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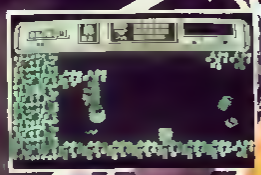
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All major listings in this issue are accompanied by checksums to help overcome typing mistakes. For full details of how they work, see the article on page 23 of the November 1987 issue of *Atari User*.



Add TEN new commands to Atari Basic with this latest package from Atari User

SEE PAGE 42

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'More to the Atari than just games'

THE capabilities of the Atari 8 bit micro are not being fully utilised according to Keith Mason general manager of Software Express

Serious programs such as word processors spreadsheets databases and programming languages are being overlooked in favour of cheap cartridge and cassette-based games", he said

We have no problems selling budget titles, but when it comes to anything over £10 it would appear that there is a no go area for 8 bit users

"It's a great pity because the machine is more than capable of handling serious applications'

Software Express (021 328 3585) produces a number of packages for the Atari such as the Xlent word processor for £29 95, the FynCalc spreadsheet at £49 95 and the FynFile data base also at £49 95

Even though the prices are relatively cheap compared to other full function programs sales are very low indeed , said Keith

The problem may be that many newcomers to the Atari just don't know that it is more than a games machine

' If they could only look beyond the joystick they would get a lot more out of their micro

ON THE SERIOUS SIDE . . .

ATARI users who want more than entertainment from their machines have a new source of serious software

Valar Software has just completed development of a desktop publishing and circuit board CAD program for Atari 8 bit machines, and wants to hear from prospective users

Richard Prengnell of Valar (0273 417370) told Atari User *"We believe the aspirations of the average 8 bit user extend further than games*

"I am sure a lot of Atari owners are interested in getting more from their machine and we would like to hear from them

"If the response is good enough then we will set up a creative user group"

Pirates are under fire

ATARI has been showing Far East software pirates that it means business

The company has obtained court injunctions against six Singapore firms alleged to have infringed its copyright and design patents

The move follows the recent inclusion of computer software under Singapore copyright laws

Atari has also seized a large consignment of games cartridges originating in Taiwan and destined for European markets

New games group formed

A MAJOR international publisher has joined forces with a new software house to launch an exclusive entertainments label for the Atari

Mandarin combines the marketing muscle of the Europress Group parent company of Database Publications in a series of joint ventures with some of the UK's top programming teams

The first title to be released by Mandarin is an adventure trilogy Time And Magik from Level 9

We believe that Level 9's programming skills together with Mandarin's knowledge of the marketplace, abilities in printing and packaging and its understanding of the need to get products out on time, will be an unbeatable com

Turn to Page 7 ▶

Fresh from the USA

THE range of acclaimed Atari 8 bit programming aids from American company OSS is to be made available in the UK

Frontier Software (0423 87140) is importing them in its role as distributor for ICD Inc of Illinois which recently took over OSS's product line

An alternative to Basic, the fast programming language Action! blends the best elements of Pascal and C It is available on cartridge for £49 95, and toolkit disc for £19 95

Macro assembler and editor Mac/65 for serious assembly language programmers, includes the powerful DDT screen oriented debugging program The cartridge costs £49 95 and the toolkit disc £19 95

Downward compatible with standard Atari Basic but with an additional 45 commands, Basic XL supports all Atari 8 bit micros The cartridge is £39 95 and the toolkit disc £19 95

Basic XE has all the commands and is designed for the Atari 130XE to make better use of the memory but still retain compatibility with Atari Basic The cartridge costs £49 95

ATARI Corporation's computer activities continue to prosper The company has just reported net sales of $147 5 million for the last quarter – up 59 per cent from the previous year's $92 6 million

Income was 53 per cant up at $31 3 million This means net sales for the year stand at a record $363 8 million – a rise of 41 per cent over the previous year Income was up 49 per cent at $72 million

Atari Presidient Sam Tramiel said "The computer segment of our business continued to grow at a record pace, contributing over 51 per cent of our net salse for the year".

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ATU4

Show's the place for big savings

EXHIBITORS are forecasting record savings on hardware and software at this month's Atari User Show.

It takes place April 22 to 24 at Alexandra Palace, London and a survey conducted by *Atari User* reveals that potential savings to visitors should total well in excess of £100,000.

The event will also be the launching pad for a number of exciting new Atari 8 bit products.

Red Rat Software will be unveiling its latest bargain price compilation games packs, which include the popular titles Mad Jax, Dreadnought, and Space Wars.

Seen at the show for the first time will be the new quality games publisher Mandarin Software. The company has produced an excellent adventure for the Atari 8 bit – Time and Magik.

The move to the larger exhibition space provided by Alexandra Palace further emphasises the increasing popularity of products on the Atari.

Previous venues have proved too small for the ever increasing numbers of exhibitors and visitors.

One of the many special attractions to be seen in the West Hall will be the games arcade. A large bank of machines will be available for playing the very latest titles from leading software houses.

Centre stage at the show will be leading Atari dealer Silica Distribution with a massive 86 square metre stand.

It will be displaying the UK's largest ever range of software and hardware at the show. The company is also offering free registration to its Atari user groups.

No Star Wars

ATARI User has received many letters pleading for a version of the top selling game Star Wars.

Despite interest shown by *Atari User* readers, Domark says it will not be releasing an Atari 8 bit version.

◀ From Page 6

bination – says Pete Austin of Level 9.

Mandarin's involvement with the innovative games software house is the first of a series of joint ventures.

We find ourselves in the position that, unlike many other publishers, we don't have to rush out titles to maintain cash flow', says Chris Payne, spokesman for the new venture.

Mandarin couldn't be more sound financially – we have £1 million in the kitty – so we are in a superb position to be able to pick and choose not only our partners, but also just what products we decide to release. It is our aim that our label will become synonymous with quality providing the Rolls Royce of software games for the Atari. And what better way to start than with Level 9?

The first game to be released, Time And Magik, has up to 60,000 words of text, 700 locations and a 10,000 word book containing detailed play guide and short story.

To help players who get bogged down with the intricacies of the game, Level 9 is providing comprehensive clue sheets free of charge. The game costs £14.95 on tape or disc.

THE GALLUP CHART TOP 20 ATARI SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
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2	1	PANTHER *Mastertronic*	1.99
3	12	POLE POSITION *Atari*	12.99
4	•	FEUD *Mastertronic*	1.99
5	11	DECATHLON *Firebird*	1.99
6	1	HENRY'S HOUSE *Mastertronic*	1.99
7	4	TRANSMUTER *Code Masters*	1.99
8	14	SPACE SHUTTLE *Firebird*	1.99
9	•	SPEED ACE *Zeppelin*	2.99
10	18	ON CUE *Mastertronic*	2.99
11	3	180 *Mastertronic*	2.99
12	17	BMX SIMULATOR *Code Masters*	1.99
13	•	PLATFORM PERFECTION *US Gold*	9.95
14	•	GHOSTBUSTERS *Ricochet*	1.99
15	•	SOCCER *Alternative*	1.99
16	•	MILK RACE *Mastertronic*	2.99
17	7	STORM *Mastertronic*	1.99
18	•	COLONY *Mastertronic*	1.99
19	6	DIZZY DICE *Players*	1.99
20	16	RIVER RAID *Firebird*	1.99

Compiled by Gallup/Microscope

New from Atlantis is League Challenge which goes straight to the number one spot. You can read the review in this issue.

The only full priced title in the Top Ten this month is Pole Position from Atari, yet there are seven new entries and re-entries, including a new title from US Gold – Platform Perfection.

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LET'S TRY TACKLING TOKENISING

ANDRÉ WILLEY continues his in-depth examination of the way Atari Basic is structured

HAVE you by now managed to digest last month's somewhat technical delve into the inner secrets of Atari Basic? It's not really as complex as it first seems, is it? This time we'll be continuing from where we left off and taking a look at the way program lines are encoded – or tokenised.

Looking back for a moment you will remember the example program we were using last time:

```
5 LET NUMBER=120
10 PRINT NUMBER
```

Line 5 tokenised to give us the codes *5, 0, 15, 15, 6, 128, 45, 14, 65, 16, 0, 0, 0, 0, 22* and line 10 gave us the somewhat shorter sequence *10, 0, 7, 7, 32, 128, 22*.

As a quick reminder the first two digits of each line represent the line number in standard 6502 low high format and the next two give us the total number of bytes contained in the tokenised line. The final 22 is a marker to tell Basic it has reached the end of the current line.

All the bytes in between represent the program lines themselves, with numbers of 128 and over referring to variables – as stored by Basic in the variable name table. These tokenised lines will be used whenever you run the program, and are only ever converted back into text form when you decide to use LIST.

This time we'll be considering a slightly more complex program – shown as Listing 1 with the tokenised version in Figure 1. It contains a number of features we haven't looked at yet, the most important being strings and multi-statement lines.

The first thing to note is that there are four variables in the program – *TEXT$, A, B* and *C*. These are given the first four variable name tokens, so *TEXT$* is referred to by the number 128, *A* by 129, *B* by 130 and finally *C* by 131.

This is, of course, the order in which the variables were first referred to when the program was typed into memory.

```
10 DIM TEXT$(20)
20 TEXT$="HELLO
30 PRINT A  PRINT B  PRINT C
40 REM THE END
```

Listing 1. Simple example program

Line 10 is easy to work out and differs little from the lines we have seen before. The token 20 refers to the word DIM, and 59 and 44 are the open and close bracket symbols. As we have already seen, *TEXT$* is given the token 128, and the number 20 is coded somewhat lengthily as a numeric constant in binary coded decimal. See last month's article for more information on BCD coding.

Line 20 contains something completely new – the string assignment **TEXT$="HELLO"**. Once tokenised, it looks like this:

20 0 15 15 54 128 46 15 5 72 69 76 76 79 22

You should know by now that the first four numbers – 20, 0, 15 and 16 – mean that the line number is 20 and it is 15 bytes long. But the rest of the codes are new.

Firstly, the token 54 means LET – because what we meant to type was **LET TEXT$="HELLO"**, even if we omitted the word itself.

This use of token 54 is referred to as an implied LET – if we typed in the full version of the line all that would change would be that the 54 would be replaced by a 6, the normal token for LET.

The digit 128 tells Basic we want to use the first variable (*TEXT$*) and 46 represents the equals sign. The number 15 signifies the start of a string constant in much the same way as the number 14 always precedes a BCD numeric constant.

The string is coded very simply as a single byte to indicate the length of the string – in this case five characters – and then the text in standard Asc form. Finally the line is terminated with the normal 22.

Line 30 gets a little more complex since it contains three different statements each separated by a colon. This line tokenises to:

30 0 15 7 32 129 20 11 32 130 20 15 32 131 22

which in turn breaks down into these four segments:

```
30  0  15
 7 32 129 20
11 32 130 20
15 32 131 22
```

The first part is simple enough to decipher since we've seen its form a number of times before. The 30 and the 0 give the line number (30) and the 15 gives us the total number of bytes in the token sed line – count them and see. We also already know that 32 is the standard token for PRINT and that the numbers 129, 130 and 131 are simple variable references.

The token 22 signifies the end of the

10 0 16 16 20 128 59 14 64 32 0 0 0 0 44 22	10 DIM TEXT$(20)
30 0 15 15 54 128 46 15 5 72 69 76 76 79 22	20 TEXT$="HELLO"
30 0 15 7 32 129 20 11 32 130 20 15 32 131 22	30 PRINT A PRINT B PRINT C
40 0 13 13 0 84 72 69 32 69 28 69 165	40 REM THE END

Figure 1. The tokenised structure of Listing 1

Turn to Page 10 ▶

◀ From Page 10

line, so it's not too difficult to see that 20 must indicate the end of a statement within a multi statement line – rather like the colon in the original text version. This just leaves us with the numbers 7, 11 and 15 at the start of each successive statement to explain.

In the same way that Basic stores the total length of the line so it must also keep track of the length of each statement within that line.

So far we have seen only a single statement on a given line, so we see two identical length values – the distance to the end of the line being the same as that to the end of the first (and only) statement.

However, in this case we see that the second length byte in fact refers to the length of just the first statement. To be more accurate, it provides an offset to the beginning of the next statement.

The value of 7 in the tokenised version of **PRINT A** gives the total number of bytes that must be counted to take you from the start of the line to the last byte of that first segment – the very next byte will be the start of the following statement.

Similarly the number 11 at the start of the second statement tells us that the third statement will begin 12 bytes in from the start of the line – since the second one finishes at byte 11.

Finally the last statement on a line will always contain the same offset value as the total line length byte – the offset to the next statement being the same as the offset to the next line. This is why the special cases we have looked at so far – in which there is only one statement on a line – always have the same number for the line offset as they do for the statement offset.

The last line of our sample program is probably the simplest of them all. After the line number and the two identical length bytes comes the single token zero meaning REM. This is followed by the rest of the Ascii text – terminated in this case with a carriage return byte (155) instead of the normal code 22. This is done so that you are able to use a Control+X – Ascii code of 22 – in your text.

A DATA statement would be coded in exactly the same way, but with a token value of 1 followed by the Ascii text.

It would obviously take far too long to give examples of all the individual tokens used by Atari Basic, but you should by now understand the general format of a line.

For further information Figures II, III and IV give a complete breakdown of all the available tokens and their meanings. The first token of any statement will always come from Figure II and it may be followed by either some Ascii text – such as in the case of REM, DATA or ERROR lines – or more normally by a mixture of the tokens listed in Figures III and IV plus various numeric or string constants.

You will notice from the list of arithmetic and string operations given in Figure III that some characters seem to have more than one possible token. This is especially notable in the case of the open bracket and the equals signs and is due to the fact that they can be used in a variety of functionally quite different situations.

For example, the equals symbol may be used to assign a value to a numeric variable – as in **LET A=10** or to a string – with **LET TEXT$="HELLO"**. It can also be used for comparison of either strings or numbers – such as **IF TEXT$="N" THEN END** or **IF A=MAX THEN 100**.

Similarly the open brackets character can be used within a mathematical formula to access a substring, inside a DIM statement or as part of a function call such as **PRINT CHR$(A)**.

Each usage of the character has its own unique token, and these various special cases are listed alongside each token.

One other point of interest concerns the useful trick of abbreviating commands when you are typing in a program. I've no doubt that many of you prefer to use GR. instead of the much longer GRAPHICS, or L. instead of LIST. But how does Basic know that typing S. means SAVE rather than SOUND or even SETCOLOR?

The answer lies in the structure of Figure II. When Basic discovers a dot within a command it scans through the table starting at the top until it finds a match for the few characters it has been given. Thus, since SAVE comes before any other word starting with S, this becomes the first match and the command is read as SAVE.

If you just type the dot without any other characters the match will be made on the very first token in the table – giving you a very quick way to enter REMs.

This technique works with any command but not with functions. Thus there is no way to shorten PADDLE, for example, because it is a function call, as listed in Figure IV. Also some abbreviations have dubious advantages – such as POK. instead of POKE. It can't be shortened any further because using P. or even PO. would result in the command POINT being generated.

Unfortunately we are stuck with the command table order as defined by Atari in the Basic rom.

● *Next month I'll conclude this tour of Basic's inner workings with a program which will enable you to see these tokens in action for yourself.*

Token	Basic keyword	Token	Basic keyword
0 ($00)	REM (followed by text terminated with a Carriage Return)	28 ($1C)	POINT
1 ($01)	DATA (as for REM)	29 ($1D)	XIO
2 ($02)	INPUT	30 ($1E)	ON
3 ($03)	COLOR	31 ($1F)	POKE
4 ($04)	LIST	32 ($20)	PRINT
5 ($05)	ENTER	33 ($21)	RAD
6 ($06)	LET	34 ($22)	READ
7 ($07)	IF	35 ($23)	RESTORE
8 ($08)	FOR	36 ($24)	RETURN
9 ($09)	NEXT	37 ($25)	RUN
10 ($0A)	GOTO	38 ($26)	STOP
11 ($0B)	GO TO (same as GOTO)	39 ($27)	POP
12 ($0C)	GOSUB	40 ($28)	? (same as PRINT)
13 ($0D)	TRAP	41 ($29)	GET
14 ($0E)	BYE	42 ($2A)	PUT
15 ($0F)	CONT	43 ($2B)	GRAPHICS
16 ($10)	COM (same as DIM)	44 ($2C)	PLOT
17 ($11)	CLOSE	45 ($2D)	POSITION
18 ($12)	CLR	46 ($2E)	DOS
19 ($13)	DEG	47 ($2F)	DRAWTO
20 ($14)	DIM	48 ($30)	SETCOLOR
21 ($15)	END	49 ($31)	LOCATE
22 ($16)	NEW	50 ($32)	SOUND
23 ($17)	OPEN	51 ($33)	LPRINT
24 ($18)	LOAD	52 ($34)	CSAVE
25 ($19)	SAVE	53 ($35)	CLOAD
26 ($1A)	STATUS	54 ($36)	(implied LET)
27 ($1B)	NOTE	55 ($37)	*ERROR (followed by the Ascii text and a Carriage Return)

Figure II Keyword tokens used by Atari Basic (always the first token of a statement)

Token	Meaning
0-13	Unused
14 ($0E)	Numeric constant (next six bytes hold it's BCD value)
15 ($0F)	String constant (next byte is length then string contents)
16 ($10)	
17 ($11)	(dummy for Start of Expression)
18 ($12)	, (parameter separator)
19 ($13)	$
20 ($14)	(end of statement)
21 ($15)	
22 ($16)	(Carriage Return)
23 ($17)	GOTO
24 ($18)	GOSUB
25 ($19)	TO
26 ($1A)	STEP
27 ($1B)	THEN
28 ($1C)	#
29 ($1D)	<= (Arithmetic comparison operators)
30 ($1E)	<>
31 ($1F)	>=
32 ($20)	<
33 ($21)	>
34 ($22)	=
35 ($23)	↑
36 ($24)	*
37 ($25)	+
38 ($26)	-
39 ($27)	/
40 ($28)	NOT
41 ($29)	OR
42 ($2A)	AND
43 ($2B)	((within arithmetic expression)
44 ($2C)	)
45 ($2D)	= (Arithmetic assignment)
46 ($2E)	= (String assignment)
47 ($2F)	<= (String comparison operators)
48 ($30)	<>
49 ($31)	>=
50 ($32)	<
51 ($33)	>
52 ($34)	=
53 ($35)	+ (unary plus)
54 ($36)	- (unary minus)
55 ($37)	((for substrings)
56 ($38)	((for arrays)
57 ($39)	((in DIM statement)
58 ($3A)	((for function call eg in 'CHR$(')
59 ($3B)	)
60 ($3C)	, (array/substring element separator)

Figure III Operator tokens used by Atari Basic

Token	Function
61 ($3D)	STR$
62 ($3E)	CHR$
63 ($3F)	USR
64 ($40)	ASC
65 ($41)	VAL
66 ($42)	LEN
67 ($43)	ADR
68 ($44)	ATN
69 ($46)	COS
70 ($46)	PEEK
71 ($47)	SIN
72 ($48)	RND
73 ($49)	FRE
74 ($4A)	EXP
75 ($4B)	LOG
76 ($4C)	CLOG
77 ($4D)	SQR
78 ($4E)	SGN
79 ($4F)	ABS
80 ($50)	INT
81 ($51)	PADDLE
82 ($52)	STICK
83 ($53)	PTRIG
84 ($54)	STRIG
85-127	Unusad
128 256	Reserved for variables

Figure IV Function tokens used by Atari Basic

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ACCESS

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Give us the tools and...



MICK RANDLE gives full details of the Atari User Programmer's Toolkit

Atari XE computers are arguably the best 8 bit home micros available and are certainly the best value for money. Even the ST range is inferior to the XE in some ways – just ask a machine code programmer.

It is amazing that the internal design of the XE has remained virtually unchanged since 1979, when the first Atari 400 was introduced. Unfortunately, some areas of its performance do tend to betray its ancient origins. For example, Atari Basic is notably lacking when compared to other versions of the language used by other computers.

Being an inventive lot, Atari enthusiasts frequently write utility programs to make up for Basic's deficiencies, and lots have been published in *Atari User*. The snag is that although each admirably fulfils a requirement, it normally has to be loaded into memory as it is required. This means that it can take programmers a relatively long time to perform straightforward tasks.

The problem is not that Atari Basic is a bad language – it is more a case of it being incomplete. Even essential program development commands like line renumbering and deletion are conspicuous by their absence. True, you can go out and buy alternative versions of Basic but they cost nearly as much as the computer itself, and you run the risk of your programs being incompatible with standard machines.

What we need is an extended Atari Basic which is compatible with the standard one, but with additional program development functions. We want the functions to execute quickly, with the minimum of typing and without having to remember complicated commands. We also have to retain as much memory as possible because a large Basic language is not much use if there is not enough memory left for a program.

THE Atari User Toolkit offers 10 additional Basic commands and is totally compatible with standard Atari Basic. It consumes only 128 bytes of user memory and it even leaves Page 6 – memory addresses 1536 to 1791 – free.

All the Toolkit commands are useful and are easy to remember and use and several, like line renumbering, can be found in other computers as built in utilities. But some of the new commands are exclusive to the Atari community.

Toolkit loads into memory via an autoboot file on tape or disc. When it has loaded you can begin your programming session and forget about it until you need it. As previously mentioned, the total cost in terms of user memory is only 128 bytes. This is achieved by placing the main code in the unused ram beneath the Basic rom chip, and switching between the two banks as required.

The code which handles this switching is 128 bytes long and resides in low memory. Figure 1 explains the computer's memory allocation. Notice that we have effectively squeezed 16k of code into the 8k area from $A000 to $BFFF.

The Toolkit commands are called from Basic's direct command mode – they execute when you type them rather than during program execution.

Renumbering

You may renumber your program lines from base line 10 in line increments of 10, by typing REN. All line references, such as GOTO 100, are automatically altered to reference the new line number. You can vary the base line and the line increment by entering them after the command, separated by a comma.

Toolkit checks to see if your new line numbers are acceptable before altering your program, so there is no chance of ruining your work. Variable line references, such as GOTO LINE, cannot be renumbered because Toolkit cannot determine how a variable may change.

Similarly, references to non existent lines cannot be renumbered because they are programming errors. Toolkit continues to renumber the program, displaying alert messages where appropriate.

As an aid to legibility, all non-existent line references are set to 99999 so that you can easily identify the offending statement.

Deleting lines

The line deletion command is an important and long overdue addition to Atari Basic. Just type the DEL command followed by two line numbers separated by commas, and all lines within the specified range will be removed from your program.

The first line number should obviously be lower than the second one but again if you make a typing error Toolkit will tell you rather than ruin your program. Make sure that the

remainder of your program makes no reference to the missing lines, as no checking is performed by Toolkit.

A good way to find such references is to renumber the program with the REN command, which will expose any references to the now non-existant lines.

Strip utility

The STRIP command is a sort of selective line deletion utility. It deletes all REM statements from the program whether they are short REMs at the end of multiple-statement lines or full-line REMs.

Their removal makes a routine more difficult to understand, but on the other hand it reduces the size of the program and increases its speed of execution. It has always been good programming practice never to GOTO a REM line, although many programmers do it. Test for such references by using the REN command as above.

Changing variables

Sooner or later every programmer reaches the stage where a variable name is no longer appropriate to its function.

Suppose you are using *X* to represent the number of remaining lives in a game program. As the program grows you decide that *LIVES* would have been a more descriptive name, but you leave it as *X* because you don't feel like altering 36 occurrences of the variable.

The CHANGE command allows you to change the *X* to *LIVES* simply and quickly, and all occurrences of the variable will be altered automatically.

