self-test problem

CORRECTION: please tell me if it is possible to turn off the self test program on my 8000.

I bought an Atari game called *States*, meant to be for any 16k Atari machine, but the tape shorted just as loading was finished.

I changed it, only to find it happening again. I asked the machine for the available free RAM, which was 12375.

So my conclusion is that the game being 16k and my machine being 12375 the memory wiped itself to stop overloading.

If the self test program cannot be turned off will I be able to run this tape with the aid of an expansion module?

I know the simple answer is to get a better machine, but I would like to know without the added expense. — C. Thomas, Brighouse, West Yorkshire.

With the tape in the recorder my holding down the *Start* and *Option* keys when you turn the machine on. When you hear the buzz, press *Play* on the recorder and then press *Buttons*.

## 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  
Europe House  
65 Chester Road  
Hazel Grove  
Stockport SK7 5HT

## The lost chord . . .

I OWN an Atari 8000 and an Atari 410 recorder. All my programs load and play normally except for the *Introduction to Programming* series of cassette which have a tutor's voice accompanying the lessons.

Up until a few days ago these cassettes loaded and played with no problem.

Now when they load and play normally except there is no tutor's voice with any of the lessons. I would be grateful if

you could give any comments as to why this should happen and any advice on how to get the tutor's voice back. — B. Tyler, Glasgow.

It sounds as though the channel through which the voice plays back may have stopped working.

Alternatively, the channel through which the voice plays back may have stopped working.

Make sure there is no dirt on the physical head, and try adjusting it slightly. If that doesn't restore the voice have your recorder checked by your dealer.

## Software protection

I HAVE just read from cover to cover the first edition of *Atari User*, which I found informative, well presented, of excellent typography, and extremely easy to read and comprehend.

I have one query to make. I bought the program cassette *States* and *Capitals* for use with my 8000.

State two (game only) loads with no trouble, but I am unable to load side one.

I have to disconnect also; printer, all each time I wish to use the game if it's going to be a corrupted outcome.

Is there some other way to load this slot? — Alan W. Thompson, Southampton.

We're not familiar with *States* and *Capitals*, but some software protection schemes require that peripherals like disk drives and printers are switched off.

They don't have to be physically disconnected, merely not switched on. If *States* and *Capitals* is of this type there's not much you can do about it.



## Faulty Frogger?

**RYAN** I received the June edition of Atari User and saw the listing for the game Frog Jump. I typed it in.

After I had done so, I tested it and found that it kept putting "Error 8 on line 340" so I checked line 340 and found it was all right.

Then I looked at all the other lines and they also were perfectly all right.

I wondered if there was something wrong with the listing. If so could you tell me where it is wrong. — Christopher Winchester, Ulverston, Cumbria.

There were no errors in the listing so you must have made a typing mistake somewhere. Line 8 is a spring length error, so make sure that you've entered the springs exactly as listed.

For example, since line 340 is mentioned, have you typed in line 130 exactly as listed? L30 should contain only 33 characters.

★ ★ ★

I ENJOY your magazine a lot. I have just finished "Frog Jump" in your June edition of Atari User. I typed in Run and pressed Return and it came up "Error 13 at 1200". I tried to solve this error, but did not succeed. I would like you to put me right. — Sarah Shephard, Ambleside, Derbyshire.

Error 13 means that the computer has encountered a NEXT statement in the program but hasn't previously seen a corresponding FOR statement. You should check that line 1140 in your program is exactly as we printed it. Make sure you've got FOR GND TO 2048 here and that line 1200 has NEXT G. While letters like G it's easy to read them as a letter O.

## Left out on cassette

I ENJOY an Atari 8000, and have noticed that one of my favourite games, *Jason*, is available on 78c cassette and 32k disc.

I have a T01D cassette deck



and am therefore forced to get the 10k version, so why is the superior 32k version only on disc?

Also, *Ghostbusters* is here. Great, but is it available on cassette? No chance, just disc again!

Why are certain games only available on disc rather than cassette? After all the disc drive would be put to better use in a business rather than games playing. — Nigel Ward, Stockton-on-Tees, Cleveland.

The game is the same size whether it's on tape or disc. However, the disc version also

needs to contain some version of DOS — see Andy Wiley's article in this issue. Hence, if the game needs the 15k, a disc version will need 15k plus DOS.

This might only be 20k in total, but the next size machine from a 15k one is usually 32k.

There are several reasons why a manufacturer might release a disc-only game. A tape version might take too long to load, discs are more reliable, tapes are too easy to copy.

We don't know why *Ghostbusters* is disc-only, but we suspect it's some combination of these reasons.

## Memory boost

IS the memory on my Atari 8000, always going to be the same old 15k or is someone

going to print a name and address of a shop that sells RAM packs. — G. Thornton, Harrogate, West Yorks.

We'll print an address — the rest is up to you. The Data Shop, 1-4 The Mews, Hatherly Road, Sidcup, Kent. Tel. 01-309 1111.

## A change in time

I WOULD just like to thank you for bringing out a *Byte* magazine for the Atari and wish you every success in the future.

May I suggest that in the program *Phantom Tower* in your first issue line 140 be changed to read 140 NEXT N — 000018760000 + memory 1255 + 160000000.

I think you will find this gives a more accurate time. — J. French, Garforth, Leeds.

# Enter the Dropzone megastars

AFTER reading the second issue of your magazine I noticed that one of your readers somewhere £7,000 on the US 16-bit game *Dropzone*. So I thought you may be interested in my score on the game, which is 1,000,000.

On the high score screen is the caption "Million achieved, you are a megastar". Could you tell me if I am the first person to achieve this score?

On the subject of programming, I have included a small instruction that may be of some interest to your readers. It plays the theme music from the film "Close Encounters" and could be used as part of a space game.

Lastly, I hope you continue to improve your excellent magazine with more programming tips and routines on all Atari-related subjects for many years to come. — Cameron McLeod, Waterford, West Yorks.

Actually, Stephen Edwards has not lettered last year's score and wrote to us first, but you still deserve Megastar status.

Thanks for the theme music. We thought the last note sounded a bit off, but we'll leave our readers to make up their own minds about it.

★ ★ ★

AFTER buying your first two copies I was very impressed at

such an informative magazine.

While reading the letters section, I read that G. Gifford from Leicester had written in and said that he had scored 80,010 on *Dropzone*.

I nearly laughed till I cried. My highest score to date is 1,079,999 and though you may not believe me.

I told I'd come to achieve and I became a megastar and the magazine said that my mission was completed.

If you would like a photo for evidence I would be happy to provide one. — Stephen Edwards, Stevenage, Herts.

We believe you — even without the photographic evidence!

### TO RUN CLOSE ENCOUNTERS MUSIC

32K RAM 0,0

32K IF NOT THEN SOUND 0,0,0,0,10000 1, 0,0,0,10000 0,0,0,0,10000 0,0,0,0,0,0,0,0

33K

12K 10000 0,0,0,0,0

12K FOR I=0 TO 100000 0

14K 10000 1,0,0,1,0,0

15K FOR I=0 TO 150000 0

16K 10000 1,0,0,1,0,0

17K FOR I=0 TO 100000 0

18K 10000 1,0,0,1,0,0

19K FOR I=0 TO 100000 0

20K 0000 000

21K 0000 70,100,00,100,00,100,100,210,

220,000

23K 0000 0,0

24K FOR I=0 TO 100000 000

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