Full checking is performed by Toolkit to prevent you from making a mess of your program by duplicating an existing name, or changing the variable to a different type such as converting a string variable to an array.

Listing variables

You may find that you receive a duplicate name error when using the CHANGE command, and you are not sure exactly what variables you are using. Find out by using LVAR which not only lists each variable in memory but also displays every line number it appears in.

Unused variables are indicated and are wasteful of memory, so rather than invent a new one you could change the name of a redundant variable with the CHANGE command.

Removing click

Every time you press a key you will hear the familiar click through the monitor loudspeaker, which can drive many programmers to distraction. A poke can switch it off, but I don't know anyone who can remember either the memory address or the number to POKE in it.

The CLICK command saves you the trouble. The funny thing is that many people actually miss the sound when it has gone, so if you find you want it back just type CLICK again.

Perfect Listing

A major bugbear for Atari users is the fact that the computer is capable of displaying more characters than a printer is capable of printing. The printer interprets many characters as print control codes in a similar way that the computer interprets the Control+Clear combination as a screen control code.

It is no coincidence that the Control Shift key is so-called. That is why you sometimes find that when listing a program with the command LIST "P:", a machine code string may make your printer perform a dozen line feeds and print the rest of your listing in Greek.

Toolkit's LISTING command gives you a full printed listing without any of the above problems on any Epson or Epson compatible printer with bit image graphics capability.

Changing bases

Intermediate to advanced programmers often need to convert a decimal number to its hexadecimal or binary equivalent. This usually means a frenzied search for the calculator or a book containing conversion tables.

Not any more. Just type VAL and the decimal number for an immediate

Turn to Page 14 ▶

Operating system rom *($C000 to $FFFF)*
8k Basic rom and 8k Toolkit rom *($A000 to $BFFF)*
Screen memory *(Size varies with graphics mode)*
Free memory for programs *(Size varies)*
128 byte Toolkit handler (address varies with system)
Operating system and Basic ram *(Size varies)*

Figure I How the Atari allocates memory

Command	Example	Purpose
CHANGE old new	CHANGE X LIVES	Change variable name
CLICK	CLICK	Toggle key-click
DEL line1 line2	DEL 100 288	Delete line range
DIR drive	DIR 2 or DIR 8	Disc directory
GIRI	GIRI	View GIRI listing
LISTING start,end	LISTING or LISTING 10 300	Full Atascii listing
LVAR	LVAR	Variable X-reference
REN start, step	REN or REN 1,1	Renumber program
STRIP	STRIP	Remove REM statements
VAL number	VAL 2 or VAL $3F	Number conversion

Figure II The Toolkit's 10 new Basic commands

◀ *From Page 13*

translation into hexadecimal and binary notation. Hexadecimal or binary numbers may be converted to the other bases using VAL and entered by prefixing the number with the $ or % signs respectively.

Directory enquiries

The DIR command is aimed, not surprisingly, at disc drive owners. Type the command followed by the drive number for a disc directory listing. Using Dos 2.5, the only restriction imposed by Toolkit is that the system must be configured for a maximum of two disc drives (plus the ramdisk if used) and three file buffers.

Realistically speaking, being limited to two drives is no great hardship since most people only need one and two drives are a luxury most of us cannot afford.

However, if he uses SpartaDos he can still use Toolkit and access all of them. This is due to the fact that SpartaDos uses the ram beneath the computer's operating system in a similar way to how Toolkit uses the ram beneath Basic.

Checksums

Most *Atari User* readers adopt the good habit of using GIRI to check their typing and the latest version in the November 1987 issue of *Atari User*, is much quicker and easier to use than the original.

Toolkit incorporates GIRI to make its operation even easier – just type GIRI for the checksum listing. The only other difference is that you can no longer send it to your printer but think of how much paper you will save!

Finally, not only does Toolkit offer 10 great utilities as extensions to Atari Basic, but it also provides English error messages to complement the computer's error code number.

With Atari User Toolkit you need no longer feel embarrassed when your BBC Micro chums start talking about their Basic. At a fraction of the cost, you have better program development commands.

AUTHOR'S NOTE

I enjoyed writing Toolkit for Atari User. Nowadays it is fashionable to knock Basic as a programming language, and Atari Basic in particular because it is does not conform to the Microsoft standard.

I have a great affection for our version of Basic. It is easy to use, quite powerful for its size and it only costs 4k of memory. The enhancements provided by Toolkit enable you to spend more time programming and less waiting for utilities to load.

I use Toolkit myself – and what better recommendation can you have than that? The special offer on page 42 is totally in keeping with Atari's philosophy of power without the price!

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WHILE STOCKS LAST

DirSort it!

ALAN CRAWFORD can bring order to that cluttered up disc directory

IF you have a lot of discs full of programs you've written yourself or typed in from *Atari User* you may have noticed one of the less endearing features of the disc directory – it's very messy

If you've got a packed disc finding out if a particular file is on it would involve looking carefully through the entire directory. But wouldn't it be a lot easier if the directory was in alphabetical order?

This would mean that if you had a number of files concerned with one program all of which had the same filename but a different extension, they would now appear together on the disc directory. It's not really a vital facility but it makes it a lot easier to keep track of where files are. And Dir Sort is just the program to do it.

It will work on Dos 2.0 or Dos 2.5 discs in single or enhanced density. Although it ignores deleted and unclosed files, it may under unusual circumstances crash if a file has become corrupted. This has never happened to me yet, but if you suspect a file to be faulty, use the *Verify Disk* option in the DISKFIX.COM utility supplied with Dos 2.5 to make sure the disc is safe.

If you don't have access to Dos 2.5 and are still using Dos 2.0, make a backup of your disc just in case a bad file causes DirSort to corrupt the disc further. Corruption is very unlikely but it's better to be safe than sorry.

Also once a disc has been sorted, deleted files cannot be unerased using DISKFIX.COM even if the disc has not been written to since the file was deleted. So make sure you won't be wanting to recover any deleted files before you sort the disc.

Don't try to sort commercial discs, even if they seem to have normal directories. Some discs store program data in the directory sectors and sorting this would be fatal.

If you've got an assembler type in Program II and then type

```
ASM,,#D:DIRSORT.BIN
```

to produce a binary file on your disc. I used MAC/65 to assemble the code but it should be easy to modify it so that it will assemble on the Atari Assembler Editor cartridge.

Those who don't have an assembler should type in Program I. Remember to use Get it Right! to check it and save a copy to disc before running it. When you are sure everything is OK, Run it and it will produce a binary file which can be executed from Dos.

If you think the principels of disc storage interesting and want to find out more about it, Atari's *Technical Reference Notes* and Compute's *Mapping The Atari* both contain a lot of useful information. Compute also publish a book by Bill Wilkinson called *Inside Ateri Dos*.

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How Dos stores files on disc

To understand how you go about sorting the directory it's useful to understand just how Dos 2.0 and Dos 2.5 store files on disc.

When you save a file, the file management system – FMS – stores information about it in the directory. This is stored in sectors 361-368 on your disc and each of these eight sectors holds the directory information for eight files, giving a maximum of 64 files.

Each record is 16 bytes long and consists of a flag byte which indicates the file status – locked, deleted or unused. Two bytes each are used for the number of sectors in the file and where on the disc the file begins, with another 11 bytes for the filename and extension.

So sorting the directory involves reading the directory sectors into memory, sorting them into order and writing them on to the disc again. I've used a simple insertion sort algorithm which involves searching through the directory and finding the record which should be last in the directory.

This record is then swapped with the last record and the process is repeated, only this time we decrease the number of records to sort by one, ignoring the last record.

Eventually we reach the situation where the number of records to sort is one, which means we have finished. This isn't a particularly fast or clever algorithm but it is easy to implement and since we are working in machine code it is still pretty fast.

While that may seem on the face of it to be all there is to sorting the directory, in reality things are a little more complex. This is because of the way in which Dos stores the files themselves.

Each sector of a file consists of 125 data bytes, a pointer to the next sector in the file, a count of the number of bytes used in the sector and a note of the file number. The file number is used to verify file integrity.

So all the sectors of the first file in the directory have zero as their file number and so on – remember that machine code programmers count from zero not one. If the file number in the sector and its place in the directory are different, the FMS reports an error.

However, since we have reordered the directory, the file numbers no longer match those in the directory, which makes it necessary to alter all the file numbers in each file.

We do this by first of all finding where the file starts from the information in the directory record. Using the pointers to the next sector in each sector of the file, we have to thread our way through each file on the disc changing the numbers to their new values as we go. This takes rather a long time as we have to read every sector on the disc that contains program data and then write it out again.

That's a rough outline of the program. We read the directory in, sort it, write it out again and then thread our way through each file changing its number. The first three stages only take a few seconds but the last can take upwards of 10 minutes on a really full disc.

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Program I Basic program to create a Binary load file This can then be loaded using option L on the Dos menu

```
100 REM DIRECTORY BASIC LOADER
110 REM BY ALAN CRAWFORD
115 REM (c)ATARI USER
120 REM Save this loader just in case
130 RESTORE 500
140 PRINT "Creating DUBINSORT.BIN
150 OPEN #1,8,0,"D:DIRSORT.BIN"
160 FOR L=0 TO 597
170 READ D PUT #1,D
180 NEXT L
190 CLOSE #1
200 END
500 DATA 255,255,0,44,251,64,186,142,8
3,66,169,1,141,1,3,169
510 DATA 238,141,58,3,169,65,141,69,3,
32,134,65,32,20,65,32
520 DATA 93,66,32,29,65,173,80,66,240,
5,32,174,44,169,20,141
530 DATA 88,3,169,66,141,69,3,32,187,6
5,96,32,28,64,173,80
540 DATA 66,240,8,72,32,96,66,104,141,
68,66,96,32,255,66,160
550 DATA 0,160,48,56,177,203,240,13,32
,0,65,230,88,66,173,68
560 DATA 66,201,64,144,239,96,32,255,6
4,185,205,133,205,165,204,133
570 DATA 206,169,1,141,61,66,160,5,177
,205,208,203,176,10,165,203
580 DATA 133,205,165,204,133,206,144,7
,208,5,200,192,16,208,235,173
590 DATA 61,66,205,80,66,240,8,32,8,65
,230,61,66,208,215,160
600 DATA 15,177,205,170,177,203,145,20
5,138,165,205,136,16,245,206,80
610 DATA 66,208,179,96,32,255,64,162,0
,160,0,177,203,68,21,160
620 DATA 5,177,203,153,61,66,200,192,5
,208,246,138,10,10,141,62
630 DATA 66,32,218,64,32,8,65,232,236,
60,66,208,220,96,52,58
640 DATA 65,160,125,185,66,66,41,3,13,
62,68,153,66,66,32,47
650 DATA 65,185,66,66,41,3,141,65,66,1
05,67,66,141,64,66,13
660 DATA 65,68,252,66,247,65,208,218,9
6,169,194,133,203,169,66,133
670 DATA 204,96,165,203,24,105,16,133,
203,144,2,230,204,96,169,62
680 DATA 141,2,3,32,56,65,96,169,87,14
1,2,3,32,56,65,96
690 DATA 169,82,141,2,3,32,106,65,96,1
69,87,141,2,3,32,106
700 DATA 65,96,158,72,162,8,169,194,14
1,4,3,169,66,141,5,3
710 DATA 169,105,141,10,3,169,1,141,11
,3,32,132,65,173,4,3
720 DATA 24,105,128,141,4,3,144,3,238,
5,3,238,10,3,202,208
730 DATA 233,104,170,96,169,68,141,4,3
,169,66,141,5,3,173,64
740 DATA 66,141,10,3,173,65,66,141,11,
3,32,137,65,96,152,72
750 DATA 138,72,32,83,228,66,5,104,170
,104,169,96,169,68,141,68
760 DATA 3,169,66,141,69,3,32,221,65,1
76,83,66,156,76,0,64
770 DATA 32,221,65,169,255,141,252,7,1
73,252,2,201,12,208,249,169
780 DATA 255,141,252,2,96,32,221,65,16
9,255,141,252,2,173,252,2
790 DATA 201,43,240,12,201,35,208,2,78
0,243,169,255,141,252,2,96
800 DATA 174,83,66,156,76,0,64,162,0,1
67,9,141,66,3,141,72
810 DATA 3,141,71,3,32,86,228,96,73,78
,83,69,82,84,32,68
820 DATA 73,83,248,65,65,64,75,32,84,7
9,32,83,79,82,84,32
830 DATA 84,72,69,78,32,80,82,69,83,83
,32,82,69,84,85,82
840 DATA 78,155,80,82,69,83,83,32,69,3
2,84,79,32,82,69,82
850 DATA 85,78,44,32,78,32,84,79,32,83
,84,79,80,155,68,73
860 DATA 83,75,32,69,82,82,79,82,33,15
5,0,0,0,0,0,0,0
870 DATA 224,225,2,0,64
```



LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
100	CUS (F)	550	OSV (D)	720	ULO (B)
110	CTS (D)	560	GUR (I)	730	1VA (B)
115	B9S (G)	570	22L (F)	740	0FX (A)
120	0SS (D)	580	FNH (D)	750	26H (K)
130	WRD (C)	590	S7R (U)	760	VTC (L)
140	7WF (A)	600	GVH (G)	770	2HA (P)
150	S76 (W)	610	2JE (J)	780	SWX (V)
160	1NR (G)	620	S7P (F)	790	S91 (B)
170	7R9 (S)	630	2KG (W)	800	UG3 (V)
180	FU1 (I)	640	2KG (W)	810	WBB (K)
190	W2R (K)	650	16W (F)	820	AW9 (2)
200	D22 (7)	660	CVO (L)	830	QG5 (R)
500	176 (F)	670	240 (B)	840	WVT (A)
510	16W (F)	680	PSY (K)	850	QLJ (U)
520	OGJ (S)	690	X8G (U)	860	KP8 (B)
530	Y0S (H)	700	W1S (O)	870	5PR (A)
540	1TO (X)	710	VN3 (A)		

Program II MAC/65 assembly listing of Program I

```
1000     .TITLE 'DirSort Directory Sor
ter'
1010     *=  $6000
1020     .OPT OBJ,LIST
1030     .SET 3,0
1040 ;
1050 DIRSCT = $0169  ;Directory start
 sector
1060 CURRENT = $CB   ;Pointer to curre
nt record
1070 GREATEST = $CD  ;Pointer to great
est record so far
1080 ;
1090 ;System Equates
1100 ;
1110 DUNIT = $0301
1120 DCOMND = $0302
1130 DBUFLO = $0304
1140 DBUFHI = $0305
1150 DBYTLO = $0306
1160 DBYTHI = $0307
1170 DAUX1 = $030A
1180 DAUX2 = $030B
1190 DSKINV = $E453
1200 ICCOM = $0342
1210 ICBAL = $0344
1220 ICBAH = $0345
1230 ICBLL = $0348
1240 ICBLH = $0349
1250 ICAX1 = $034A
1260 ICAX2 = $034B
1270 CIOV =  $E456
1280 CH  =   $02FC
1290 ;
1300 ;Main Program Loop
1310 ;
1320 DIRSORT
1330     TSX         ;Save initial sta
ck position.
1340     STX STACK
1350     LDA #$01    ;Use drive #1
1360     STA DUNIT
1370     LDA # <INITMESS ;Point to sta
rting message
1380     STA ICBAL
1390     LDA # >INITMESS
1400     STA ICBAH
1410     JSR RETURN  ;Wait for return
 key.
1420     JSR GETDIR  ;Get directory.
1430     JSR SORT    ;Sort it.
1440     JSR WRTDIR  ;Put it back
1450     LDA MAX     ;Is directory emp
ty?
1460     BEQ FINISH  ;If so then finis
h.
1470     JSR TRACE   ;Rewrite file #s

1480 FINISH
1490     LDA # <REDOMESS ;Display recu
rn prompt.
1500     STA ICBAL
1510     LDA # >REDOMESS
1520     STA ICBAH
1530     JSR YESNO
1540     RTS         ;Return.
1550 ;
1560 ;Directory Sorting Module.
1570 ;Routines to perform an insertion
 sort on the memory image of the direc
tory
1580 ;
1590 SORT
1600     JSR FINDMAX ;Find number of f
iles on disk
1610     LDA MAX     ;Is the disk empt
y?
1620     BEQ EXTSRT
1630     PHA         ;If not, preserve
 value of MAX
1640     JSR SHUFFLE ;Then sort it
1650     PLA         ;Restore MAX
1660     STA MAX
1670 EXTSRT
1680     RTS         ;Return
1690 ;
1700 FINDMAX
1710     JSR FRSTREC ;Set pointer to f
irst record.
1720     LDY #$00    ;No records found
 yet.
1730     STY MAX
1740 FINDLOOP
1750     LDA (CURRENT),Y ;Check flag b
yte.
1760     BEQ EXTFND  ;If it's zero, th
en we've reached the end.
1770     JSR NEXTREC ;Move to next rec
ord.
1780     INC MAX     ;Increase file co
```

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```
unt
1790     LDA MAX     ,Have we read 64
files?
1800     CMP #$40
1810     BCC FINDLOOP ,If not then loo
p back
1820 EXTFND
1830     RTS         ,Return
1840 ;
1850 SHUFFLE
1860     JSR FRSTREC ,Point to the fir
st record
1870     LDA CURRENT ,Set pointer to g
reatest to start
1880     STA GREATEST
1890     LDA CURRENT+1
1900     STA GREATEST+1
1910     LDA #$01    ,It's the first r
ecord
1920     STA POS
1930 SHFLOOP
1940     LDY #$05    ,Filename starts
at 6th. character
1950 SHFLOOP2
1960     LDA (GREATEST),Y ,Compare cur
rent letter with greatest so far
1970     CMP (CURRENT),Y
1980     BCS EQUAL   ,Branch if <=
1990     LDA CURRENT ,It's greater so
make current record the greatest
2000     STA GREATEST
2010     LDA CURRENT+1
2020     STA GREATEST+1
2030     BCC EXTSHF  ,Try next record
2040 EQUAL
2050     BNE EXTSHF  ,If it's less the
n try next record
2060     INY         ,It equal then tr
y next character
2070     CPY #$10    ,Last character?
2080     BNE SHFLOOP2 ,If not, then lo
op.
2090 EXTSHF
2100     LDA POS     ,Is this the last
 record?
2110     CMP MAX
2120     BEQ SWAP    ,If so, then swap
 greatest with current
2130     JSR NEXTREC ,New record
2140     INC POS     ,Increase count
2150     BNE SHFLOOP ,Loop around agai
n.
2160 SWAP
2170     LDY #$0F    ,16 characters
2180 SWAPLOOP
2190     LDA (GREATEST),Y ,Get charact
er from greatest
2200     TAX         ,Save it in X
2210     LDA (CURRENT),Y ,Get characte
r from current
2220     STA (GREATEST),Y ,Put it in g
reatest.
2230     TXA         ,Retrieve saved c
haracter
2240     STA (CURRENT),Y ,And put it i
n current
2250     DEY         ,Finished?
2260     BPL SWAPLOOP ,If not, then lo
op.
2270     DEC MAR     ,Any sorting left
 to do?
2280     BNE SHUFFLE ,If so, then Loop
.
2290     RTS         ,Return.
2300 ;
2310 ;File Modification Module.
2320 ;Routines to thread through a lin
ked file and change file #.
2330 ;
2340 TRACE
2350     JSR FRSTREC ;Point to first d
irectory record
2360     LDX #$00    ,File #0
2370 TRCLOOP1
2380     LDY #$00    ,Check flag byte.
2390     LDA (CURRENT),Y
2400     BMI SKIPFILE
2410     LDY #$13    ,Point to start s
ector.
2420 TRCLOOP2
2430     LDA (CURRENT),Y ,Move start i
nfo from record to SECT
2440     STA SECT-3,Y
2450     INY
2460     CPY #$05
2470     BNE TRCLOOP2
2480     TXA         ,Multiply file #
by 4 to generate mask
2490     ASL A
2500     ASL A
2510     STA MASK
2520     JSR LINK    ,Thread through t
he links.
2530 SKIPFILE
2540     JSR NEXTREC ,Next record?
2550     INX
2560     CPX MAX     ,Finished?
2570     BNE TRCLOOP1 ,If not, then lo
op
2580     RTS         ,Return.
2590 ;
2600 LINK
2610     JSR GETSCT  ,Get sector.
2620     LDY #$7F    ,Point to file #
byte
2630     LDA SECBUF,Y ,Get it.
2640     AND #$03    ,Preserve sector
data.
2650     ORA MASK    ,And new file #
2660     STA SECBUF,Y ,Put it back
2670     JSR WRTSCT  ,And write the se
ctor to disk again
2680     LDA SECBUF,Y ,Use forward poi
nter in sector to select next sector.
2690     AND #$03
2700     STA SECT+1
2710     LDA SECBUF+1,Y
2720     STA SECT
2730     ORA SECT+1  ,Is next sector 0
? (End of file)
2740     BNE LINK    ,If not, then Loo
p.
2750     RTS
2760 ;
2770 FRSTREC
2780     LDA # <DIRBUF ,Point to the s
tart of the directory buffer
2790     STA CURRENT
2800     LDA # >DIRBUF
2810     STA CURRENT+1
2820     RTS
2830 ;
2840 NEXTREC
2850     LDA CURRENT ,Move pointer on
by one record (16 bytes).
2860     CLC
2870     ADC #$10
2880     STA CURRENT
2890     BCC EXTREC
2900     INC CURRENT+1
2910 EXTREC
2920     RTS
2930 ;
2940 ;Disk I/O Module.
2950 ;Routines to read and write direc
tory or single sectors.
2960 ;
2970 GETDIR
2980     LDA #'R     ,Read command.
2990     STA DCOMND
3000     JSR MOVDIR  ,Move directory.
3010     RTS
3020 ;
3030 WRTDIR
3040     LDA #'W     ,Write command
3050     STA DCOMND
3060     JSR MOVDIR  ,Move directory
3070     RTS
3080 ;
3090 GETSCT
3100     LDA #'R     ,Read command
3110     STA DCOMND
3120     JSR MOVSCT  ,Move a sector.
3130     RTS
3140 ;
3150 WRTSCT
3160     LDA #'W     ,Write command.
3170     STA DCOMND
3180     JSR MOVSCT  ,Move a sector
3190     RTS
3200 ;
3210 MOVDIR
3220     TXA         ,Save X register
on stack
3230     PHA
3240     LDX #$08    ,8 sectors to wri
te.
3250     LDA # <DIRBUF ,Point to start
 of directory buffer
3260     STA DBUFLO
3270     LDA # >DIRBUF
3280     STA DBUFHI
3290     LDA # <DIRSCT ,Point to disk
directory sectors.
3300     STA DAUX1
3310     LDA # >DIRSCT
3320     STA DAUX2
3330 DIRLOOP
3340     JSR ONESCT  ,Move one sector
to/from disk
3350     LDA DBUFLO  ,Move buffer on b
y 128 bytes.
3360     CLC
3370     ADC #$80
3380     STA DBUFLO
3390     BCC DIRNXT
3400     INC DBUFHI
3410 DIRNXT
3420     INC DAUX1   ,Next sector.
3430     DEX         ,Done?
3440     BNE DIRLOOP ,No, so loop
3450     PLA         ,Restore X-reg
3460     TAX
3470     RTS         ,Return
3480 ;
3490 MOVSCT
3500     LDA # <SECBUF ,Point to secto
r buffer.
3510     STA DBUFLO
3520     LDA # >SECBUF
3530     STA DBUFHI
3540     LDA SECT    ,Point to a disk
sector
3550     STA DAUX1
3560     LDA SECT+1
3570     STA DAUX2
3580     JSR ONESCT  ,Fetch/Put sector

3590     RTS         ,Return
3600 ;
3610 ONESCT
3620     TYA         ,Save Y & X regis
ters
3630     PHA
3640     TXA
3650     PHA
```

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```
3660     JSR OSKINV  ;Perform disc I/O
.
3670     BMI DISKERR ;Report any error
s.
3680     PLA         ;Restore register
s
3690     TAX
3700     PLA
3710     TAY
3720     RTS         ;Return.
3730 DISKERR
3740     LDA # <ERRMESS ;Display error
 message.
3750     STA ICBAL
3760     LDA # >ERRMESS
3770     STA ICBAH
3780     JSR PRINT
3790     LDX STACK   ;Restore stack to
 its original value.
3800     TXS
3810     JMP DISKORI
3820 ,
3830 RETURN
3840     JSR PRINT   ;Print message.
3850     LDA #$FF    ;Clear keyboard b
uffer.
3860     STA CH
3870 RETLOOP
3880     LDA CH      ;Check buffer.
3890     CMP #$0C    ;Is it return?
3900     BNE RETLOOP ;If not then loop
3910     LDA #$FF    ;Clear buffer.
3920     STA CH
3930     RTS         ;Return.
3940 ,
3950 YESNO
3960     JSR PRINT   ;Print message
3970     LDA #$FF    ;Clear keyboard b
uffer.
3980     STA CH
3990 YNLOOP
4000     LDA CH      ;Check buffer
4010     CMP #$2B    ;Branch if Y is
 pressed
4020     BEQ YES
4030     CMP #$23    ;Branch if N is
 pressed
4040     BEQ NO
4050     BNE YNLOOP  ;Loop otherwise
4060 NO
4070     LDA #$FF
4080     STA CH
4090     RTS         ;Exit program alt
ogether
4100 YES
4110     LDX STACK   ;Restore stack t
initial value
4120     TXS
4130     JMP DISKORI ;Rerun
4140 ,
4150 PRINT
4160     LDX #$00    ;Use editor (IOCB
 0)
4170     LDA #$09    ;Put record comma
nd
4180     STA ICCOM
4190     STA ICBLL   ;Set max. record
length to $0909 (And why not?)
4200     STA ICBLH
4210     JSR CIOV    ;Call CIO.
4220     RTS         ;Return
4230 ,
4240 ;Program Messages
4250 ,
4260 INLINESS  BYTE INSERT DISK TO RU
RT THEN PRESS RETURN ,$9B
4270 REPONESS  BYTE 'PRESS Y TO RERUN,
 N TO STOP',$9B
4280 ERRMESS   BYTE 'DISK ERROR! ',$9B
4290 ,
4300 ;Program Workspace
4310 ,
4320 MAX  BYTE $00   ;No. of files on
disk
4330 FBS  BYTE $00   ;Current record n
o.
4340 MASK  BYTE $00  ;Used for alterin
g file #s
4350 STACK  BYTE $00 ;Used to save ini
tial stack value
4360 SECT  WORD $00  ;Pointer to next
sector to load.
4370 SECBUF ,        Sector buffer 128
 bytes.
4380 DIRBUF = SECBUF+$80 ;Directory bu
ffer 1k
4390     += $0280   ;Putting this on
the end causes Binary file to run.
4400     END DISKORT
```


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It's a challenge!

Mike Cook helps you pick up the gauntlet to solve quite a devious programming problem

HINTS AND ALGORITHMS

IN our March issue we set out a programming challenge to test a roulette gambling method. The strategy was always to bet on the red numbers and if you lost, to double the bet until you won.

This month we present you with a plain English description of how to translate the betting strategy into a program. You can refer to the March issue to compare the techniques here with the original problem.

In the next edition of *Atari User* we will give you a no frills program that will do the job, along with suggestions for further improvement. You can check this against your own efforts and perhaps sort out any points you had difficulty with.

Remember, as far as a program is concerned there are as many right answers as there are wrong ones, but the solutions I favour are simple and readable.

I will avoid, as much as possible, using fancy tricks or so-called clever programming techniques, as most of the time they are not necessary.

So, without further ado, I present the hints for the casino problem.

THERE are many ways of writing a program. One method is called *top down* programming, where you plan the outermost level of your code first and work down, sub dividing the problem until you reach the nitty-gritty.

I prefer to write the crux routine first and build the rest of the program around it. This is usually known as *bottom up* programming although I call it *middle out*, as the first routine you write ends up in the middle of the code and you put all the fancy extras around it. Let's see how we can program this problem using the bottom up method.

There are 37 positions on the roulette wheel, ranging from 0 to 36, so the first thing we have to do is to produce a number in that range. In general, the random number function INT(RND(0)*N+1) will generate a number between 0 and *N*. So to get our roulette value we use the expression INT(RND(0)*37).

Having spun the wheel we need to see if the number generated is a red number, in other words have we won? The red numbers are:

```
1,3,5,7,9,12,14,16,18,19,21,23,25,27,30,32,34,36
```

We could test these against our random value from each spin with a separate IF statement but this would take 18 lines.

```
IF roll=15 THEN
IF roll=4 THEN
IF roll=2 THEN
```

There is a rule in computing that when you find yourself writing nearly identical lines of code, there is an easier way to do it.

In this case the answer is to use an array to hold the red number data, so that we need only have one IF statement inside a loop.

Before we enter the loop we must set a variable – *WIN* would be a good name. Then if one of our array values matches the spin we change its value to something else.

However, we need to initialise the array at the start of the program by reading the red numbers from a data statement.

Having found out whether we have won, appropriate action can be taken – either add twice the bet money to our pot if we have won, or double the bet if we have not. At this point we need to test if we have the amount to cover the bet in our pot – if not we are broke and the run ends. Otherwise we subtract our bet from the pot and try again.

We should also keep track of how many bets we have placed. That should be easy: simply increment a counter every time – and look for some criteria for when to stop, other than losing all our money.

For example, we could stop when we have doubled our initial pot, or when a certain number of bets have been laid. It would also be useful to keep track of the largest bet we have had to place.

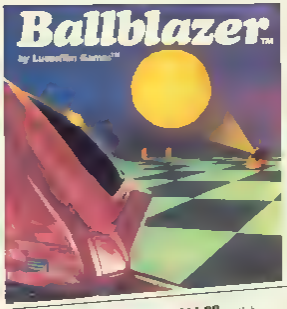
Finally to stop the program looking boring when it's running, after each bet let's print its value and what's in the pot as well as the bet number every spin of the wheel.

● *Well, what are you waiting for? Get tapping away at that micro and I'll see you next month with a solution.*

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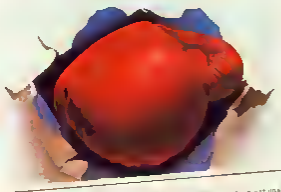
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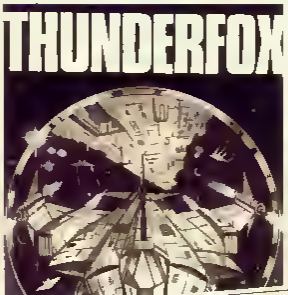
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ATARI

NEWS...NE

More power, speed for MicroLink

MAJOR improvements to MicroLink have been announced, following the successful outcome of prolonged negotiations with Telecom Gold

The enhancements are based on speeding up connect time on the system, with the aim of bringing down the cost to subscribers

'With the vast increase in telex traffic in particular over

Costs will be cut

the last few months one of our top priorities has been to simplify the sending of messages" said the head of MicroLink Derek Meakin

'Our programmers have achieved a significent break through which we are now implementing We are also completing the switch to our new Prime 3955 computer which provides more than four times more power than has been available to MicroLink subscribers so far

The other big development is the opening of 2400 baud access to the MicroLink computer – doubling the speed at which users can transmit and receive data'

Wanted – a disaster

IF anyone out there has recenty found disaster turning into a crisis, there could be a silver lining to their troubles

A company on MicroLink specialising in providing locations for films and still photography is asking ohter users to help

'We've got a stinker of a job' says spokesman Kell Gatherer

"Our brief is to find a location for a photo to illustrate an advert for a smoke detector

We need a recently burnt out detached house whose roof timbers are charred and standing out against the sky – we're so desperate, any part of the country would do

' We're offering a small reward to any MicroLink user who finds the building we eventually use

Now disabled study at home

PHYSICALLY disabled people in London are being helped toward employment with the aid of MicroLink.

Over the next three years 60 housebound residents of the Borough of Greenwich will be given the chance to study computing and information technology in their own homes

Aim of the scheme funded by the Urban Aid Programme and Greenwich Council is to enable trainees to eventually either gain employment as outworkers for businesses or to become self employed in computer related activities such as programming, word processing or desktop publishing

Each trainee is being provided with a computer modem and printer A tutor will regularly visit each trainee to sort out any problems and to check on their progress

But there will also be a constant 24 hours a day computer link to the base at Greenwich ITeC through MicroLink , said tutor Marion Robeson

'The first 20 students start this year and should be fully trained after twelve months

'During the year we hope employers will be found who are willing to provide work experience for the trainees'

DIAL FOR A DEMO

COMPUTER users who haven t yet seen the massive range of facilities MicroLink has to offer can now logon directly for a free interactive demonstration – and all from the comfort of their own home or office

All they need is a 1200/75 baud modem and telephone connection to 01-583 1275

Once online at the >PAD prompt simply key CALL 72 then Return When asked to sign on key ID MAG111 then Return The password DATA BASE followed by Return will bring up the menu

There are four sections to browse through – communication information services and leisure – each describing a different aspect of the system

This free demo vividly illustrates that MicroLink has lots to offer everybody from hobbyists to business executives , said head of MicroLink Derek Meakin

Laying it on the line

WHISPER it if Mary White house is about but MicroLink subscriber Keith Channing is looking for people who like to take their clothes off

Not that there's anything naughty going on Keith is membership secretary of CORAL – standing for Clothes Optional Recreation and Leisure – which is a beach camping, and general out door naturist group

At present he is trying to bring together all those MicroLink subscribers who are naturists so that they can chat about their pastime via electronic mail

In the best possible taste

IT is immensely pleasing, though as we adventurers would stoutly maintain, unsurprising and only natural to see that adventures are still very much up there with the other types of entertainment software when it comes to the inevitable round of software award ceremonies

One of the accolades recently dished out at such a prestigious software industry awards binge was for the adventure of the year.

If you take a quick peep back at the January issue of *Atari User*, you'll see that my vote for the best adventure went to Infocom's Stationfall, which marked the welcome return of Floyd the mischievous scatterbrained, but ultimately loveable chatterbox of a robot.

To my mind, Stationfall has one of the most engaging and teasing plots, with superb writing, imaginative puzzles and, without a shadow of a doubt, the most dramatic ending ever written for a computer adventure game. And, the piece de resistance – Stationfall has Floyd.

Now I don't like to boast about my undoubtedly fine judgement, but the aforementioned prize for best adventure of the year was awarded – you've guessed of course – to none other than Stationfall.

Runner up was Rainbird's Guild of Thieves which, if you look once more at my list in the January issue was also my second-placed favourite.

So there you are. Any unbiased observer simply has to be forced to the conclusion that either the judges' first read Rouloc's column and decided that his impeccable assessment was good enough for them and just followed his lead, or that they all have the same unquestionably excellent taste as myself. Well, that's my opinion and I'm sticking to it!

Looking back just once more – promise – to my list of best adventures you'll notice that in third place is the very funny and innovative Hitch Hiker's Guide to the Galaxy. This leads me neatly and quite coincidentally to my next piece of news.

Although it's not just about adventures. I simply must tell you about a smashing paperback that my good friend Brillig – of *ST User* fame – has just kindly loaned me. Do you know once I picked up this book with my hot little hands I just couldn't put it down until I had read every one of its 182 highly entertaining pages.

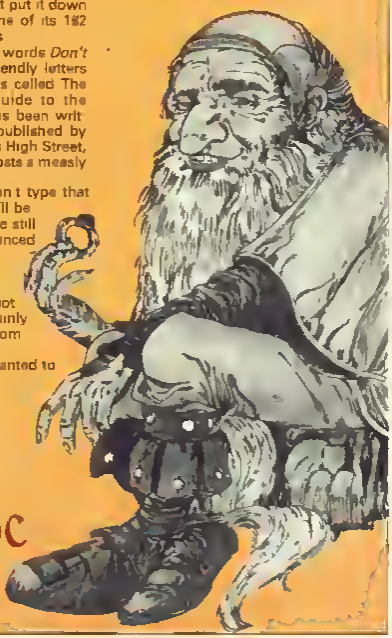
The paperback has the words *Don't Panic* written in large friendly letters on the front cover and is called The Official Hitch Hiker's Guide to the Galaxy Companion. It has been written by Neil Gaiman, is published by Titan Books of 58 St Giles High Street, London WC2H 8LH and costs a measly £3.95.

The OHHGTTGC – I can't type that title out again in full or I'll be here all day and there are still plenty of trolls to be trounced before nightfall – charts the complete history of the famous series and includes many extracts not previously published, mainly because they were cut from final versions.

Everything you ever wanted to know about The Guide, the making of the different series – radio book, TV, and so on – the characters and the life and times of the original author Douglas Adams, is here. And there's a whole chapter on the famous computer game, hence it's relevance to this column.

Neil Gaiman has written the whole thing in a witty and light hearted style that blends perfectly with the material itself. There are bags of quotes, interviews, anecdotes and insights. It really makes you want to go back to

Turn to Page 26 ▶



by Rouloc

WENDY'S RAVES

Here's a list of Wendy Albiston's favourite adventures. Although it doesn't quite match mine – but who's counting – it does reflect the point that everyone has different tastes. Thanks Wendy.

1. Stationfall (Infocom)
2. Hitch Hiker's Guide to the Galaxy (Infocom)
3. The Pawn (Rainbird)
4. Jewels of Darkness (Rainbird/Level 9)
5. The Dark Crystal (Sierra On Line)
6. The Guild of Thieves (Rainbird)
7. Spellbreaker(Infocom)
8. Ballyhoo (Infocom)
9. Gnome Ranger (Rainbird)
10. Mordon's Quest (Melbourne House)
11. Suspect (Infocom)
12. The Hulk (Scott Adams)

◄ From Page 25

the original books and read them again immediately

As Douglas Adams is reputedly to have said about Gaiman s book "Certainly the most outstandingly brilliant book to have been written about the HHGG since this morning' Go buy it settle down with a Pan Galactic Gargle Blaster and enjoy

Finally there s just room to mention two of your letters Sam Ingram of Wolverton is stuck in Quest For Eternity He has found the cartridge and the manual but can not open the crate or get the computers to work Can anyone out there help him?

The second letter is a real mystery It takes the form of a diary recording the encounters on different levels in Alternate Reality – and is signed Alien

Accompanying it were some enormous hand-written maps covering the first four levels of that adventure I don t know who you are, Alien, but your documents sure as heck impressed me

Until next month, keep out of swamps and slime pits.

THE PAWN Solution – Part three



In the chamber with the dragon shine white at the shadows Point at the shadows then go North Throw the potion bottle at Kronos and press the nozzle Look inside the top hat, examine the rabbit and the rack

Get the pointy hat, wand and cloak Wear the cloak and hat and go to hell where the devil waits Give the aerosoul to the devil Go to the entrance by the small cave near the laboratory and open the doors Go South and knock on the door Say "no ", then go South and examine the listing Type in the word DEBUG and press Return

Go to the cavern near the lava river and move the pedestal to get at the key Go to the snowman and melt him with white Go to the store and get the spiky boots and wear them Get the prism and unlock the door on the landing That s all I m telling!

Once you've examined the listing and typed DEBUG, you can keep on experimenting and exploring without getting killed You won t have got all the points but at least this partial solution should have helped you through most of the problems

Why not start again now and tackle it more comprehensively? But before you do try typing DEBUG and going past the southern edge of the adventure

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Figure I 1050 Speed comparison table (in seconds)

COMPANIES in the USA have been producing 8 bit Atari products for many years, but their products always had the disadvantage of being rather expensive in this country UK dealers had to order their stock directly from US wholesalers, giving rise to some pretty hefty shipping and customs charges

Recently, however, one or two UK Atari distributors have struck deals to supply US products at very reasonable prices There are still only a few available and in future issues of *Atari User* we ll take a look at some of them, but for the moment let s consider the SpartaDos range of products by ICD, now released by Frontier Software

SpartaDos is probably the most sophisticated disc operating system for the 8 bit and knocks spots off Dos 2 5 and the happily now extinct Dos 3

It supports multiple sub-directories (known as folders on the ST), full time/date stamping of files, full random access to any byte within a file, batch command files hard disc access, and a whole host of more specialist features

It also keeps most of its code locked away under the operating system so you get more free memory for your programs Even with the most powerful configuration (version 3 2) you will still have 32,501 free bytes available to Basic, and the smaller versions can leave as much as 36,176 available These figures should be set against 32,274 with Dos 2 5 and 37,902 with no Dos at all

If you also use ICD's R Time 8 battery backed-up clock cartridge the correct time and date will always be available, and they will be stamped on each new file created The clock module plugs into the standard cartridge port and has a replacement socket on the top for another cartridge

I have tried it with every cartridge I've got – Action! Mac/65 Basic/XE, AtariWriter and so on – and it seems completely transparent to everything There is even a Z driver which allows you to access the clock directly from Basic

However, where SpartaDos really

comes into its own is in conjunction with another ICD product – the US Doubler. This comes in the form of two new plug-in ICs for your 1050 drive which not only give it the ability to work in true double density but also speeds up the data transfer rate considerably.

The installation instructions are clear and concise, but you will need to take your 1050 apart to get at the motherboard. Although there is no reason why a complete novice shouldn't be able to fit the chips – it's not a difficult task – some caution should be exercised since opening up the casing invalidates your guarantee.

Once you've got into the drive – and some are so well constructed you'll virtually need a can opener – you must remove the two existing ICs from their sockets and install the ICD replacements.

Some older 1050 drives were fitted with slightly different chips – and if you have the wrong type you have the option of chickening out and sending off for the matching US Doubler ICs or of making a very simple adjustment to two jumper leads on the board. This second option does require the use of a soldering iron, so think carefully if you do happen to find yourself in this situation.

Once installed, and it is only the work of half an hour once you've read the instructions, your drive is supercharged. Upon booting your SpartaDos master disc the old bleep, bleep, bleep sound is replaced by a staccatto burst of machine-gun fire.

Reading data from the disc is roughly four times faster than with a standard 1050, but after allowing for seek time – the time taken to move the head around the disc – the average speed increase is nearer three times. The increase in speed of writing is slightly less at roughly twice as fast – see Figure 1 for full benchmark timings.

The other major feature of the US Doubler is to give access to true double density, giving 180k per disc as opposed to 90k in single or 130k in enhanced density.

Double density actually uses 720 sectors per disc, as with single density, but each sector contains 256 bytes of data rather than 128. This does mean that you'll have to remember to format and write in standard mode if you want to give a disc to someone without a US Doubler, but this is very simple since SpartaDos is intelligent enough to detect what type of disc it is using.

SpartaDos has so many features that it's impossible to describe them all in full, but Figure II will give you some idea of its amazing power and flexibility when compared with Dos 2.5.

Dos 2.5	SpartaDos	Function
A	DIRS	Disc directory, any drive (Dos 2.x format)
B	CAR	Go to cartridge (if present)
C	COPY/XCOPY	Copy file(s) (multiple drives)
D	ERASE	Delete file(s) from disc
E	RENAME	Rename file(s) on disc
F	PROTECT	Protect file(s) from accidental erasure
G	UNPROTECT	Remove erasure protection from file(s)
H	n/a	Write Dos files (handled during format by XINIT)
I	XINIT	Format disc (see also AINIT)
J	DUPDSK	Duplicate whole disc
K	SAVE	Save binary file (see also APPEND)
L	LOAD	Load binary file (see also OFF_LOAD)
M	RUN	Run machine code at given address
N	n/a	Create MEM.SAV (SpartaDos is always in memory)
O	XCOPY	Copy file(s) (single drive) (see also SPCOPY)
P	AINIT	Format (Single density Dos 2.0 mode)
	APPEND	Save binary file at end of existing file
	AUTOBAT	Select batch file to run when Reset is pressed
	BASIC ON/OFF	Turn internal Basic on or off
	BOOT	Set filename to load when no Dos present on disc
	BYPASS	Modify hard disc drive access number
	CHKDSK	Give current disc statistics
	CHTD	Change time/date stamp on file(s)
	CHVOL	Change volume name of disc
	CREDIR	Make new sub-directory
	CWD	Change default path details for current drive
	DATE	Set system date
	DELDIR	Delete sub-directory (must be empty)
	?DIR	Show path to specified sub-directory
	DIR	Disc directory (Extended format: time/date/bytes)
	DUMP	Print file as Ascii + hex digits to screen
	KEY ON/OFF	Type ahead buffer on or off
	LOCK/UNLOCK	Protect whole disc from write operations
	MDUMP	As for DUMP, but to print memory contents
	MEM	Show current Dos (lomem/himem values
	MENU	Load menu system (may be set as default)
	OFF_LOAD	Binary load file, with offset
	PAUSE	Wait for a key to be pressed (in batch files)
	PORT	Change the RS-232 configuration
	PRINT	Echo screen output to another device like P: or C:
	PUTRUN	Add run address to binary file
	RD	Set up ramdisc (many configurations available)
	RPM	Test disc drive rotation speed
	RS232	Load RS-232 driver for 850 module/P:R: connection
	TIME	Set system time
	TDLINE	Load time/date header line routine
	TD ON/OFF	Turn time/date line on or off (requires TDLINE)
	TREE	Show all sub directories/files (alphabetical)
	TYPE	Show Ascii file contents on screen
	VERIFY ON/OFF	Turn disc write verify on or off
	XDIV	Turn off I/O redirection (disable PRINT/batch mode)
	ZHAND	Activate Z: for time/date handling from Basic
	filename	Execute batch command file (extender = BAT)
	filename	Execute machine code file (extender = COM)
	Dn	Select new default drive number, n

Figure II. Dos 2.5 and SpartaDos features comparison

I particularly liked the time/date stamping of files and the excellent sub-directory facilities – and also their ease of use from Basic and other languages. I prefer to use command processors rather than menu systems for ease of use, but that said a very comprehensive menu system is available for beginners.

Whichever of the many configura

Turn to Page 30 ▶

◄ From Page 28

tions you decide to use, the manual provides clear instructions for every feature, even down to such things as file formats and fully documented machine code access

SpartaDos can also read, write and format Dos 2 discs automatically so you need never worry about which type you currently have in the drive It can even handle a hard disc if you happen to have one

I've come across a couple of minor quirks but nothing too serious One thing I did find was that files opened for access In update mode will be extended in size if you try to read a byte beyond the current end of file marker

This is acceptable when writing additional data, but when reading I feel you should receive an error message For example, if you have a disc file containing a single line of text and you try to read in two lines while in update mode, the file will quickly be extended to fill all available space on the disc

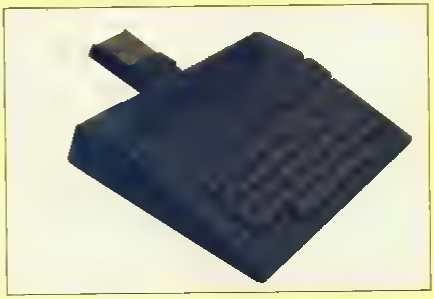
The moral is never read beyond the end of a file in update mode

I would thoroughly recommend both SpartaDos and the US Doubler, and at £49 95 they re a give away compared to the import prices – you'd have paid £79 95 for the US Doubler alone

The R Time 8 is also quite useful, but by no means essential unless you are using a mass storage device such as a hard disc – after all you can always use the TIME and DATE commands at the start of a session Otherwise it's still a little pricey at £49 95

However, if you are still using an unmodified 1050 with Dos 2 5, now is the time to move up to the power and flexibility of SpartaDos

Products SpartaDos	£29 95
US Doubler	£29 95
SpartaDos + US Doubler	£49 95
R Time 8 cartridge	£49 95
Supplier Frontier Software, PO Box 113 Harrogate North Yorkshire HG2 0BE	
Telephone 0423 67140	



130XE with R Time 8 and cartridge fitted

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Turn to page 61 to take advantage of this superb offer

SoftwarE SCENE

On-the-ball management simulation

Product League Challenge
Price £1 99
Supplier Atlantis 2E Station Road London SE25 5AG
Tel 01 771 8642

THIS is a game of management that allows you as a football critic to take the hot seat and prove your worth by taking charge of a league team

You have the chance of starting for Division One and maybe even completing the double by being voted Manager of the Year

League Challenge is loaded in two parts – the main program followed by a small amount of data Once loaded you are asked to sign on the dotted line and select your team There are 64 names available to choose from or you can use your own 14 character name

The screen displays are mainly text but there are some graphics during matches

You start the actual game with the mid-week options – looking over your playing staff as well as your club's statistics You can load and save data here to allow you that mid-season break to relax

The save option only saves the necessary data so the main program has to be loaded first

Mid week decisions lead you into the preparation for your first league match Your earlier training choice may well determine your fate on Saturday Do you choose an easy session or do you put your players through their paces?

It's up to you, but the cost of training increases with your level of choice

Now it's on to team selection time The ratings for defence, midfield and attack are shown along with both teams fitness rating allowing comparisons to be made

Individual players have both a skill and a fitness level which vary from one to nine The former remains the same throughout the season but fitness will fluctuate depending on whether a player is resting or playing

You can change your team's formation by selecting and removing players to field a combination which beat matches your opponents

League Challenge then switches to a very basic graphics mode which is, however sufficient for playability So sit back and watch the action as the goal-mouth highlights are shown

Once it is all over, the match result is displayed along with any injuries incurred The results of the other matches in your division are also shown with a full league table

Your weekly turnover is shown at the end of each match – you can go into debt but only to the amount of £250 000 Pass this and the club is declared bankrupt and the game starts afresh

So be careful when you buy players But make sure you have the money in the bank before writing that cheque because it won't bounce – you will – right back to the start Players



available for transfer are shown from time to time and as a maximum of 15 players is allowed in a squad at any one time remember to leave a space for that star signing

There are 15 league matches to be played in a season together with knock-out cup matches

An important consideration for cup matches is fitness If a replay is necessary the option for team re-selection is not available so it may be advisable to use players with a high fitness rating

When the season is over you receive a bonus payment which depends on your league position The top three teams are promoted while the bottom three are relegated

You keep the same players for the start of the following season, but their skill and fitness levels may change

All in all it is a good game – not an original theme but it does have variations on other similar ones It's very easy to use and offers entertainment for both novice and expert

The screens change quickly and only the match highlights are shown, so there's no time for tedium to set in Sound could have been used to add atmosphere to the match highlights It would have been nice to hear the roar of the crowd when a goal was scored

The graphics are a little on the weak side and the game deserved more time and effort being devoted to this area But overall playability is the most important factor Everyone likes glossy graphics and sound but if – as in this case – the game is addictive and enjoyable then that's what counts the most

Keith Pattison

Sound	*N/A*
Graphics	*4*
Playability	*8*
Value for money	*8*
Overall	*7*

Nerve-tingling combat

Product Computer Ambush
Price £19.99
Supplier SSI/US Gold Units 2/3 Holford Way Holford, Birmingham B6 7AX
Tel 021 356 3388

"THUS those unable to understand the dangers inherent in employing troops are equally unable to understand the advantageous ways of doing so

This is a quote taken from The Art of War by Sun Tzu around 500 BC which makes reference to the tactical deployment of troops in a battle

Computer Ambush from Strategic Simulations – SSI – is a wargame based on this theme and one that superbly captures the nerve-tingling excitement and fear of war

The game puts you in command of a troop of American GIs in France during World War II pitted against a squad of German soldiers in a small village

You can choose whether you want a computer or human opponent and depending on your choice you are offered a list of different scenarios

You can select from various options such as sound on or off whether you can see the enemy or not, and how long each play turn lasts These will affect the game so choose wisely

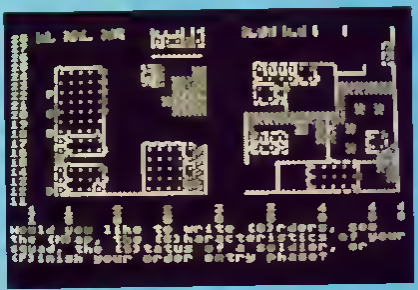
As with all SSI simulations, the game is split into different sequences of play, or phases as they are known – entering commands for the deployment of troops, allowing the computer to resolve the battle situations, receiving reports on the results and save a game

A map of the village can be displayed at any time but the full map is too large to be shown in its entirety When this option is chosen you are asked which row of the map you want to appear on the bottom of the screen and only segments are shown

Because the game is based on the individual actions of all soldiers, each has his own characteristics which affect his actions within a given scenario – very similar to characters created in fantasy role playing games

The players characteristics include rank name, body weight, physical strength, dexterity and so on

Each soldier can be given many different orders, entered in an abbreviated form For example PB means prepare bayonet and HH is the order to engage in hand to hand combat At any time during the game any soldier's status report can be called giving for instance, his position or any wounds he has received



Your view

The move command is brought into play by using M followed by parameters that control who goes where and the distance and manner in which progress is made, for example crawling or running

The rules here are quite involved but are explained in great detail in the manual

Three types of weapons are available – fire types (bolt action and automatic rifles), explosives (hand grenades) and hand to hand weapons (knives and bayonets) Here again the rules are involved, but they are well covered in the literature

One section contains dossiers on the individual soldiers on both sides I particularly liked this as it made for interesting and amusing reading

The American soldiers have what can only be called Yankee names such as Sergeant J C 'Buck' Padooka Corporal Rodney 'Rich Boy" Richfield and P F C Aloysius 'Gunner' Garrity

The same applies for the Germans, with names like Obergefreiter Erick Braun and Obergefreiter Ludwig 'Lover" Schneidar I was left in no doubt who I was fighting

The packaging is superb The box contains a rule book, game disc two mapboards grease pencils and two squad cards

This is quite a complicated game to get to grips with but once you have achieved a good working knowledge of the rules the simulation will flow quite smoothly – and you do have the help of quick reference sheets

The computer interpretation of the mapboard is well done and very easy to follow And the map you can draw on is an invaluable aid and a very good idea

I found it very easy to totally immerse myself in this challenge and there was more than one occasion when I was panicking when the Germans had me cornered Even though it carries quite a hefty price tag – £19.99 – it's well worth every penny

Neil Fawcett



The opening screen

Documentation	*10*
Graphics	*7*
Playability	*10*
Value for money	*10*
Overall	*10*

Flight of fantasy

Program Space Shuttle
Price £1 99
Supplier Firebird 64 76 New Oxford Street, London WC1A 1PS
Tel 01 379 6682



IF the title sounds familiar it s because this is a budget re-release of a 1983/4 game from Activision Firebird has snapped up all Activision s old titles, so we can look forward to seeing some old favourites again

You are in control of the shuttle Discovery on its 101st mission and your target is an orbiting satellite 210 nautical miles above the Earth

Your mission is to launch rendezvous with the satellite and return safely to Earth as many times as you can using minimum fuel

There is one snag – every time you dock with the satellite its orbital path becomes more and more erratic Your success in coping with this aberration is evaluated at the end of your mission

There are three levels to pursue The first is Auto simulator, where the shuttle flies practically by itself, and all you have to do is dock with the satellite

The second is Simulator, which is a simulation of the flight controlled by you and the computer Here you have to use most of the available keyboard commands and life turns out not to be quite the bed of roses you thought

Finally STS 101 is a fully fledged shuttle flight where every key command is available to you and you have the ability to abort all functions when and where you like

This level is for fast thinkers with 12 pairs of hands, qualified NASA astronauts, *Atari User* reviewers or lunatics

Your flight begins with the launch You have to activate the engines and ignite them at the right time or the mission will be aborted

After a successful lift off you must keep the engines at the right power – the computer displays the exact amount of thrust to use – and follow the digital course readout

Once in space you have to stabilise orbit by opening the cargo bay doors and adjust your position so you have visual contact with Earth This is achieved by setting your nose down

Once a stable orbit is achieved you have to match your speed relative position – X, Y and Z axes – and successfully rendezvous with the satellite

All this involves major keyboard use, major joystick use and constant reading of the instructions so that you know what are doing

Once all this insanity is complete you must turn the shuttle around fire the engines and decelerate to leave orbit Don't forget to close the cargo bay doors and set the correct pitch and course for re-entry

At last the landing! The pitch must still be at the correct setting and tight turns must be made to keep the shuttle on course

Once sonic booms have been made by your shuttle and the chase plahes the shuttle becomes a glider Before you reach the runway you must deploy the landing gear Once the wheels touch keep the nose down and slow to a stop That wasn t too difficult was it?

When landing is complete, the computer displays a numeric value showing what mistakes you made or if you didn't make any – which seems extremely unlikely – the number of dockings you successfully accomplished For a title that was released four years ago I d say this has done very well indeed

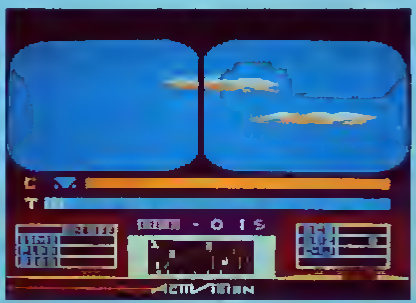
On the negative side there are too many commands to handle at once I know it's supposed to be a shuttle but this is going a bit too far

Also the evaluation messages at the end of your mission could have been written on screen rather than you having to resort to the instructions for enlightenment

Talking of the instructions, the acronyms are a nuisance, as you have to keep looking up what TAEM means while burning up in re entry!

Apart from some bad points Space Shuttle performs well The graphics aren t mind-shattering and the sound limited to rumbles and bangs but it is enjoyable and at a very good price

Robert Swan



Graphics	8
Sound	4
Playability	4
Value for money	7
Overall	6

Softwar E

Strictly for aces

Product Ace of Aces
Price £9 99
Supplier SSI/US Gold, Units 2/3, Holford Way, Holford Birmingham B6 7AX
Tel 021 356 3388

CHOCS away Ginger, and it's out into the wide blue yonder blasting the odd German ME109 fighter as we play Ace of Aces the new World War II flight simulator from Accolade – an American company which trades in Britain through US Gold

After the initial load ng sequence you are presented with a very attractive title screen and the strains of Land of Hope and Glory with machine gun fire accompaniment

In the nicely animated briefing room you are faced with the choice of a real mission or a practice flight

This is indicated by the Group Captain pointing at a board with a stick Using the joystick you move the stick to your selection and press fire to make your choice

The practice option offers you dogfight train or U boat – and I strongly recommend it to enable you to become accustomed to the controls

Mission offers you the choice of train U boat V 1 bombs or bombers After you have chosen you will receive your intelligence report which will give you details of your target the weather, recommended weapons you will need and your orders

Once these have been taken in you go on to take a look at a map of England and France which shows your location – mid Channel – the position of the your target and all major cities

After this you must load up your Mosquito maverick fighter with bombs rockets fuel and cannon shells and prepare to take off

This is indicated by a series of black and white freeze frame photos of a klaxon, running feet (presumably yours), the propellor whirring away, the chocs being pulled away and then you waving goodbye from the cockpit This very original idea adds considerably to the atmosphere

Next comes another boring loading sequence which when you have a tape version is exceptionally tedious

Finally, after nearly 25 minutes, you get airborne The game uses a split screen with the view from the cockpit showing white clouds rolling in the wind at the top



Your instrument panel is shown at the bottom and indicates airspeed radar, compass, altitude and artificial horizon A nice feature is that as you move your joystick the stick displayed on screen moves too

If at any point during the game you double click the fire button the screen will switch between the pilot s engineers or bombadier s view of the aircraft Using the same technique you can also view the map you saw early on

Unfortunately, this way of selecting views can pose some problems When in a dog fight with a German plane it is very easy to double click the fire button at the wrong time

As you look bewildered, at these unwanted views or at the status screen – brought up by pressing the spacebar – the Germans can still fire at you and you can do nothing about it

Also some joysticks have difficulty responding to the double click, so it would have been better if Accolade had the keyboard controlling this function

I found this a very hard, if not impossible game to play as no indication of your status is available to you without viewing the appropriate screen

Accolade could have at least displayed a short message when your plane catches fire or your navigator gets killed

Having said this the graphics are excellent There is a wide variety of styles, from cartoon figures in the briefing room to the still-frame photographs as you prepare to take off

It s a shame that such a potentially good game has been applied by a poor choice of controls

There is a nice use of sound throughout ranging from Land of Hope and Glory to the Last Post when you die, and the sound of klaxons when you take off is nicely implemented

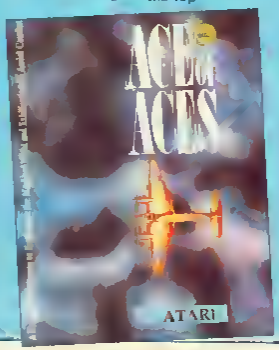
Overall I found it very frustrating The loading time from tape is ridiculous – far too long to sustain interest And when you finally start flying you can t really last very long against an enemy who can fire at you while you can t fire at him

However, the game shows potential and it is always nice to see American software in Britain It would be good to have more transatlantic games made available

As simulators go, Ace of Aces is one of the best I have seen and definately up there with the leaders

If you have the patience of a saint and a very low blood pressure this is the game for you All said and done it is well worth the price

Ruth James



Sound	7
Graphics	8
Playability	8
Value for money	8
Overall	8

ATARI USER Classifieds

Has upgrading your computer given you herdwere you no longer need? Or have changing interests left you with unwanted software? Then THIS is the piece to advertise your surplus items. *Atari User* readers are always on the lookout for a bargain and this is the first piece they look!

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● 800XL 1050 drives (two) with US Doubler, XC11 recorder, 850 interface, touch tablet, centronics printer lead, Ateriwriter, Superscript, Mini Office II, Flight Simulator II, Basic XL, Timewise, Filing Manager and more £300. Tel DE26 8256S.

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● Wanted urgently 1050 disc drive and 1029 printer plus Mini Office II. Buyer collects. Tel 0502 717285.

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● Wanted Ateri penpals between 11yrs and 16yrs old. I own 800XL and 1050 DD. If interested contact Terence Maguire, Oliver Plunkett Street, Oldcastle, Co Meath, Ireland.

● 800XL 1050 drive, XC11 cassette, 1029 printer, joysticks, user mags, lots of software including latest games (originals) boxed, value £800+, £300 secures. Tel 0268 754043 evenings.

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● Atari 800 and 800XL 800 and 1050 drives, 1029 printer, 1010 cassette, 50+ disc programs, plus Commodore 1701 monitor and leads, no reasonable offer refused. Tel (Hayes) 01 561 7325.

● Atari 1050 drive £50 plus discs and cassettes from 50p to £5 send a s a e for price list to Wayne Bunn, 10 Seymour Terrace, London SE20. Tel 01 778 6033.

● Atari hyperdrive ver 2 disc drive enhancement for 1050 hardware/software package enables true double density, faster read/write, backs up protected software similar to Ideal happy archiver compatible £40. Tel 01 508 2671.

● Atari 130XE, XC12 recorder and joystick £80. 1050 disc drive £90, 1029 printer £90. All as new and boxed. Tel 01 302 0689 after 6.30pm.

● Fidelity CM14 colour monitor for Atari XL/XE £90. Tel 01 736 1658.

● 800XL 1050 drive, cassette, over 50 discs including original software, boxed as new £185. Tel 0284 81236.

● 130XE requires two keys replaced £80. 1050 plus software £80. Touch Tablet £28, cartridges £8 each, 20 budget games £25. Full price games £5 each. Tel 0532 268482 evenings.

● 1029 printer + Font IV, character rom+ software, nine months old, excellent, £35. Tel 0747 870409.

● 800XL 1050 drive, 1020 plotter, MAC-65, 16 classic games on cartridge and 22 latest games on disc. Also books and prof. joystick £250. Tel Mr Levien, Telford 680262 (work).

● Graphix AT Centronics printer interface, voice master, complete Microsoft Basic II cartridge, APX PASCAL, Mini Office II, Xlent wordprocessor, basket ball cartridge. The lot worth £300, sell for £150 will split. Tel 01 461 4969 eves.

● Wanted Touch tablet with software + a good tape to disc copier. I will pay up to £25. Tel Wakefield (0924) 498248 ask for David.

● Atari 800, 410 recorder, plus Space Shuttle Simulator, Chuckie Egg £50. Tel 0256 779065 evenings.

● Wanted 1050 disc drive about £70. Tel Mark on Darlington 718382.

● 800XL disc drive + US doubler, tape deck, games, magazines etc. £200. Tel Ilkeston 305756.

● 130XE + 150 disc drive + Atari 1029 printer as new, software included and tractor feed paper. Sell for £199. Tel Wes on 0462 731801.

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5 LINERS



FONT LOADER
from Gary Hudson

THIS short program contains two machine code routines One loads a font into memory and the other re-installs the character set if you accidentally press System Reset

To use it all you have to do is change FONT SET in line 20 to the name of the new set you wish to load The routines contained within this program can easily be removed and used in your own programs

PROGRAM BREAKDOWN

- **10** Lowers the top of memory and pokes in the machine code
- **20** Opens a channel to the disc file containing the font
- **30** Reads in data from the disc and re-installs Reset protection
- **40** Machine code load routine
- **50** Machine code jumped to when Reset is pressed

VARIABLES

- **MEM** Holds the current top of Basic memory
- **X, Y** Used to poke in the data

```
10 MEM=PEEK(106)-8 POKE 106,MEM POKE 7
54 MEM GRAPHICS 0 FOR Y=0 TO 38:READ X
:POKE 1536+Y,X NEXT Y
20 OPEN #1,4,0 "D:FONT SET":IF PEEK(12
1)<>32 THEN POKE 765,PEEK(137):POKE 200,
PEEK(138)
30 U=USR(1536) CLOSE #1 POKE 2,PEEK(20
8) POKE 3,PEEK(1706):POKE 17 33:POKE 18
,6:POKE 5,3 POKE 756,MEM
40 DATA 104,162,16,165,7,157,66 3,169,
0,157 68,3,165,10a,157,69,3,169,0,157,
72,3,169,6,157,73,3,32,86,228,96
50 DATA 104,105,260,141,244,2,96
```




```
10 W76 (L)
20 VYH (E)
30 CA1 (E)
40 E0P (K)
50 J26 (S)
```

LEGGIT
from Eric Liddell

THERE you are, out walking and having a lovely time when suddenly you hear a tremendous bang When you look up you see a nearby volcano starting to erupt

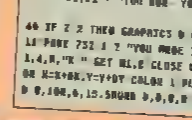
Huge pieces of rock and ash are flung into the air and you must dodge them in an attempt to get to the safety of a nearby cave represented by a green square at the bottom-right corner of the screen

This is a simple but very addictive joystick controlled game The positions of the falling rocks are totally random, and if one lands on you it will give you quite a headache If you don t make it to the cave simply press a key for another game

VARIABLES

- **X, Y** Horizontal and vertical position of the player
- **DX, DY** Horizontal and vertical direction of player
- **A, B** Random positions of the falling rocks

```
10 GRAPHICS 8:COLOR 3 PLOT 0,0:DRAWTO
79 0 DRAWTO 75,39 DRAWTO 0,39 DRAWTO 0
,0:X=1 Y 1 DX=1 COLOR 1 PLOT 77,37
20 A=INT(RND(0)*77)+1:B=INT(RND(0)*37)
+1 COLOR 3 PLT A,B S=STICK(0) DX=(S=8
OR S=6 OR S 7)-(S=3 OR S=10 OR S=11)
30 DY=(S=13) (S=14) LUCATE X+DX,Y+DY Z
:IF Z=1 THEN GRAPHICS 0 POKE 752 1 PUS
ITION 12,11 ? "YOU DIE- YOU ATEK " END
40 IF Z > THEN GRAPHICS 0 POSITION 14
14 POKE 752 1 ? "YOU MADE IT !" OPEN #
1,4,0,"K " GET #1,E CLOSE #1 RUN
50 X=X+DX,Y=Y+DY COLOR 1 PLOT X,Y SOUN
D 0,100,6,15.SOUND 0,0,0,0 GOTO 20
```




```
10 FGE (E)
20 SUB (S)
30 J00 (N)
40 K9K (N)
50 AWW (Y)
```

IF you've written any useful or interesting five line programs why not send them to us to grace our pages?

We pay £25 for each one published

You should give a full description of the routine and any other details that are relevant. And remember if you want your material returning please enclose a suitably stamped package

Win £25

Simply send a copy of the program on disc or tape together with the documentation – preferably as a word processed file – to

Atari User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP

JARGON
from Eric Liddell

ONE of the most amusing programs you can write for your computer is what is known as a buzz word generator and that's precisely what Jargon is. It will randomly string together two words to give you some *computer speek*. Any words can be placed in the data statements to produce your own jargon.

Some examples of computer jargon using the default data

Micro regulators	Program oriented
Software display	Micro media
Micro friendly	User regulators

VARIABLES

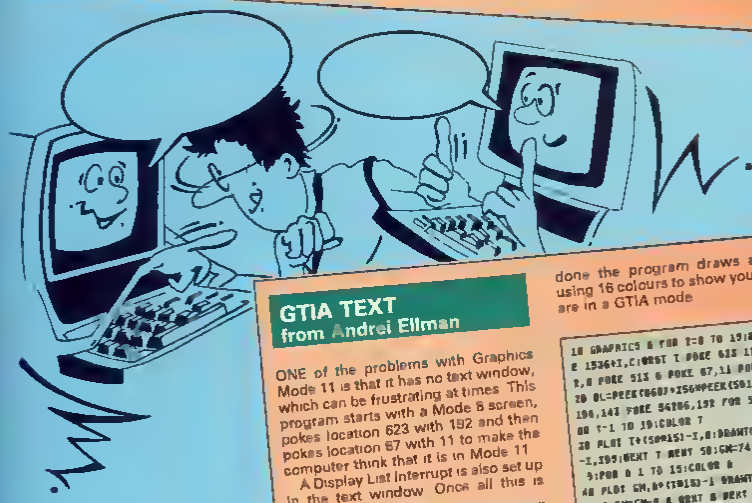
A$ Reserves space to read the words from the data into this string

A A random number to tell the computer how many words to read before printing the word

```
10 DIM A$(20) :GRAPHICS 0 :POKE 752,1 :PO
KE 710,0:POSITION 5,0 ? "JARGON PHRASE
 GENERATOR"
20 RESTORE 0:FOR I=1 TO A:READ A$:NEXT I
 :A=INT(RND(0)*13)+1
30 FOR I=1 TO A:READ A$:NEXT I :? A$;:
 OPEN #1,4,0,"K:":GET #1,K:CLOSE #1:GO
 TO 20
40 DATA USER ,BOOST ,MACHINE ,PROGRAM
 ,LANGUAGE ,SOFTWARE ,HARDWARE ,STORAGE
 ,MEMORY ,MICRO ,CPU ,CHIP ,0
50 DATA FRIENDLY,SPECIFIC ,ORIENTED,ACC
ESS,MEDIA,ROM,RAM DISPLAY,REGISTERS,DI
SKS,COMPUTERS,CODE INTELLIGENCE
```

Get it right!

```
10 JOG (M)
20 CE2 (P)
30 GIV (O)
40 INF (S)
50 PNJ (S)
```



GTIA TEXT
from Andrei Ellman

ONE of the problems with Graphics Mode 11 is that it has no text window, which can be frustrating at times. This program starts with a Mode 8 screen, pokes location 623 with 192 and then pokes location 87 with 11 to make the computer think that it is in Mode 11.

A Display List Interrupt is also set up in the text window. Once all this is done the program draws a picture using 16 colours to show you that you are in a GTIA mode.

```
10 GRAPHICS 8 :FOR I=0 TO 15:READ C :POK
E 1536+I,C:NEXT I :POKE 623,192:POKE 54
2,0 :POKE 512,0 :POKE 87,11 :POKE 712,6
20 DL=PEEK(560)+256*PEEK(561):POKE DL+
106,142 :POKE 54286,192 :FOR S=0 TO 8 S
TEP 1:I=I TO 15:COLOR 7
30 PLOT I+(S*15),I:DRAWTO I+(S*15),
I:POKE 0,I TO 15:COLOR 0
40 PLOT S*15,0:DRAWTO 79,0+(I*4):
NEXT I :NEXT S :FOR I=0 TO 15 :COLOR I
50 I=150 TO 155 :COLOR 0
60 PLOT S*I :DRAWTO 79,I :NEXT I
70 DATA 72,126,71,169,0 ,192,0,141,14,21
2,141,27 ,208,141,26,208,104,170,104,64
```

Get it right!

```
10 DOS (R)
20 ASA (M)
30 T95 (M)
40 U64 (U)
50 ESV (4)
```

Tyrants of Torment



GAVIN DAVIDSON puts you in control of a hi-tech buggy to try and save the world from total destruction by evil

IT is the year 2521 and mankind is in dire straits. After the *Great Destruction* control of the world was seized by evil dictators. This catastrophy was detailed many years after in the Book of Wisdom.

Apparently Arthur Endit, a high ranking Pentagon officer, phoned the President to say he was coming over for some coffee and buns. Due to interference on the telephone line the President misinterpreted and thought he said "The commies have begun to bomb", which is when the Great Destruction began.

All but a handful of resistance fighters have survived death at the hands of the tyrants. Now the time has come for someone to undertake an almost suicidal mission to overpower them. A super hi tech buggy equipped with all the latest weapon systems has been put at the disposal of some brave soul. Right – you are elected.

The approach to the tyrants' stronghold has been strewn with mines, so your buggy has been equipped with a suspension system that allows you to jump over them. Kamikaze defence fighters constantly buzz the area, so you have missiles to try to deal with them effectively.

Remember to use Get it Right! when typing the program in and save a copy before running it. Be especially careful with the data statements.

The Start key begins the game and Select will change the level of play. There are 21 levels, but you can only select up to level nine to start. To advance to the next level you must complete six miles in your buggy.

Distance completed and your score are displayed at the bottom of the screen. Twenty points are awarded for destroying a defence fighter and 10 for completing a mile. You only have one buggy, so be very careful.

The panel opposite shows all the controls, so on with the salvation of the world – it's up to you now.

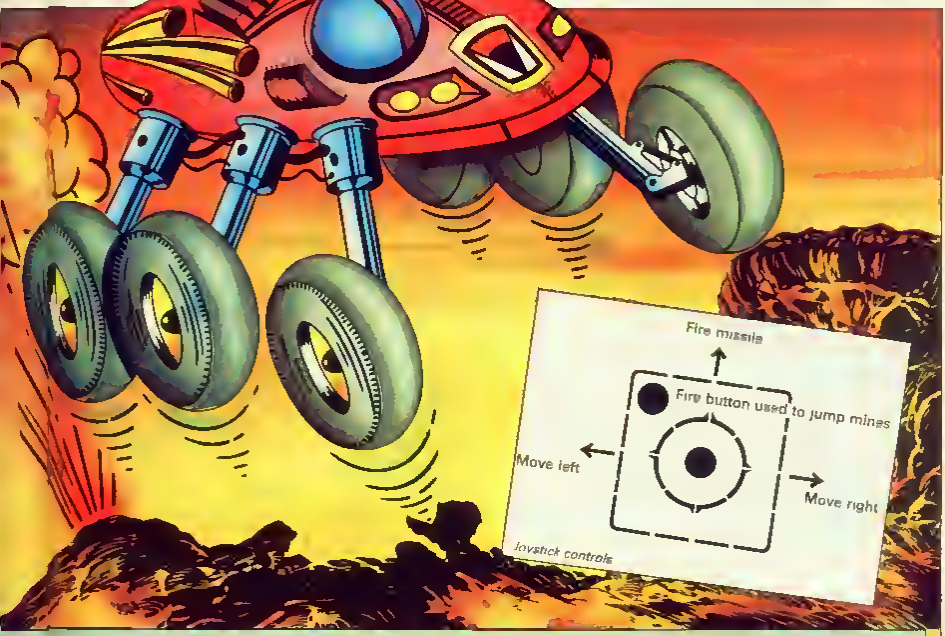
PROGRAM BREAKDOWN

90-120	Configure the Display List for the screen
130-190	Draw the mountains using sine and cosine curves
170-180	Display List Interrupt used to put eight shades of colour on the screen
190-230	Redefine custom characters
250	Machine code subroutine used for the main game loop
270-300	Level select routine – if line 290 is removed you can select any of the 21 levels to play
360-460	Routine to change the difficulty level
510-520	Buggy destroyed routine
530-550	Completed level routine
500	Machine code data for the main game loop

```
10 REM ************************
20 REM *  TYRANTS OF TORMENT   *
30 REM *          BY          *
40 REM *    GAVIN DAVIDSON    *
50 REM *   (c) OTAKT USER     *
60 REM ************************
70 GRAPHICS 0 POKE 752,1 ?      PLEASE
 WAIT FOR 50 SECONDS"
80 FOR I=0 TO 1000 NEXT I
90 GRAPHICS 7 DEG  POKE 710,10 POKE 70
8,82:POKE 705,54 POKE 559,0 POKE 711,2
```

```
100
110 GL=PEEK(560)+256*PEEK(561) POKE GL
+4,96 POKE GL+5,160
120 FOR G=0 TO 47:DCAD READ T:POKE GL
+G+8,T NEXT G:GOTO 130
125 DATA 141,161,12,141,124,6 124,6,6,
124,5,6,124,6 6,149,7,6,6,65,32,156
130 FOR X=200 TO 830 STEP 4:Y=1 ON=SIN
(X) GOSUB 500
140 NEXT X
150 FOR X=5 TO 790 STEP 5:Y=Z:ON=COS(X
```

```
)):GOSUB 500
160 NEXT X
170 FOR SUBSET=0 TO 27:DCAD TEXT POKE
1536+SUBSET,TEXT:NEXT SUBSET POKE 512,
0:POKE 513,6:POKE 54286,192
180 GOTO 72,173,200,2,200,9,169,240 14
1 200,2,238,200,2 238,200,2 173,200,2,
141,10,212,141,26,208,106,64
190 J CPEEK(7423)*256 RIZ
200 FOR E=128 TO 484:POKE J+Y-256,PEEK
(57344+Y):NEXT Y:POKE 756 J/256
210 FOR Y=26 TO 55:DCAD TEXT POKE J+Y-
200,TEXT:NEXT Y
220 DATA 85 65,85,151,171,174,234,170
85,65,84,214,170,234,171,170
230 DATA 0,0,0 230,255,106,170 170,0,0
,0,2,170,174,170,234
240 POKE 65,140 POKE 66,181 POKE 752,1
 POKE 87,0
260 FOR Y=0 TO 761 READ T:POKE 20600+Y
,T:NEXT Y
264 POKE 559,46:POSITION 1,0:? #6;"TYR
ANTS OF TORMENT          by" ? #6;" GA
VID DAVIDSON" SKILL-1
270 POSITION 7,4 ? #6;"LEVEL ";INT(SKI
LL)
280 IF PEEK(53279)=6 THEN SKILL=SKILL+
1 GO
290 IF SKILL)5 S THEN SKILL=1
300 IF PEEK(53279)=6 THEN 270
310 ? #6;"%  POKE 559,0 POSITION 8,7:?
 #6;"POZNIK'S BOOOO"
```




```
320 POSITION 11,7 ? #6;"OBLES B" SOUND
 0,0 0,0 FOR Y=0 TO 41 POKE 20208+Y,1+
RND(0)*1 NEXT Y
110 POSITION 7,0:? #6 " BY96Z USER 908
IL 80" POKE 77,0
160 FOR Y=1664 TO 1854 POKE Y,0 NEXT Y
250 POKE 1664,0 POKE 1665,8 POKE 1679,
90 POKE 1073,82 POKE 53248,178 POKE 53
256,0 POKE 53255,0
260 SPEED=4 DISTANCE=24 S R=0 T=0
270 SPEED=SPEED-R *5 DISTANCE=DISTANCE
-R R=R-R+1 T=T+1
280 IF R=4 OR R=1 THEN R = 1 SPEED=SPEED
-R *5 POKE 53268,178
350 IF R=1 THEN POKE 1664,1
450 IF R=1 OR DISTANCE(14 THEN POKE 10
84,0
610 IF R=1 OR DISTANCE(14 THEN POKE 53
268,90
620 IF T(>INT(SKILL) THEN GOTO 270
630 IF SPEED(1 THEN SPEED=1
640 IF DISTANCE(14 THEN DISTANCE=14
650 IF T(>INT(SKILL) THEN GOTO 270
660 POKE 1662,INT(SPEED) POKE 1661,INT
(DISTANCE)
670 POKE 54275,64 POKE 53277,1 POKE 52
3,83:POKE 559,40:POKE 704,111:POKE 705
,6
680 POKE 53258,1:POKE 53257,1
690 X=USR(Z1110)
700 IF PEEK(1000)=1 THEN GOTO 570
710 FOR B=240 TO 0 STEP -10 SOUND 0,B
720 SOUND 0,0,0,0 NEXT B
730 GOTO 260
740 SKILL=SKILL+1
750 POSITION 7,7 ? #6 "LEVEL " INT(SKI
LL)
760 FOR B=0 TO 15 FOR T=0 TO 255 STEP
10 SOUND 0,T,10,B NEXT T NEXT B
770 POSITION 7,7? #6 "          " POKE
709 0 GOTO 320
780 COLOR 1 PLOT K/(I+2) 10+DN*SIN(I+2)*8
0*COS(I+2) DRAWTO K/(I+2),39-DN*COS
550 DATA 0,12 0,120,120,240,124,255,12
0,120,120,0,0,0,0,12,0,110,0,135,7,121
,0,120,174,111,120,0,111,174,111
600 DATA 0,56 111,255,111,56,0 0,0,0,0
,70,47,127,62,20,0,0,0,240 184,240,0,1
02 100,142,132 0,32 154 90 169
610 DATA 84,133 240,169 0,180,133,203,
140 201 239,208,201,210 204,160,204,23
8,85 208,201,172,118,5,167,0 193
620 DATA 0,80 153,0,80 189 14 80,153 1
27,85,232,208,226,14 208 230,102,9,173
,118,5,105,11,80,153,0 87,165
630 DATA 48,80,153,113 87,208,232,224,
9,240,238,162,0,172,140,5,185 49,80 15
3,188,85,208,232,224,5,208,244
640 DATA 173,141,5,105,40 141,7,208,96
,142,9,208,162,1,208 96 173,120 0,141,
4,212 206,125,5,208 217 102 0
650 DATA 173,133 0,208,10,238 111,6,17
2 111 5,196,27,80,141 215,56,185,20,86
,141 220,56,192,2,200,1,142,111
660 DATA 0 165,127,145,127,138,169,212
,224,42,208,240,3E,120,91,105,4,157,15
5,165,138 129,0,173,125,0,250
670 DATA 147,6,144,45,173,120,0,250 13
```

VARIABLES

SPEED Decides the speed of the game
DISTANCE Decides the least amount of space there can be between mines

Turn to Page 40 ▶

◀ From Page 38

```
,32,235,81 240,10,32,235,81,105,1,142,
110,6,12,236 81,105 7,157 136
688 DATA 149 205 136,6,173,128,6,208,1
1,141,129,6,76 28,81,165,19,141,125,6,
169,7,141,128,6 76,162,88,236
690 DATA 133,6,171,117,6,201,4,144,11,
201,10,176,7 238,117,6,224,4,208,36 16
0,6,140,125 6,173,133,6,201,13
700 DATA 240,10,201,7,176,6,208,134,6,
76 84,82 238,124,6,76,84,88,140,117,6,
185,82,141,134,6,96 174 135,6
710 DATA 208,207,173,123 6,208,106 173
,112,2,240 103 174,132,6,171,128,2,201
,11 208,5,201,7 240,11,96,224
720 DATA 48,248,231,208,132,6 78,156,6
0,224,191,240,241,238,112 6 78,108,80
32,220,81,141,116,6,12,96,82,96
730 DATA 162,8,189,9,172,8,208,132,4 2
00,6,142,129,6,32,141,81,192,8,208,8 1
42,142,6,32,141,81,173,126,6,206
740 DATA 10,165,108,141,1,210 169 87 1
41 116,6 201,82,206,15 173,120,2,201,1
4,208,16,173,112,6,105,3,141,4
750 DATA 208,169,3 141,1,219,208,116,6
,174,136,6,157,120,65,142,8,218,165,9,
137,129,65,96,173,18,210,41,1
760 DATA 98,169,8,153,108,85,208,192,5
9,208,240,143,168,6,141,141,6,173,108,
6,208,11,172,140,6,192,59,240
770 DATA 228,192,8,208,14,238,141,6,17
2,141,6,140,6,206 208,112,6,144,6,238,
140,6,208,141 6,32,210 81 169
780 DATA 139,6,141,2,208,141,129,6,172
 137 6 208,10,173,128,6,210,112,6,201,
82 144 18,192,88 240,5,238,117
790 DATA 6 206 118,6 76,82,82 169,6,14
1,137,6 208 142,6,173,142 6 141 3,206,
76,187,88 162,8,238,194 169,169
800 DATA 141,149,201,76 208,11,165,18,
157,121,149,202,208 241,169,206,238,96
,12,54,08,173,38,2,208,15,173
```

```
810 DATA 146,6,141,38 2,32 183,06 32,9
1,81,12,1,03,173 38 2,208 63,169,1,141
,38,2 208,134,2,238,195,2,12,151
820 DATA 81,12,151,81,169,6,141,38 208
,238,142 6,173 142,6,201,50,208,31,162
,0,142 143,6,238,144,6 173,144
830 DATA 6,201 10,206,16,142,146,6,32,
54,82,238,201 149,173,203,145,201,23,2
40,16,173,14,208,201,1,240,12
840 DATA 171,15 208 201,1 240,25 173,4
,208 208,28,173,11 208,201,3,240 11,17
3,10 208 201,3 240,5,76,121,82
850 DATA 238,145,6 104,96
```

10 CP1 (Y)	180 VM2 (K)	350 78A (P)	520 GNC (N)	690 53X (N)	
20 CP2 (3)	190 RW1 (T)	360 WTE (7)	530 OAA (F)	700 8XB (V)	
30 CP3 (X)	200 WK6 (V)	370 GVV (U)	540 XDO (M)	710 O8W (R)	
40 CP4 (A)	210 A66 (2)	380 ABK (3)	550 HC7 (N)	720 CUA (1)	
50 CP5 (Y)	220 BUS (A)	390 ML8 (P)	560 MRU (4)	730 ESS (1)	
60 CP6 (7)	230 UKR (9)	400 GXC (1)	570 X40 (H)	740 41P (M)	
70 LHE (4)	240 RTK (8)	410 HE3 (B)	580 2ER (K)	750 YKW (U)	
80 78M (2)	250 SHW (F)	420 1JH (6)	590 CAN (L)	760 YYR (5)	
90 EEQ (Y)	260 MAA (G)	430 RSR (9)	600 3NE (C)	770 WNX (A)	
100 47W (E)	270 HL8 (4)	440 AOJ (B)	610 B2? (B)	780 2PT (5)	
110 6LX (3)	280 H0W (9)	450 1WH (C)	620 O9U (W)	790 CXS (6)	
120 8XB (W)	290 J9H (V)	460 W2J (2)	630 5LK (C)	800 XAH (7)	
130 8YC (X)	300 R7A (W)	470 GC5 (4)	640 Y0P (6)	810 8LK (B)	
140 QUI (2)	310 16A (2)	480 SGT (Q)	650 98C (F)	820 6XF (J)	
150 VM5 (P)	320 S7Y (U)	490 RNK (U)	660 OW6 (F)	830 14R (Y)	
160 QSI (Y)	330 882 (S)	500 VGG (M)	670 XFU (L)	840 4ND (V)	
170 MVO (7)	340 7XM (B)	510 LTA (2)	680 X7F (T)	850 5UR (4)	

Get it right!

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1 604 (the Whisper) the dearest £2,892 (the Cheetah). You will also need a separate telephone line costing £101 to install plus £404 a year rental. That's a total outlay over the first year of a minimum of £2 109. (All prices include VAT.)

Or you could do what more and more Atari users are doing – use your micro to double as a Telex machine. And just use your ordinary telephone!

How do I turn my Atari into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to Atari users on *MicroLink*. With MicroLink you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free telesoftware programs directly into your micro, and much more.

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. It's used to dramatically speed up business communications – just as quick as using the phone but far more efficient, because you have a hard copy of every conversation for your records.

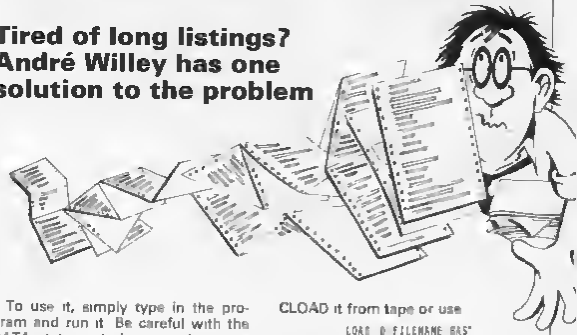
But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

How to join – see Page 8

Checksum Buster

Tired of long listings? André Willey has one solution to the problem



MANY of you have written in praising our new Get It Right! II checksum program, and one reader from Berkshire added a comment which set us thinking

If each line can generate its own unique checksum, why is it not possible to reverse the process and regenerate the original line from the special checksum value? After all, the four checksum bytes exactly represent the original line don't they?

After some thought we can now bring you a program which at least goes part way to solving this problem. Since Atari Basic uses a small number of fixed tokens to make up all its lines it is quite possible to re-generate a program except for the contents of strings DATA statements and REM statements. These could obviously contain any text and since they are processed separately by GIR! in any case (see my source code listing and flowchart in the November 1987 issue of *Atari User* 1987 for information) there just isn't enough information to recreate them reliably.

However, everything else can be generated from just the four byte checksum, so once you have created the final program file you should load it into memory and correct the string and data contents from the full listing – REMs may safely be ignored. You should make sure that the normal GIR! tape or disc was loaded when you turned on the computer because this new program will access some of its internal machine code routines to save time and space.

To use it, simply type in the program and run it. Be careful with the DATA statements because they contain machine code to access the Basic rom which might crash the computer if mistyped. When you run the program you will be asked to enter checksum values one by one, and you should hit Return on its own to finish. To start with try entering just the first 10 or 20 checksums to see how the system works before going on to attempting a full program.

You should then enter a filename to save the newly generated program – C: for cassette or D:FILENAME.BAS for disc. Once the program has finished writing you should rewind and CLOAD it from tape or use

```
LOAD "D:FILENAME.BAS"
```

for disc.

The original program will now be almost complete in memory. All that is then left to do is to LIST it and use the screen editor to complete any lines containing strings or DATA from the original listing. These will be flagged on screen with asterisks to remind you of the correct number of characters.

● *Next month, I'll show you how this program works and other applications of the same principle. In the meantime, reading the article on tokenisation on page 9 will give you some clues.*

```
10 REM GIR II EXPANDER PROGRAM
20 REM WRITTEN BY ANDRE WILLEY
30 REM (C) ATARI USER, APRIL 1988
40 REM
50 MAX=FRE(0)-1000
60 DIM MCODE$(500),GIR$(MAX),FILE$(20)
,INP$(10)
70 CURR=1
80 GOSUB 410
90 POSITION 2,9 ? "Enter each GIR II c
ode on a new line"; ?  "      using the
 format ABC X"
100 ? :? "then press RETURN twice to s
ave file" ? :?
110 ? "ENTER CODE:";
120 INPUT #16,INP$
130 IF INP$="" THEN 230
140 IF LEN(INP$)<4 OR LEN(INP$)>5 THEN
 220
150 FOR I=1 TO LEN(INP$)
160 IF I=4 AND INP$(I,I)=" " AND LEN(I
NP$)=5 THEN 180
170 IF INP$(I)<"0" OR INP$(I)>"Z" OR (
INP$(I)>"9" AND INP$(I)<"A") THEN POP
 :GOTO 220
180 NEXT I
190 GIR$(CURR,CURR+A1)=INP$:CURR=CURR+5
200 IF LEN(GIR$)>MAX-10 THEN 230
210 GOTO 110
220 ? CHR$(253);"ERROR  RE-";:GOTO 110
230 REM FINISHED ENTERING DATA
240 GOSUB 410:IF LEN(GIR$)=(MAX-10) T
HEN POSITION 2,7:? #6;"  ** MEMORY FULL.-
 TIME TO SAVE **"
250 POSITION 2,10:? " Give full filesp
ec to save prog to:-"      (Eg:- C: OR
 D:FILENAME.BAS or C:)";?
260 ? "Enter filespec:-";:INPUT #16,FI
LE$
270 CHAN=1:CLOSE #CHAN:TRAP 280:OPEN #
CHAN,8,128,FILE$:TRAP 40000:GOTO 290
280 ? CHR$(253);"ERROR  RE-";:GOTO 260
290 ? :? "OK. Saving program to:";F
ILE$
300 CURR=1
310 READ A:IF A<>-1 THEN 330
320 MCODE$(CURR,CURR+1)=CHR$(A):CURR=CUR
R+1:GOTO 310
330 ADDR=ADR(MCODE$)
340 TEMPH=INT((ADDR+45)/256):POKE ADDR
+16,TEMPH
350 TEMPL=ADDR+45-(TEMPH*256):POKE ADD
R+11,TEMPL
360 ERR=USR(ADR(MCODE$),CHAN,ADR(GIR$)
)
370 CLOSE #CHAN:?
380 IF ERR=1 THEN ? "File completed OK
":END
390 IF ERR<>1 THEN ? "ERROR  File may
be corrupt":END
400 ? "  ..# DONE":END
410 GRAPHICS 0:SETCOLOR 4,0,2
420 ? "                GIR II EXPANDER"
430 ? "  :? "          Written by Andre Wille
y"
440 ? "       (c) Atari User, April 1
988"
450 RETURN
460 DATA 104,104,104,10,10,10,10,170,1
04,104,169,255,157,68,3,169,255,157,69
,3
470 DATA 169,11,157,66,3,169,0,157,73,
3,169,224,157,72,3,32,86,228,132,212
480 DATA 169,0,133,213,96
490 DATA 0,0,0,1,109,1,110,1,142,1,101
,1,212,1,32,32,32,32,32,32
500 DATA 32,32,32,32,32,32,72,111,33,3
2,72,111,33,32,72,111,101,32,32,32
510 DATA 32,32,32,32,32,60,60,60,32,65
,88,82,73,76,32,78,79,79,76,33
520 DATA 32,62,62,62,100,32,89,111,117,32
,100,105,100,110,39,116,32,82,69,65,76
530 DATA 76,89,32,102,97,108,108,32,10
2,111,114,32,105,110,32,46,46,46,174,3
2
540 DATA 32,32,32,32,32,32,32,32,32,46
,46,46,46,46,32,65,73,68,32,32,121
550 DATA 111,117,191,0,0,0,0,0,0,0,0,0
,0,1,0,0,0,0,0,0
560 DATA 0,2,0,0,0,0,0,0,0,3,0,0,0,0,0
,0,0,0,49,49
570 DATA 54,22,22,22,22,22,22,22,22,22
,22,22,22,22,22,22,22,22,22,22
580 DATA 22,22,22,22,128,22,22,22,22,129,
22,22,22,22,130,22,22,22,131,22,22
590 DATA 22,22,22,22,22,0,128,21,21,25
,15,13,68,51,50,65,80,82,73,76
600 DATA 50,44,66,65,85,22,-1
```

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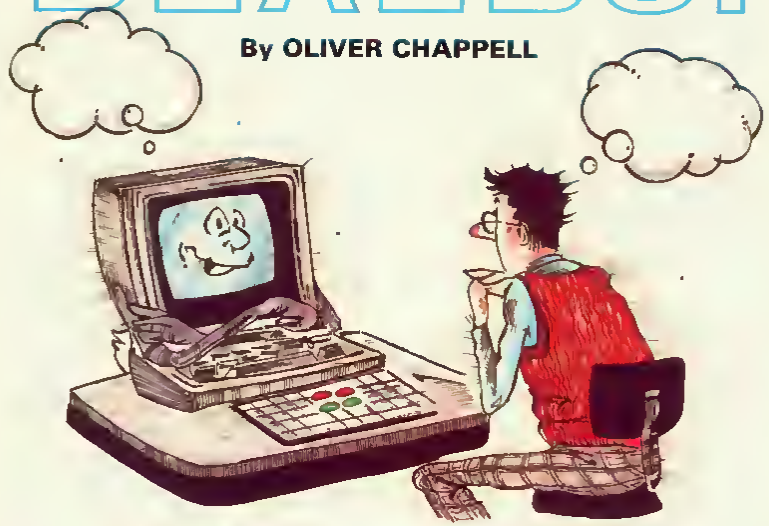
LVAR Gives the name of all used variables and a list of all their occurrences

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TO ORDER PLEASE USE THE FORM ON PAGE 61

REVERSI

By OLIVER CHAPPELL



THIS is an adaptation of the traditional game played on a board with 64 squares. The objective is to obtain the most counters at the end of the game – when all 64 squares are coloured in. The players, in this case you and the computer, take alternate turns to place a counter on the board. You have green counters and the computer red.

They can only be placed on the board sandwiching one or more of the computer's counters in between two of your own. They must be in a straight line – horizontally, vertically or diagonally. No counters can ever be taken off the board, and no player can have consecutive turns unless his opponent cannot move.

The game starts with four counters in the centre of the board – two for each player – and the game expands from there. It is worth noting that counters in the centre of the board are not much of an asset as they can be easily surrounded and recaptured.

It is therefore advisable to have edge pieces and an even more distinct advantage to secure the corners as these can't be altered. Having said that there is only one way to perfect your play – practice.

To place your counter all you do when the *YOUR MOVE* prompt appears is press the keys 1 to 8 twice. First for the vertical coordinate and then for the horizontal one. The computer will record the move on the screen and turn over all the necessary counters.

There are, at your disposal, several functions which can either help, pass your move over to the computer or even cheat.

Firstly there is *Help*, which after a few seconds will give you the coordinate which will allow you to take the most counters on the board. Secondly comes *Swap* which changes all the computer's counters into yours and vice versa by reversing the colours. This is a useful feature if you are in a sticky position.

Pass allows you to pass your move over to the computer. This must be used if you can't go, but at times it can be to your advantage. You can also quit at any stage or use the *Judge* function which will assess the state of play at any time by giving a percentage result as to who is in the stronger position.

The game ends when all the positions on the board are occupied or either player has no counters left and is therefore unable to win.

Remember to use Get it Right! when you type the program in and be extra careful with the data statements. They are part of a short machine code routine and could crash the computer if entered incorrectly.

Turn to Page 45 ▶

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◀ From Page 43

```
1 REM ********************
2 REM *     REVERSI      *
3 REM *       BY         *
4 REM * OLIVER CHAPPELL *
5 REM *  (C)TOTAL USER   *
6 REM ********************
10 SETCOLOR 1,8,8:SETCOLOR 1,0,12:SETC
OLOR 4,9,4:POKE 752,1:? "K" ? "Enjoyin
g M/C###    "
20 DIM ***** DEFINE VARIABLES *****
30 DPEN #1,4,0,"K'
40 DIM R$(8),M$(20),B$="1234567890":DIM
QR$(140),IF$(40)
50 OTH Q(8):FOR R=1 TO 8 Q(R)=2*10 NE
XT R
60 GOSUB 1120
70 POP  FOR R=152# TO 1810 STEP 10:FOR
 I=R TO R+8:POKE I,0 NEXT I:NEXT R
80 POKE 1549,2 POKE 1561,2 POKE 1564,1
 POKE 1591,2
90 FOR R=1536 TO 1645 POKE R,4 NEXT R
FOR R=1520 TO 1532 POKE R,4 NEXT R:FOR
 R=1560 TO 1572 STEP 10:POKE R,4
100 POKE 849,4:NEXT R
110 REM ***** TITLE SCREEN *****
120 GRAPHICS 31
130 SETCOLOR 0,8,12 SETCOLOR 1,12,8:SE
TCOLOR 3,3,8
140 XC=4:YC=0 NS=1 YS=3 IN=2.M$="Prese
ntion ! " GOSUB 2290
150 XC=21 YC=20 NS=2 YS=8 IN=1.M$="REV
ERSI"GOSUB 2290
160 XC=10 YC=110 NS=1 YS=3 IN=3 M$ "By
 Oliver Chappell" GOSUB 2290
170 XC 5 YC 165 NS=1 YS 2 IN=2 OR=1:OR
 "  Press To Play  " GOSUB 2290
180 X=USR(ADR(Z155),255)
190 REM ***** PLAY SCREEN *****
200 ? #6;" OK:0
210 FOR R=1 TO 9:COLOR 1:PLOT 10,R*19-
1 DRAWTO 100,R*19 I NEXT R
220 FOR R=1 TO 9:COLOR 1:PLOT R*10+2,1
0 DRAWTO R*10+2,170:NEXT R
230 COLOR 2 PLOT 10,90 PLOT 26,6# PLOT
 10,90 PLOT 26,54:PLOT 70 130:PLOT 6#
130 PLOT 70,130.PLOT 90 134
240 PLOT 30,130 PLOT 34,134 PLOT 30 13
0 PLOT 30,110 PLOT 70,9# PLOT 90 54 PL
OT 70,50 PLOT 90 50 COLOR 1
250 COLOR 0 PLOT 35,50 PLOT 79,6# PLOT
 10,132:PLOT 79,132 COLOR 1
260 PLOT 132,10:DRAWTO 154 10:DRAWTO 1
54,51:DRAWTO 131,51 DRAWTO 131,10
270 PLOT 111,10 DRAWTO 110 9:DRAWTO 15
9,0 DRAWTO 154,10:PLOT 155,5 DRAWTO 15
9,40:DRAWTO 154,51
280 PLOT 111,22 DRAWTO 154,23:DRAWTO 1
59,30:PLOT 130,23 DRAWTO 133,51
290 PLOT 18,17 DRAWTO 102,17 DRAWTO 10
2,171 DRAWTO 12,171 DRAWTO 12,17
300 PLOT 114,72:DRAWTO 154,72 DRAWTO 1
54 156 DRAWTO 113,156 DRAWTO 111,72 DR
AWTO 110,67 DRAWTO 105,67
310 DRAWTO 105,151:DRAWTO 150,150 PLOT
 150 87 DRAWTO 150,73 PLOT 111,85.DRAW
TO 150,73 DRAWTO 150,86
320 DATA 0F8Tv,Help,Swap,Pass,Quit,Qua
0r
330 IB 3 COLOR 1 RESTORE 320 FOR D=8 T
O 9:NC=131 XS=1 XS 1 READ M$;VC R=14+7
5 GOSUB 2230 ID=3:NEXT R
340 GOSUB 1690
350 GOSUB 1720
360 REM ***** PLAYER 1 GO *****
370 IF CMP+HUM>63 OR CMP=0 OR HUM=0 TH
EN 2320
380 NC=21 YC=170 IN 3 OK 0 XS=1 YS=1 M
$="YOUR MOVE" GOSUB 2290
390 XC=131 YC=75 OR="AFBTe":GOSUB 2290
400 NC=1:YC=0 IN=3 YS=2 M$="4" GOSUB 2
290
410 POKE 704,256:GET #1,PCN:ROW=ROW-46
420 IF ROW=32 THEN 630
430 IF ROW<33 THEN 70
440 IF ROW()24 THEN 460
450 GOSUB 2230 X=USR(ADDR(D$),COL+11*R,
1:IF PEEK(1734)=0 THEN OR="CANT HELP":G
OTO 470
460 M$ ' HELP  ':M$(LEN(M$)+1)=STR$(PEE
K(1735)*11)/10:
470 NC=21 YC=170 IN=1 YS=1 GOSUB 2290:
FOR R=1 TO 220 NEXT R GOSUB 370
480 IF ROW=35 THEN GOSUB 2130:GOSUB 17
70
490 IF ROW=20 THEN GOSUB 2420
500 IF ROW(1 OR ROW>8 THEN 370
510 A =USR(ADR(A$),3,ROW*19+1,3,8,1,1,
ADR(R$+ROW,ROW)),1)
520 M$="0":GRSUB 2230
530 SET #1 GRL COL CRL-60 IF COL(1 OR
COL)8 THEN 510
540 A =USR(ADR(QR$),COL+11*R,0,1,0,1,1,
ADR(B$+ROW,ROW)),1)
550 R=COL T=ROW GOSUB 2200 IF PEEK(CO)
()0 THEN TAK=1 GOTO 580
560 M ROW:N COL POKE CO,1
570 GOSUB 480
580 NC 21 YC 170:IN 0 NX=0:NS=1 YS=1:M
$="          ":GOSUB 2290
590 IF TAK=0 THEN R=COL T ROW:GOSUB 93
0 GOSUB 2200 POKE CO,0 GOSUB 2270 GOTO
 170
600 IF TOK= 1 THEN GOSUB 930 GOSUB 227
0 GOTO 370
610 GOSUB 1730
620 XC=113 YC=70 YS=1 ID=3 OR="AFBTe'
GOSUB 3290
630 YS=2 XC=3 YC=0 M$ '  " GOSUB 2290
640 GOTO 660
650 REM *****  COMPUTER GO  *****
660 IF CMP+HUM>63 OR CMP 0 OR HUM=0 TH
EN 2320
670 QT 0 GET 0 XC 21 YC:170 IN 3 OK 0
 XS=1 YS=1 M$=" MY MOVE " GOSUB 2290
680 FS=USR(ADR(A$))
690 IF PEEK(1734)=0 THEN OR "COMPUT GO
" GOSUB 2290 FOR R=1 TO 100 NEXT R GOS
U 370
700 IF PEEK(1734)=0 AND QT%)1 THEN QT
=1 GOTO 670
710 RW INT(PEEK(1736)/10)
720 MY PEEK(1735)-(RW*10) NN=RW*8+ MY=R
W*1 T=NX R=MY GOSUB 2200
730 IF QT= 1 THEN 790
```

PROGRAM BREAKDOWN

20 – 100	Define all the necessary variables and clear Page 6 where the data for the counters is stored
110 – 180	Set up the screen in graphics Mode 31
190 – 350	Set up the screen of play by drawing the board, score board and function box
360 – 840	Main routine for handling all player inputs
650 – 840	Machine code subroutine to calculate the computer's moves
850 – 1110	Routine to change the colours of the counters
1115 – 1670	Routine to poke machine code data into memory
1680 – 1710	Print the numbers 1 to 8 vertically and horizontally along the board
1720 – 1910	Print the board on the screen and make the sound for a red or green counter
2260 – 2270	Routine to work out an illegal move
2280 – 2380	End of game routine

Turn to Page 48 ▶

◀ From Page 45

```
740 IF NX(>NX OR 00 (9-NX):OV THEN 750
750 GOSUB 1540:A=USR(ADR$)
760 IF PEEK(17277)=1 THEN RT=RT+1:POK
E 16317+PEEK(17735),01:A=USR(ADR$):GOTO
780
770 GOSUB 2030:A=USR(ADR$)
780 IF PEEK(17277)=1 THEN RT=RT+1:POK
E 16317+PEEK(17735),0:A=USR(ADR$):GOTO
700
790 GOSUB 990
800 OOM=NM:COL=NY:A=USR(ADR(A$)):COL=1
1+4*0,1,3:2,ODR(DS(COL,COL)),1)
810 A*USR(ADR(ER$),3,ROW*(7+1,1,0,1,2,
ADR(DS(ROW,ROW)),1)
820 GOSUB 1730
830 GOSUB 930
840 GOTO 370
850 REM ***** TUDM OVER COUNTERS *****
860 IA=0 FOR C=-1 TO 1:FOR D =-1 TO 1
870 F=M,G=0
880 F=F+C:G=G+D:IF F<1 OR F>8 OR G<1 O
R G>8 THEN 920
890 A*G 7 F:IGOSUB 2280
900 IF PEEK(CO1=3 THEN 880
910 IF PEEK(CO1=2 THEN 940
920 NEXT D:NEXT C
930 A*ROW A=USR(ERR(ADR$),3,0*15+1,1,0,
1 2,ODR(DS(R,R)),1)
940 O=COL*O=USR(ADR(ADR$),0*I3*4,0,1 0,
1 2,ODR(DS(R,R)),1)
950 RETURN
960 F=M G=N
970 F=F+I:G=G+D O=S:T=F GOSUB 2280 IF
PEEK(CO)=2 THEN 920
980 POKE CO,2 IA=I GOTO 970
990 POKE CO,3
1000 FOR C=-1 TO 1 FOR O=-1 TO 1:O=AR
O=NY
1010 A=A+O N=N+D IF A<1 OR O>8 OR A<1
OR O>8 THEN 1060
1020 N=N T=O GOSUB 2280
1030 IF PEEK(CO)=2 THEN 1010
1040 IF PEEK(CO)=3 THEN 1000
1050 IF PEEK(CO)=0 THEN 1060
1060 NEXT O NEXT C
1070 RETURN
1080 F=MM G=MY
1090 F=F+C:G=G+D N=S.T=F GOSUB 2280 IF
PEEK(CO)=3 THEN 1060
1100 POKE CO,3 GOTO 1090
1110 GOTO 1260
1120 OK$TOOK 1100
1130 FOR J=1 TO 2229.NE00 A:IF A=-1 TH
EN 1296
1140 A$(J,J)=CHR$(A):NEXT J
1150 5100
1160 DATA 169,0,141,255,6,100,201,0,24
0,10,100,1 10,170,240,4,104,002,000,20
2,100,255,6,96,100,141,104,141
1170 DATA 243,6,104,141,242,5,104,200,
4,169,12,200,220,104,141,244,6,100,104
,141,245,6,100,104,141,245,0
1180 DATA 104,240,4,169,7,200,207,155,
141,247,0,104,240,4,169,6,200,156,104,
200,5,168,169,0,200,190 141 248
1190 DATA 6,104,132,206 104,133,208,10
4,141,245,6,104,141,250,5,173,244,0,14
1,252,0,173,249,6,13,250,5,200
1200 DATA 1 90,169,855,141,251,6,173 2
00 6,66,232,1,141,250,6,176,3,206,249,
6 160 0,177 205 10,144,1,140
1210 DATA 251,6,74,201,95,176,10,201,3
2,140,4,233,32,176,2,105,64,173,244,1,
132,204 162,2 10,144,0,72,138
1220 DATA 24,201,206,133,104,104,202,2
08,242,133 201 250 0,162,72 173,242,6,
141 252,6,173,241,6,141,250,0
1230 DATA 173,252 6 141,241,6,177,203,
77,251,0,162,0,200,147,10 72,169,0 200
,221,42,160 105,245 6,141,201
1240 DATA 2,130 72,24 171,252 6,133 05
 105,247,6,141,251,6,173,254,6,133,06
 105,9,141,254,6,172,248,6,162
1250 DATA 0 229,252,6,149,90 202 16,24
8 133,64,152,72,162,96,169,17,157,66,2
,200,198,32,05,220,40,52,230
1260 DATA 252,6,200 150,136,208,220,10
4,170,104 202 240,9,172,243,6,240,252,
6,24,144,254,104,168,200 232
1270 DATA 0,200,161 239,208,200,2,230,
206 173,253,6 141,242,6,173,254,0,101,
243,6,109,0,240,197,140,205,6
1280 DATA 104,104,200,104,96,-1
```

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```
1290 RESTORE 1510:FOR D=0 TO 999 READ
A:IF A=-1 THEN 1310
1300 POKE 27960+D,A NEXT D
1310 RESTORE 1450 FOR D=1 TO 999 READ
A:IF A=-1 THEN 1330
1320 Z$=Z$+CHR$(A):NEXT D
1330 RESTORE 1400 FOR A=0 TO 999 READ
A IF A=-1 THEN 1350
1340 POKE 1748+D,A NEXT D
1350 RESTORE 1430 FOR D = 0 TO 999 READ
A IF A= 1 THEN 1370
1360 POKE 20500+D,A NEXT D
1370 RESTORE 1040 FOR D=0 TO 999 READ
A:IF A=-1 THEN 1390
1380 POKE 20300+D A NEXT D
1390 RESTORE 1300 FOR O=0 TO 999 READ
O IF A =-1 THEN OCTURD
1400 POKE 27980+D O:NEXT D
1410 DATA 2 61,2,4,55,2 0,55,2,15,47,2
,3,29,1,4,27,3,0,33,3,2,13,4,4,11,4,2,
5,6,32,32,7,16,200,7,0,216,7,32,00,6
1420 DATA 10,64,7,10,40,0,0,20 7,4,30,
2 0 54,2,15,40,2,4,25,3,0,52,2,0 20,3,
16,40,2,64,200,7,32,220,7,15,236,7
1430 DATA 0,240,7,64,104,6,32,216,5,20
,232,6,64,170,5,32,200,5,66 160 6,61,2
30,2,30,192,2,80,120,2,39,192,2
1440 DATA 30,192,3,200,1,7 120,3,6,92,
1,7,104,3,6,176,3,6,12,1,7,00,1,7,00,1
,7,124,1,7,20,1,0,66,2,6,122,1,6
1450 DATA 22,1,0,00,1,5,210,1,6,24,3,0
,110,1,5,24,3,6,60,3,0,120,3,0,40,7,5,
132,7,5,00,7,6,40,220,2,00,220,2
1460 DATA 00,220,2,62,220,2,00,220,3,9
9,220,3,96,220,3,104,220,4,100,220,4,1
10,220,4,20,252,3,20,252,3,30,192,3
1470 DATA 12,224,4,14,224,4,10,220,2,1
 252,7,220 32,7,2,72,2,00,224,7,255,25
5,255,255,255,255,-1
1480 DATA 0,10,11,19,20,21,29,30,31,-1
1490 DATA 104,104,104,72,162,57,250,0,
173,0,210,101,20 141,22 200,141 10,211
,138,200,242,292,200 237,104,56,233
1500 DATA 1,173,11 200,201,6,240,2,200
,221,56,-1
1510 DATA 0,1,2,3,4,5,0,7,0,10,20,30,4
0,50,60,70,7,17,27,37,47,57,67,77,70,7
1,72
1520 DATA 73,74,75,70,77,0 7,70,77,0,0
,0,0
1530 DATA 162,0,169,0,141,190,0,141,25
5,6,357,101,0,232,224,70,200,240,169,0
,141,224,0 174,224,6
1540 DATA 109 13,6 201,0,240,0,169,0,1
41,227,6,76,97,110,169 0,141,227,6,169
,0,142,225,0,165
1550 DATA 0,141,226,6,169,0,141,220,0,
173,224,6,143 225,6,169,0,162,0,235,22
5 6 240 0,105,7
1560 DATA 232,76,167,109 162,0 235,220
,6,240,6,185 1,232,76 100,109,141,233,
6,174,223,6 109 204,6
1570 DATA 109 225,6,233,20,141,225,6,1
70 185,11,6,141,230 6,173,230,6,201,3,
200,3,76,0,210 173
1580 DATA 230 6 201,0,200 0,160,0 100,
220,0 76,0,110,173,230 6,201,2 200 6,2
30,220,6,76,154
1590 DATA 109,76,232,109,162,0,235 220
,6,240,7,232,230 227,6 76,2,110 235,22
6,6,173,226,6,201,1
1600 DATA 208,10,173,235 6,201 1 200 1
,76,14,110,162,3,235,226 6 240,3,76,15
2,109 230,125,6,162
1610 DATA 2,236,235,5,240,3,76,147 105
,173,237,0,174,224 6,157 101 6 230 224
,6,173,226,0,200,70
1620 DATA 240,3,76,119,105,100,0,205,5
0,109,170,105,101,6,101,0,240,3,254,10
1,6,200,192 36,200,237
1630 DATA 162,0,102,101,6 237,150 6,40
,9,195,101,6,141 170,6,142,199,6 212 2
24,70,200,224,104 70 -1
1640 DATA 162,0,142 251,6,109,86,111,2
02,255,240,75,205 214 6,200,30 105 85,
111,205,115,6 200 22,195
1650 DATA 00 111,205,215 6 200 14,169,
0,174,155,0,157,201,6,141,104,6,76,67,
111,102,00,111,205,227
1660 DATA 6,200,20,109,85,111,205,220,
6,290,22 105,06,111,205,215,0,200,10,1
65,0,174,155,0,157,103
1670 DATA 0,142,199,6,75,07,115,222,23
2,272,76,235,110,104,00,109,1,101,151,
8,104 00,-1
1680 REM ***** PRINT UP SCREEN *****
1690 FOR D=1 TO 0 A=USR(ODR(OO$),3,001
561,1,0,1,2,ODR(05(R,R)),1):NEXT D
1700 FOR D=1 TO 0 A=USR(ODR(OO$),0*114
4,0,1,0,1,2,000(R(R,R)1,1) NEXT D
1710 MO$113 YC=13 CB=1 BA=0 X5=1 Y5=1:
MS "SCORE' GOSUB 2290 RETURN
1720 REM ***** PRINT UP SCREEN *****
1730 O0='0" Y5=0 M=USR(27960)
```

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1	CAJ	130	LNS	550	JF	1090	HM	1150	HP	1450	BOA	1810	[illegible]	2050	U6H	[illegible]	[illegible]
2	CAK	140	SNJ	560	GE4	1100	[illegible]	1160	T6D	1460	CWM	1820	QWF	2060	RQE	340	T49
3	CAL	150	KFW	570	Q4N	1110	T6D	1170	XS2	1470	GF7	1830	NQS	2070	NUT	2360	75V
4	CAM	160	SXW	580	QW4	1120	4TF	1180	U3C	1480	U3C	1840	KFW	2080	AFU	2370	MXW
5	CAN	170	ZUY	590	TPY	1130	6PG	1190	G9S	1490	DVL	1850	KJ1	2090	TA7	2380	9TC
6	CAP	180	4KH	600	TLA	1140	6R9	1200	VY5	1500	6R9	1860	PPS	2100	UOH	2390	UMA
7	XWE	190	X21	610	PE4	1150	[illegible]	1210	U12	1510	PFG	1870	PBS	2110	LW5	2400	HUO
8	CP2	200	MH7	620	XY5	1160	[illegible]	1220	V8H	1520	2CF	1880	22G	2120	WJ7	2410	ASQ
9	YKN	210	FMA	630	DTU	1170	[illegible]	1230	WM2	1530	KYM	1890	BXJ	2130	EMW	2420	YK4
10	M4T	220	PU5	640	AE8	1180	[illegible]	1240	X1Q	1540	K1A	1900	7ID	2140	5RH	2430	SM4
11	LF9	230	PW5	650	OGX	1190	[illegible]	1250	XLC	1550	JVL	1910	B5L	2150	IM7	2440	SLT
12	R4P	240	XLU	660	JCU	1200	[illegible]	1260	WGE	1560	MV1	1920	WH5	2160	UDH	2450	SP0
13	B5S	250	JG5	670	MHP	1210	[illegible]	1270	VM5	1570	GEM	1930	6PA	2170	N15	2460	SNF
14	WJR	260	W6O	680	W2R	1220	[illegible]	1280	F0T	1580	FSE	1940	R7T	2180	NWT	2470	SUV
15	K3W	270	W5Z	690	WM5	1230	[illegible]	1290	F9V	1590	JTQ	1950	X2M	2190	MPU	2480	SAK
16	6SB	280	QJE	700	YTQ	1240	[illegible]	1300	GOO	1600	HMG	1960	FMW	2200	TF7	2490	SPA
17	CYS	290	M9H	710	C15	1250	[illegible]	1310	EXG	1610	JWP	1970	WHK	2210	U4N	2500	SRY
18	SJU	300	N5D	720	QCN	1260	[illegible]	1320	UDE	1620	SYY	1980	EBN	2220	M7T	2510	TO7
19	4N2	310	DJV	730	7WR	1270	[illegible]	1330	F2M	1630	UCJ	1990	SBN	2230	WQT	2520	SEX
20	7FD	320	FMO	740	6T9	1280	[illegible]	1340	7RP	1640	X4C	2000	7QO	2240	F61	2530	4WA
21	7AT	330	LRJ	750	LAU	1290	[illegible]	1350	F6A	1650	UVA	2010	WKQ	2250	VVL	2540	QFA
22	7RL	340	8M2	760	FMG	1300	[illegible]	1360	GTW	1660	Q9T	2020	81R	2260	DKP	2550	8A5
23	SB1	350	V8E	770	LSC	1310	[illegible]	1370	FAR	1670	D82	2030	KJV	2270	A10	2560	8A5
24	SJU	360	EHE	780	FVG	1320	[illegible]	1380	E6N	1680	E6N	2040	7I5	2280	ALH	2570	UB4
25	6YS	370	U8R	790	QJQ	1330	[illegible]	1390	XYA	1690	66D	2050	A79	2290	N7P		
26	1KU	380	YA6	800	23U	1340	[illegible]	1400	G2H	1700	3S5	2060	AP9	2300	J5R		
27	YRH	390	VXX	810	VY5	1350	[illegible]	1410	9JS	1710	7W5	2070	DEM	2310	N6H		
28	U5W	400	4GV	820	PJ8	1360	[illegible]	1420	X1B	1720	9XN	2080	VFL	2320	P4E		
29	0AA	410	7AY	830	PLR	1370	[illegible]	1430	5FT	1730	NUA	2090	XYG	2330	44N		
30	0SE	420	107	840	W3F	1380	[illegible]	1440	4CU	1740	GG8	2100	TF7	2340	DNW		

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```
X740 FOR T=1 TO 8 YC=T*13
X750 FNN N=X TO 8:GOSUB X200 XC=8*X1+6
X760 LNCATE #81X+7,7*13+7 Z
X770 IF Z=PEEK(ICD) THEN XNN
X780 IF PEEK(ICD)=Z THEN XN=X GOSUB XX9
0 SOUND 0,45 X0 10 FOR Z=X TO 7 NEXT Z
:SOUND 0,0,0,0
X790 IF PEEK(ICD)=Z THEN XN=X GOSUB XX9
0 SOUND 0,45 X0,10 FOR Z=1 TO 7 NEXT Z
 SOUND 0,0,0,0
X800 NEXT X
X810 NEXT T
X820 CMD=PEEK(X731) NUM=PEEK(X734)
X830 XC=1X4 YC=1X5 IN 1 OK=N RS=1 Y5=1:
MS=" SCRNN" GOSUB 2290
X840 XC=1X4 Y5=2 YC=29 IN=N NK=0 MS="
 " GOSUB XX90
X850 IF CMD<10 THEN XC=1X4
X860 XN=1 M$=STR$(CMD) GOSUB XX90
X870 ME=1X3N XN=N MS=" ":GOSUB 2290
X880 IF NUM<10 THEN XC=1X9
X890 XN=2 M$=STR$(NUM) GOSUB XX90
X900 IF CMD+NUM>97 THEN CMD = X NUM=-1
X910 RETURN
X920 REM P SOME USEFUL ROUTINES ******
X930 REM * OFTEN USED,TO SAVE SPACE *
X940 AN=N N=0 M=1516+(NM*10) FOR N=1 T
O N
X950 IF PEEK(M+A)=2 THEN N=N+1:RU
X960 IF PEEK(M+A)=3 THEN AN=AN+1:RU
X970 NEXT N:POKE X756,09 POKE X761,0:P
OKE X752,NY
X980 NB=0:B=0 M=1516+NY:L=1:FOR A=X0 T
O NN STEP X0
X990 IF PEEK(M+A)=2 THEN B=B+A(9-L)
X000 IF PEEK(M+A)=X THEN NB=NB+A(9-L)
X010 L=L+1 NEXT A:POKE X753,BA POKE X7
```

```
64 N POKE X755,9-NN
X020 RETURN
X030 A NN NA=N N=N M=1516+(NM*10)+NY:F
OR B=M-11 TO M-XNN STEP -11:A=A A
X040 IF PEEK(B)=2 THEN N=N+1:RU
X050 IF PEEK(B)=3 THEN AN=AN+1:RU
X060 IF PEEK(B)=4 THEN X080
X070 NEXT B
X080 A=AN M=1536+(NM*10)+NY:FOR B=M+11
 TO M+XNN STEP 11 A=A+1
X090 IF PEEK(B)=X THEN N=N+A(A)
X100 IF PEEK(B)=3 THEN AN=AN+A(A)
X110 IF PEEK(B)=4 THEN X130
X120 NEXT B
X130 POKE X7NN NN POKE 1751,N:POKE X75
2,AN
X140 A=NY NN 0 A 0 M=1516+(NM*10)+NY:F
OR N=M-9 TO M-220 STEP -9 A A+1
X150 IF PEEK(M-2)=2 THEN N=N+A(A)
X160 IF PEEK(M-1)=2 THEN AN=AN+A(A)
X170 IF PEEK(M)=4 THEN X190
X180 NEXT M
X190 A=NY M=1510+(NM*10)+NY FOR N=M+9
 TO M+XNN STEP 9 A=A-1
X200 IF PEEK(N)=2 THEN N=N+A(A)
X210 IF PEEK(N)=3 THEN AN=AN+A(A)
X220 IF PEEK(N)=4 THEN X240
X230 NEXT N
X240 POKE X755,NN POKE 1754,0 POKE X75
6,NY
X250 RETURN
X260 REM ** ILLEGAL MOVE SUBRTN ** 
X270 XC=1X4 YC=178 IN 1 Y5 1 M$=" ILLEG
AL " GOSUB XX90 RETURN
X280 CO=1536+(Y*40)+N RETURN
X290 M=USR(ADR(X6A5),XC,YC,XN,KK X5,Y5,
BO,N(M5),LEN(M5)) RETURN
```

```
2300 DATA 104,162,0 142,X94,0,142,X95,
0 IN9 11,N,X01,X,X00,X,XXN,194,N XN1,X
,X00,X,X38,195,R
2310 DATA X32,224 79,XNN,214,96 -1
2320 NC A5 YC:X75 XN=1 Y5=1
2330 IF CMC>NUM THEN M5=" " + M5N
ENT
2340 IF CMP<NUM THEN M5=" YOU WIN " + M5
ENT
2350 IF CMP=NUM THEN M5="A DRAW " + M5
ENT
2360 GOSUB XX90
2370 M=USR(ADR(XX15),X5N)
2380 GNTH 7N
2390 FOR N=1547 TO 1NEY STEP 4N:FOR Y=
N TN N+7 NF PEEKXY3=X THEN POKE Y,X 6N
X0 X4IN
2400 XY PEEKXT3=3 THEN POKE 1-2
2410 NEXT Y:NEXT N RETURN
2420 C=N N=N FOR N=X TN N FOR T=1 TO 0
2430 AM=0 IF N=1 OR N=8 THEN AM=4
2440 IF T=1 OR T=N THEN AM=AM+6
2450 IF N 2 OR A=7 THEN AM=AM+1
2460 IF T=X OR T=7 THEN AM=AM+1
2470 IF N=X OR N=N THEN AM=AM+2
2480 IF T 3 OR T=6 THEN AM=AM+2
2490 IF N-4 OR N-6 THEN AM=AM+1
2500 IF T-4 OR T=5 THEN AM=AM+1
2510 C=1X16+KMXIN1+T
2520 IF PEEK(C)-2 THEN M=N+AM
2530 IF PEEK(C) 3 THEN C=C+AM
2540 NEXT T:NEXT A
2550 XC=1X3:YC=X3 XN=X NK=N X5=1 Y5=1:
M5="JUNGE' GOSUB 2290
2560 T=C+N NUM=INT(A/T*100) CMP 100-NU
M
2570 Y5=2 GN360 1N4N RETURN
```

SOFTWARE Solutions

Your programming problems solved by ANDRÉ WILLEY

LET'S get cracking straight away with a letter from Philip Carter from Frome in Somerset who is having a few problems with his 800XL.

While I was playing around with my micro I decided to write a Basic trigonometry program. When I got round to the tangents, sines, cosines and inverse tangents I came across the problem that my machine did not seem to accept the trig statements correctly. Instead it gave ERROR 9 AT LINE 127, which was simply

```
127 LET A=TAN(B)
```

This also happened for the sines and cosines and the inverse tangent. Since Error 9 means an array or string error, and I'm using neither, is there something wrong with my micro?

Firstly I don't think that there's anything much wrong with your computer – your problems stem from a slight misunderstanding of how Basic handles trig operations. To be strictly accurate, Atari Basic only supports three fundamental trigonometry operations – sin, cosine and inverse tangent (or arc tangent as it is more commonly known).

The commands to use are SIN(number) COS(number) and ATN(number), so your use of the command TAN was not recognised. However, Basic still tried to make sense of the statement by assuming you were talking about an array variable called TAN. Since you had obviously not DIMmed such an array, it finally gave up and resorted to giving out an Error 9 – for an undimensioned array reference.

I suspect that the other errors might have been caused by your using SINE(number) or COSINE(number) instead of the shortened SIN and COS which are required. These too would have been interpreted as undimensioned arrays.

So how do you work out such things as tangents when Basic doesn't seem to provide a command for them? Luckily trigonometry is entirely logical, and just about any function can be calculated from the main three we've seen so far. You will also need to use some other mathematical operations – most notably natural logarithms and square roots, both of which are readily available.

You don't require the base 10 logarithms given by CLOG(number) but those based on powers of the mathematical value of e, or 2.71828. These are given using the LOG function and antilogs are given by using EXP which returns a result given by raising the number to the power of e.

For example, if you think back to your school days and good old Pythagoras the tangent of an angle is calculated using the very simple formula of sine divided by cosine. In computer terms the tangent of the variable X would be given by

```
LET ANSWER=SIN(X)/COS(X)
```

Don't forget that some values for various trigonometric formulae are illegal – there is no tangent of the angle 90° for example because cos 90° equals zero, and you can't divide by zero.

You should also decide whether you want to work in degrees or radians – selected by using the DEG or RAD commands. There is obviously no point testing for an angle of 90° when you're working in radians – you should instead check for a value of $\pi/2$.

The panel on the following page lists some of the more common trig functions and how to derive them, but make sure you test for any illegal values or you'll have another error on your hands. Don't forget there are lots more formulae if you need them – check out Appendix C of Your Atari Computer manual, or consult your local library for books on trigonometry.

Slow clock?

Next we have an international enquiry from **Mr A Grünbauer** from Holland. It's nice to see so many letters coming in from abroad, and the standard of the English rather puts us Brits to shame when it comes to learning foreign languages – the nearest thing I come to a second language is Action! Anyway, Mr Grunbauer writes:

I must first tell you that you are selling the best English Atari magazine I have ever read. Keep up the good work. As I was reading my manual I discovered the following line:

```
Processor 6502C
(Clock Speed 1.79 Mhz)
```

Isn't that a little slow for a great computer like this? For instance, the MSX Z80 processor has a clock speed of 3.0 Mhz. As I know nothing about this I would like to know just what the clock speed is used for and if it has anything to do with the calculation speed of my 130XE.

In order to function, a CPU chip like the 6502 must be able to work in close association with all the other chips inside the computer. This means that

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SOFTWARE Solutions

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it must regulate its own tasks to match the speeds of the ram chips, the I/O devices and, in the Atari's case the special graphics and sound chips If they did not all run in perfect synchronisation the micro would instantly crash

In order to keep to this strict timing a tiny crystal inside the casing of the micro sends out a very fast stream of pulses which are then used by all of the major chips to time their various activities Thus the 6502 knows exactly when to ask the ram for information, and also when POKEY will be ready to accept a byte of sound data

The crystal inside a European Atari oscillates at 3 Mhz – three million times a second The display chip Antic needs nearly half of these cycles for its own use, so the 6502 gets left with as the message says, 1 79 million clock cycles every second

The MSX machine you mentioned has a clock speed of 8 Mhz, or 8 million cycles per second but you won t find it runs that much faster than your Atari for two main reasons

Firstly the 8 Mhz clock will also have some cycles "stolen" by special display chips similar to, but nowhere near as powerful as, our very own ANTIC

Secondly although they are both 8 bit microprocessors the Z80 and the 6502 function quite differently internally The former has a more powerful set of registers for calculations and many more instructions but it often uses up a lot more clock cycles to do each job In general terms a Z80 would take three to four times as many cycles as a 6502 to perform a given task

So overall there will be little difference in CPU instruction speed between a 6502 running at 2 Mhz and a Z80 running at 8Mhz Any differences between the speeds of execution of Basic programs are more likely to be due to the skill of the writers of the Basic interpreter used on the machine in question

Atari Basic is fairly fast in itself, but is badly let down by the maths package in the operating system This means that overall Atari Basic is nowhere near as fast as such machines as the BBC Micro but if you tried a machine code comparison you d see little or no difference

Email uploading

THE final letter this month comes in by electronic mail from a Dave on MicroLink's Atari section

"I use my Atari and a modem to talk to the MicroLink system and I want to prepare electronic mail and other text while off-line so that I can transmit my messages in a block and log off again

I am unable to get Mini Office II to upload text to the bulletin board, or to use the WPMAIL feature When I'm trying to upload, the text appears about two inches in from the left of my TV screen, and this means that the MAIL command is not detected by MicroLink I don't know why I cannot upload to the BB, but maybe it's a related problem?

In both cases I save my word processor files in Ascii text format but the commands do not seem to register when I try to upload the file Any help would be much appreciated"

As this was an electronic mail question I have obviously also sent an online answer to Dave, but the solution may well interest other Email users

When you edit a document using the Mini Office II word processor you have the option of saving the text in internal format – which stores all the embedded control codes and formatting commands – or of storing a straight Ascii text version

MicroLink – like most other Email services – requires its messages to be in standard Ascii text form with any commands at the start of the line You can for example use the command SEND to post your letter on to the system or EDIT if you decide you wish to do some online editing or QUIT to abort the current mail item

What has happened in this case is that you have saved the Ascii text with the margin still set for printing normal letters – at 10 characters This means that each line of text in the disc file starts with 10 blank spaces and so the mail commands are not recognised MicroLink does not strip spaces off the start of each line in the same way that Basic does because you might wish to use spaces to offset some portion of your letter

All you need to do is to re set your Mini Office II left margin to zero which can be done with embedded commands or via the menu system Then save the document as an Ascii file and go to the communications program

Log on to the remote system (such as MicroLink) and go to the mail section You should then type Control+Shift+T – or use the menu – In order to select the filename to transmit. The filter mode should be set to Standard Ascii

When you're ready to send, press the Start button and off it will go This method should allow you to prepare text off line and then transmit it with the minimum of fuss to almost any electronic mail system – all from your humble 8 bit Atari

● *Well that just about wraps it up for this time Keep those letters coming in – especially if you're still struggling with your first few programs on your new Atari 8 bit computer*

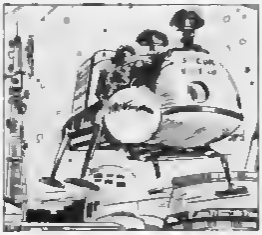
TRIG	BASIC
Tangent(X)	SIN(X)/COS(X)
Inverse sine(X)	ATN(X/SQR(X*X+1))
Inverse cosine(X)	ATN(X/SQR(X*X+1))+90
Cotangent(X)	COS(X)/SIN(X)
Inverse cotangent(X)	ATN(X)+90
Secant(X)	1/COS(X)
Inverse secant(X)	ATN((SQR(X*X 1))+SGN(X) 1)*90
Cosecant(X)	A=1/SIN(X)
Inverse cosecant(X)	ATN(1/SQR(X*X 1))+(SGN(X)-1)*90
Calculated in degrees – change any number 90 to PI/2 for radians	

Derived trigonometric functions

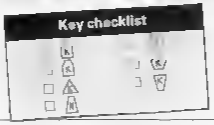
Your HINTS & TIPS

Mercenary: The Second City

LAST month we published a map to the superb science fiction adventure game. To complement it here is a useful checklist to the keys and objects you will find. Just tick them off when you get them.



Key checklist



Object checklist

- ☐ Antenna
- ☐ Antigrav (AG)
- ☐ Anti time bomb (ATB)
- ☐ Bed
- ☐ Catering provisions (CP)
- ☐ Chair
- ☐ Chart
- ☐ Cheese
- ☐ Coffin
- ☐ Databank
- ☐ Energy crystal (EC)
- ☐ Essential 12939 supply
- ☐ Fire
- ☐ Gold
- ☐ Grenade
- ☐ Kitchen sink
- ☐ Lamp
- ☐ Large box (LB)
- ☐ Mechanoid (M)
- ☐ Medical supplies (MS)
- ☐ Metal detector (MD)
- ☐ Music stand
- ☐ Neutron fuel
- ☐ Novadrive (ND)
- ☐ Oven
- ☐ Pass
- ☐ Photon emitter (PE)
- ☐ Poweramp (PA)
- ☐ Prestinium
- ☐ Sights
- ☐ Table
- ☐ Transmitter
- ☐ Useful armament (UA)
- ☐ Winchester
- ☐ Web

● *You may photocopy this page to save cutting your magazine if you wish*

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TRANSDISK IV

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READ ON!

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The cost of this the most powerful tape to disk utility for the Atari is just £24.95 inclusive of first class delivery. Also comes complete with comprehensive instruct ons wh ch were specially written with the cassette upgrader and first time disk user in mind.

Requires Atari 800XL or 130XE Computer with disk drive and cassette recorder.

Remember, that not only will you save money on upgrades to disk (if they are available) but many games are only available on cassette anyway so Transdisk IV has to be a worthwhile investment!

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It's a moving experience

Continuing his Basic programming series LEN GOLDING introduces simple animation techniques

So far we've seen how to produce text displays and static pictures anywhere on screen. The next step is to make the images move around – computer animation in fact.

All arcade games use movement in one form or another, and the Atari computers have some very sophisticated built in animation facilities – notably Player Missile – *PM* – graphics. We'll get on to these in due course, but they are quite difficult to understand and usually require machine code to make them work so we'll steer clear for the present.

It's relatively easy though, to produce fast animation using ordinary keyboard characters and this month we show you how to do it. We'll encounter the IF...THEN command, together with the joystick functions STICK and STRIG. We'll also take our first look at subroutines, using the commands GOSUB and RETURN.

Armed with these new techniques you will be able to write your first joystick controlled games, and we've listed one to demonstrate the basic principles behind arcade action.

In order to create the illusion of movement you must first print your character, then quickly erase it and print it again in an adjacent position. So long as there is no background to disturb, this is very easy. Try this:

```
10 PRINT CHR$(125):REM Clear the screen
20 FOR H=10 TO 30
30 POSITION H,10:PRINT CHR$(20);:REM
Print the ball
40 FOR W=1 TO 50:NEXT W:REM Short delay
50 POSITION H,10:?CHR$(32);:REM Blank
space erases ball
60 NEXT H
```

This prints a small ball which apparently moves across the screen from left to right. The cursor is also printed which is rather distracting, but you can turn it off by POKE 752,1 followed by a PRINT statement, as we'll see shortly.

We can make the program more interesting by using a joystick to control the movement.

A joystick is just a simple switching device which can generate numbers between 5 and 15 depending on the stick position – see Figure 1. If you plug a stick into port 1 this number which shows its current position – 5 to 15 – is automatically stored in a function called STICK(0).

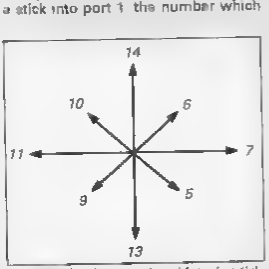


Figure 1. Numbers produced by a joystick

This behaves like an ordinary variable, except that the computer's operating system sets it up for you and updates it automatically every fiftieth of a second. All you have to do is check the current value stored in it, for example by:

```
PRINT STICK(0)
```

and this will reveal the joystick's current position. There's also a function –

STICK(1) – which reads a joystick plugged into port 2

Two other functions – STRIG(0) and STRIG(1) – read the state of the trigger buttons. When no button is pressed both contain the value 1. If you press the button on a stick plugged into port 1, STRIG(0) will go to the value 0.

STRIG(1) behaves in exactly the same way for a fire button operating through port 2. You can check the action of all four functions using this little program:

```
10 PRINT CHR$(125)
20 POSITION 2,10:PRINT STICK(0),"  ",ST
RIG(0),STICK 1,  ,STRIG(1)
30 GOTO 20
```

Plug your joystick into port 1 or port 2, move it around, press the trigger and watch what happens.

Program 1 shows one technique for joystick control using the IF THEN command. This is extremely useful, and you'll come across it in almost every game you encounter, so it's worth taking the time to understand it thoroughly.

Basic starts by looking at the IF part to see whether that condition is true or not. If it is the rest of the program line is executed, but if not, Basic ignores everything else on that program line – including any other statements separated by colons – and skips to the next line in sequence.

```
10 REM PROGRAM 1  Two-directional joys
tick control
20 POKE 752,1:PRINT CHR$(125):REM Swit
ch cursor off and clear screen
30 H1=20:REM Current horizontal co-ord
inate
40 H2=20:REM Will be used as new horiz
ontal co-ordinate
50 POSITION H1,11:PRINT CHR$(20):REM P
rint ball at initial position
60 IF STICK(0)=15 THEN GOTO 80:REM No
thing if stick centralised
70 IF STICK(0)=7 THEN H2=H1+1:GOTO 100
:REM New co-ordinate is one column rig
ht
80 IF STICK(0)=11 THEN H2=H2-1:GOTO 10
0:REM New co-ordinate is one column le
ft
90 GOTO 60:REM Take no action for any
other stick positions
100 POSITION H1,11:PRINT " ":REM Erase
 ball at current position, by printing
 a space
110 POSITION H2,11:PRINT CHR$(20):REM
Print ball at new horizontal position
120 H1=H2:REM Update current cursor po
sition, ready for next cycle
130 FOR W=1 TO 30:NEXT W:REM Short d
elay slows down movement
140 GOTO 60
```

Program 1: Joystick control

Now look at line 60. If the value of STICK(0) is equal to 15 – stick centralised – the program stays there. If STICK(0) is not equal to 15, Basic moves on to line 70 where it checks to see whether the stick value is 7 – pointing right. If so, it adds 1 to the current value held in *H1*, stores the new value in *H2* and jumps to line 100.

If the stick value is not 7 the program skips to line 80. This line sets *H2* to H1-1 if STICK(0) is equal to 11 – pointing left. Any value other than 15, 7 or 11 will take it to line 90 which loops back to start the checking process without affecting *H1* or *H2*. The net result is that all joystick positions other than left and right are ignored.

Line 100 prints a blank space at the position which the ball currently occupies (H1 11) – thereby erasing it from the screen – then line 110 reprints the ball at its new co-ordinates (H2 11). This happens so quickly that the ball appears to jump from one position to the other.

H2 now holds the cursor's current horizontal position and line 120 transfers this value into *H1* ready for the next cycle. Line 130 introduces a short delay which makes the movement slow enough to handle easily – you can omit this line if you want to move at full speed. Finally, line 140 loops back to start the process all over again.

There is nothing in this program to stop the ball moving off screen, so if you allow the ball to reach a screen border you'll get an error message. You can avoid this by using a second IF THEN statement to prevent further

Turn to Page 54 ▶

◀ *From Page 53*

movement if the ball hits either boundary

The least complex way of doing this is to nest the second IF THEN statement inside the first Change lines 70 and 80 to read

```
70 IF STICK(0)= 7 THEN IF H1<39 THEN H
2=H1+1:GOTO 100
80 IF STICK(0)= 11 THEN IF H1>0 THEN H
2=H2-1 GOTO 100
```

The symbol < means *is less than* and > means *is greater than* So line 70 will now update *H2* only if the stick is pointing right AND if the character has not yet reached the right hand border Similarly line 80 will update *H2* only if the stick is pointing left and the character has not reached the left border

Once you understand how this program works you re ready for Program II – our first game It s called Spider Attack and uses most of the techniques you've learned so far If when you type it in, there's anything you don't understand, go back and re read the earlier parts of this series – all the information is there for you

```
10 REM Program 2  Spider Attack game
20 POKE 752,1:PRINT CHR$(125) REM Make
 cursor invisible and clear screen
30 H1=20 H2=20 SHOT=0
40 FOR STAR=2 TO 38 STEP 2:POSITION ST
AR,22 PRINT * NEXT STAR REM Print li
ne of spiders
50 POSITION H1,0 PRINT CHR$(0) REM Her
oine's heart character
60 IF STRIG(0)=0 THEN GOTO 150
70 IF STICK(0)=15 THEN GOTO 60
80 IF STICK(0)=7 THEN IF H1<39 THEN H2
=H1+1:GOTO 110
90 IF STICK(0)=11 THEN IF H2>1 THEN H2
=H1-1:GOTO 110
100 GOTO 60
110 POSITION H1,0 PRINT  :REM ONE S
PACE
120 POSITION H2,0:? CHR$(0);:H1=H2
130 GOTO 60
140 REM Routine to throw mothball
150 FOR ROW=1 TO 22
160 POSITION H1,ROW PRINT CHR$(96)
170 FOR W=1 TO 10:NEXT W
180 POSITION H1,ROW ? "
190 NEXT ROW
200 SHOT=SHOT+1 IF SHOT=22 THEN POSITI
ON 15,10 PRINT"GAME OVER":END REM Enou
nt shots  Max 22
210 PRINT  REM Invisible cursor is now
 on bottom line, so this PRINT command
 scrolls the screen upwards one line
220 GOTO 50
```

Program II Spider attack game

The scenario involves a young lady who is frightened of spiders and must hurl mothballs at them to deter their inexorable advance The heroine is represented by a heart – CHR$(0) – at the top of the screen – yes I know it's sexist, but I couldn t find a macho symbol in the character set The mothball missiles are represented by the ball character – CHR$(96) The spiders are asterisks – a mutant variety with six legs

As the game starts our heroine is at the top centre of the screen and the line of spiders is near the bottom Use the joystick to move from side to side and the fire button to hurl a mothball If the missile hits a spider it will obliterate it but after every shot the abominable arachnids will advance one line up the screen Your task is to eliminate as many as possible before they reach the top line

Right how does it work? Line 20 turns off the cursor so that it doesn't interfere with the action Unless you do this the little white square will be zipping around all over the screen with every POSITION command it's still there of course, but the POKE command makes it invisible

Line 30 sets up the variables which will be used to control horizontal movement and to keep track of the number of shots Line 40 prints a row of nineteen asterisks near the bottom of the screen, and line 50 prints the heroine's heart character at top centre

Lines 60 to 130 read the joystick and move the heroine one space left or right using the technique we explained in Program I Line 60 checks to see if the fire button is pressed and if it is control passes straight to line 150 which handles the mothball movement

Since the mothballs have to move vertically down the screen, the horizontal co-ordinate remains constant and the vertical co ordinate increases according to the FOR NEXT loop which starts at line 150

As before, each move prints a blank space at the character s current location, then re prints the character at its new position

Line 200 keeps track of the number of mothballs thrown and ends the game when it reaches 22 The command END does precisely what you'd expect it to – it terminates pro

gram execution and returns control to you with a READY message

The clever bit is at line 210. This controls the spider's movement up screen using a command to PRINT nothing. It works because the invisible cursor must inevitably be on the bottom line after tracking a mothball all the way down screen. So any PRINT statement will now make the whole screenful of characters scroll upwards by one line.

This means that the heroine ascends into oblivion, of course, but the final jump to line 50 immediately restores her to her rightful position.

You might like to improve the game by adding sound to it. Try linking the pitch of a SOUND statement to one or more of the existing variables – for example

```
155 SOUND 0,ROW,10,8
```

or, for greater variation, make the pitch 10 times the value of *ROW* as in

```
155 SOUND 0,ROW*10,10,8
```

And don't forget to switch the sound off when you've finished with it

```
195 SOUND 0,0,0,0
```

So much for two-directional joystick movement. Now take a look at Program III, but don't bother typing it in. This one uses familiar techniques but allows you to move a character in any direction under joystick control.

It has to be a lot more complex since instead of just two directions there are now eight to worry about – up, down, right, left and four diagonals. And there must be a boundary check for each direction.

This leads to an annoying amount of repetition in the program, and each diagonal direction needs two separate lines of IF...THEN statements – one for the horizontal and the other for the vertical component. You'd be right in thinking that there must be a better way, and in fact there are several, but the one we'll look at just now is the subroutine.

This is a sort of mini program-within-a-program. It usually handles a clearly defined and self-contained task, especially if that task has to be executed more than once during the main program. It can be called at any point using the command GOSUB followed by the line number at which

```
10 REM PROGRAM 3: Cumbersome method fo
r 8-directional joystick control
20 H1=19 V1=11 REM Current Horizontal
and Vertical co-ordinates
30 H2=H1 V2=V1 REM New horizontal and
Vertical co-ordinates
40 POKE 752,1 : CHR$(125) REM Turn cur
sor off and clear screen
50 POSITION H1,V1 : CHR$(20)+REM Print
 ball at its starting position
60 S=STICK(0) REM Read position of joy
stick in port 1
70 IF S=15 THEN GOTO 60 REM Do nothing
 if stick centralised
80 REM Find next position for the ball
 to be printed
90 IF S=14 THEN IF V1>1 THEN V2=V1-1 G
OTO 210 REM Up only
100 IF S=6 THEN IF V1>1 THEN V2=V1-1
110 IF S=4 THEN IF H1<38 THEN H2=H1+1
GOTO 210 REM Diagonal up/right
120 IF S=7 THEN IF H1<38 THEN H2=H1+1
GOTO 210 REM Right only
130 IF S=5 THEN IF V1<22 THEN V2=V1+1
140 IF S=5 THEN IF H1<38 THEN H2=H1+1
GOTO 210 REM Diagonal down/right
150 IF S=13 THEN IF V1<22 THEN V2=V1+1
 REM Down only
160 IF S=9 THEN IF V1<22 THEN V2=V1+1
170 IF S=9 THEN IF H1>1 THEN H2=H1-1 G
OTO 210 REM Diagonal down/left
180 IF S=11 THEN IF H1>1 THEN H2=H1-1
REM Left only
190 IF S=10 THEN IF V1>1 THEN V2=V2-1
200 IF S=10 THEN IF H1>1 THEN H2=H2-1
REM Diagonal up/left
210 POSITION H1,V1 : CHR$(32) REM Eras
e old ball by printing a space over it
220 POSITION H2,V2 : CHR$(20) REM Prin
t ball at new co-ordinates
230 H1=H2 V1=V2 REM Update H1 and V1 r
eady for next cycle
240 GOTO 60  REM Next cycle
```

Program III: Cumbersome method for joystick control

your subroutine starts, for example

```
GOSUB 100
```

And as long as the subroutine ends with a RETURN command, Basic will automatically jump back to the next statement after its point of departure.

In the example below we have used a subroutine to produce a short bleep when you enter a value for either *X* or *Y* from the keyboard.

```
10 INPUT X:GOSUB 40
20 INPUT Y:GOSUB 40
30 GOTO 10
40 SOUND 0,100,10,8
50 FOR N=1 TO 40:NEXT N
60 SOUND 0,0,0,0:RETURN
```

Turn to Page 56 ▶

◀ *From Page 56*

After the first call (line 10) Basic will automatically go to line 20. After the second call (line 20) it will return to line 30. GOSUB is obviously a lot more versatile than GOTO, which can only ever jump to a single, fixed point in your program.

If there are any further statements on the line containing your GOSUB command, Basic will return to the next statement after GOSUB – unlike IF...THEN, it doesn't need to skip to the next line.

Note the GOTO 10 at line 30. Without this Basic would crash through into the subroutine section and, when it encountered the RETURN command, it wouldn't know where to go. You'd then get ERROR 16, indicating RETURN without a corresponding GOSUB.

Program IV shows how you can use subroutines to avoid much of the repetitive typing in Program III. There are four subroutines controlling movement up, down, right and left respectively, and each contains its own boundary check. If vertical upward movement is required we instruct the computer to GOSUB 220. To go left it's GOSUB 280, and to move diagonally up left we simply call both routines one after the other – GOSUB 220:GOSUB 280. Using this technique it's easy to move a character in any of the eight possible directions.

The code for our joystick control routine is now shorter and much easier to understand – compare lines 90 to 160 in Program IV with lines 90 to 200 in Program III.

Because the subroutines can be called more than once – from different places in the program – there's very little repetitive typing to do. You can write subroutines to handle any repetitive chores of this kind and they make the program structure more elegant.

● *Next month we'll demonstrate how you can move characters in eight directions without disturbing a background picture, and start to look at the use of colour in Graphics Modes 2 and 3.*

Until then try these routines and write some of your own. Remember, practice makes perfect.

```
10 REM PROGRAM 4: More elegant 8-way j
oystick control, using subroutines
20 H1=19:V1=11 REM Current Horizontal
and Vertical co-ordinates
30 H2=H1:V2=V1 REM New horizontal and
Vertical co-ordinates
40 POKE 752,1 ? CHR$(125) REM Turn cur
sor off and clear screen
50 POSITION H1,V1 ? CHR$(20) REM Print
 ball at its starting position
60 S=STICK(0) REM Read position of joy
stick in port 1
70 IF S=15 THEN GOTO 60 REM Do nothing
 if stick centralised
80 REM Find next position for the ball
 to be printed
90 IF S=14 THEN GOSUB 220:GOTO 170 REM
 Up only
100 IF S=6 THEN GOSUB 220:GOSUB 260:GO
TO 170 REM Up/right
110 IF S=7 THEN GOSUB 260:GOTO 170:REM
 Right only
120 IF S=5 THEN GOSUB 240:GOSUB 260:GO
TO 170 REM Down/right
130 IF S=13 THEN GOSUB 240:GOTO 170:RE
M Down only
140 IF S=9 THEN GOSUB 240:GOSUB 280:GO
TO 170 REM Down/left
150 IF S=11 THEN GOSUB 280:GOTO 170:RE
M Left only
160 IF S=10 THEN GOSUB 220:GOSUB 280:R
EM Up/left
170 POSITION H1,V1 ? CHR$(32) REM Erase
 old ball by printing a space over it
180 POSITION H2,V2 ? CHR$(20) REM Print
 ball at new co-ordinates
190 H1=H2:V1=V2 REM Update H1 and V1 r
eady for next cycle
200 GOTO 60
210 REM Subroutines start here
220 IF V1>1 THEN V2=V1-1 REM Prepare t
o move up, if there's room
230 RETURN
240 IF V1<22 THEN V2=V1+1 REM Prepare
to move down, if there's room
250 RETURN
260 IF H1<38 THEN H2=H1+1 REM Prepare
 to move right, if there's room
270 RETURN
280 IF H1>1 THEN H2=H1-1 REM Prepare t
o move left, if there's room
290 RETURN
```

Program IV Elegant joystick movement

Put in the boot when all else fails

JUST before Christmas I bought a 65XE system My first attempts with the micro have been quite frustrating to say the least, and I have several questions

Firstly, I have been experiencing great difficulty loading some of the games I get with the computer It appears that it is not sufficient to just simply type CLOAD What else do I have to do?

Is it possible to expand the micro's memory and what is the best disc drive to use with it? Finally, will old games like Drol and Conan the Barbarian run on my computer? – **A. White, Barnsley, South Yorkshire**

● Most of the tapes you got with your computer contain machine code programs You can't load these direct from Basic – so you must *BOOT* them You do this by holding the Start and Option keys down as you switch the micro on

You will hear a beep and at this point insert the tape and press Return Then just wait a while and the program will load

It is possible to upgrade the memory of your 65XE, but the 64k of memory it has is enough to run any software currently available

Any of the Atari disc drives will work with it although, at the moment there is a slight problem obtaining one Atari plans to release a new disc drive which should be available soon

Most games written for the old style micros – Atari 400 and 800 – will work on your XE system However some differences in operating systems between the new and old machines mean certain software will not work – but this is only a minority

Drol and Conan the Barbarian will work perfectly

Display width poke

I HAVE just bought a book for my Atari called Software for the XL There's a program in it called Omniopoly, and every time I try to type in the listing I get an error at line 605

When I list this line the end is always missing, and try as I may I can't get it to go in Can you please tell me how to enter this line? – **Derek Goring, Leeds**

● Before you attempt to enter the listing type POKE 82,0 followed by Return This will increase the width of the display and allow you to enter more characters per program line

Also use all possible abbreviations for commands – for example G for GOTO – and enter the line without any spaces as Basic will automatically insert them for you

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Saving with paint

COULD you please tell me if it is possible to save or print pictures from the Paint artist package? I have an Atari 130XE 1050 disc drive and 1025 printer

I have drawn some quite good pictures and it is most annoying to just switch off the system and lose them – **Michael Simons, Crowborough, East Sussex**

● You can save pictures created using Paint by entering the disc menu from the main menu and selecting Save File Enter the filename when prompted but make sure you have a Dos disc in the drive

In the January 1988 issue of *Atari User* there was a program to convert Paint picture files to a 62 sector uncompressed file and in the same issue there was also a utility to print the newly-converted picture on an Atari 1029 printer

Cartridge gadget

I OWN an Atari 130XE and 1050 disc drive and I am very happy with it except for one small problem concerning the cartridge socket

The way the system is located on my desk makes it very difficult to plug and unplug cartridges without having to move the computer

Apart from the annoyance at moving it I'm also worried about the wear and tear on the socket Would it be possible for your gadgets expert Len Golding to design something to overcome my problems? – **Robbie James, Warrington**

● Although it would be possible for Len to design such a gadget it could work out to be rather expensive and if any mistakes were made in its construction it could damage your computer quite badly So regretfully, it's a non starter

Recipe for success

IN the October 1987 issue of Atari User there was a letter from John Upton asking for information about astrology

Turn to Page 58 ▶

Boost for Atari comms

I FOUND the article on modems in the January issue very interesting It doesn't seem that long ago that it was almost impossible to buy a modem for an Atari

However, despite this improvement, we Atari owners for a long time were still lacking in communications software that would allow the use of teletext mode and support split baud rates

Part of the trouble was the Atari 850 interface box that was for a long time the only way of connecting anything to an Atari

Then Miracle Technology brought out its interface and cable and Multiviewterm software which allows the use of split baud rates and the viewdate modes

Now Atari users are not restricted to 300/300 bulletin boards and MicroLink/Telecom Gold and can now access Prestel and 1200/75 bulletin boards to their heart's content – **Peter Boulter via MicroLink**

◀ From Page 57

and cookery programs for the 8 bit Atari

I know of a couple of programs available on astrology one from The Catalog, 544 Second Street, San Francisco CA U S A and one from Astrocalc 67 Panscroft Road, Hemel Hempstead Herts HP3 8ER

A good cookbook/recipe program is available from New Horizons P O Box 180253, Austin, TX 78718 U S A It is called The Computer Gourmet and is very useful and informative – **R Luesser, Burnaby, Canada**

Sub hunting for errors

COULD you please tell me if there is anything missing from the listing of Sub Marine Hunter that appeared in the January 1988 issue of Atari User?

I am convinced I have entered it correctly, but when I play it I find that no score appears at the bottom of the screen – **M Fitzgerald, Darlaston, West Midlands.**

● The listing we published was complete and works perfectly Check the lines of data very carefully as a mistake there may not crash the game but could cause the wrong information or none at all to be displayed

£10 LETTER

The Melody lingers on

What a marvellous program Melody Maker by Bruce Woodland is (February 1988) I typed it in and have throughly enjoyed playing tunes on it ever since

However, as it stands it is not suitable for playing guitar music which needs a greater range of notes and a larger memory store – the third movement of Barrios' La Catedral needs 4125 bytes to store including its repeats

Also tunes are stored in files whose size is set by the variable CAP so a little jingle occupies the same size as a symphony

The following changes to the program will remedy these slight discrepancies

```
110 CAP=5000 REM MAX TUNE LE
NGTH
140 DIM KS(18),WHEF$(27),KSG
$(27)
150 DIM PICK$(28),SCALE$(27)
160 DIM TUNE$(CAP),TEMP$(255
),SIZE=0
520 KS$="BEEGAADCDEFGAADCDEEG
ABCDEFGAAB"
550 RESTORE 650 FOR A=1 TO 2
7
640 DATA 15,17,19,22,23,26,2
9,31,48,45,47,53,60,64
670 DATA 72,81,91,96,108,121
,128,144,162,182,193,217
805 ?" SIZE ",SIZE, F,CAP
3001 ? "OK to write ?  GET#
1,A IF A<>89 THEN RETURN
3002 ? CHR$(125)
3550 IF Y=10 OR Y=37 THEN Y=
Y-P
4120 IF Y=11<P THEN VOT=VOT+
10 OF$=0
4130 IF Y>13 THEN Z=USR(ADR(
5,WD+VOT,SCRN-OF$)
4210 B=T-P NOTE=ASC(SCALE$(B,
B))
4505 SIZE=Z+DUR
6165 SIZE=VAL(TEMP$(15,17))
SIZE=SIZE+125
7510 TEMP$=KS$(Y-P,Y-P)P=1
9505 CAP=5000 DIM TUNE$(CAP)
 TAB=ADR(TUNE$)
9355 TRAP 9460 OPEN#2,6,0,FN
$ INPUT#2,TEMP$ SIZE=VAL(TEM
P(15,17)) SIZE=SIZE+125 CLOS
E#2
9390 H=INT(SIZE/256) L=SIZE-
H*256
```

To avoid problems with the highest notes on the top staff being poked Into important memory you will find that they will not be shown but the correct note will be played

Well that's my part done, Does anyone know how we can introduce polyphony? Any ideas? – **M Holland, Lower Penn, South Staffordshire**

Customised screen

I HAVE just typed in the program to customise the default screen from the February issue of Atari User and checked it with Get it Right! The checksum for line 260 didn't match the one published

After creating an autoboot cassette I attempted to load it by holding down Start and switching the computer on, followed by Return When the tape stopped the screen had not changed and the computer had locked up

Can you please tell me what is wrong with the program? – **D Bill, Rednal, Birmingham**

● Unfortunately several bits of data were lost from the end of line 260 The line should read

```
240 DATA 240,8,201,135,240,4
,201,134,208,31,173,43,2,201
,32,176,24,205,16,7
```

Vintage month

MAY I congratulate you and all your staff for the excellent February issue of Atari User There was a superb variety of programs and articles which made this edition extraordinarily interesting and informative.

I was intrigued by the technique, exemplified by the Graphic Equaliser program, of reading the digitised values of cassette input

Even a book I have – Mapping the Atari – never gave me any hint of what the values of the registers signify So thanks for a superb and fun to use program

I have also been waiting a long time for a music playing program combining an on screen editor and getting Melody Maker In the same issue was a real bonus

May I also congratulate you on your excellent Get it Right! program, which has saved me a lifetime s speculation on what went wrong with my programs

More of the same, please – **Richard Martin, Acton, London**

In the February 1988 issue we published a letter from Martin Osborne of Hambleton who estimated the lack of software available for Atari users. Here is a selection from the responses we have received over the last few weeks.

Software shortage

WHY is it that 8 bit Atari owners always get left out when games like Out Run are released? I have written to many of the major software companies but to no avail

If games like Out Run and with the better machines have to sit out in the cold – **S White Barrow in Furness, Cumbria**

★ ★ ★

I AM in total agreement with Martin Osborne It seems that all of a sudden software houses have forsaken the 8 bit Atari computers for the new 16 bit ST

I visit Atari World in Manchester at least once a week and since early December there have only been three or four 8 bit releases – **L Griffiths Boarshaw, Middleton**

★ ★ ★

I AM also annoyed about the sad lack of software available for the 8 bit Atari In my home town of Barrow in Furness there are three computer shops One doesn't stock any games for the Atari and the other two keep very few and most of them are only £1 99 budget titles

I am certain plenty of Atari users would buy more games if they were readily available and of a higher quality than a lot of the present ones

It is quite frustrating that owners of computers like the Commodore and Spectrum have vast numbers of games when those of us

AFTER reading the February issue of Atari

with a question. Every month Gallup provides you with information of games sales which enables you to compile a chart of the top 20 selling Atari games. Could you please tell me which shops are polled by Gallup?

I live in London and yet in such a vast expanse of commercial retailing I still have problems finding Atari software.

I have been informed by its advert that Silica Shop is the UK's No 1 Atari specialist, but although it may have been, since its Tottenham Court Road branch started to sell other formats of computer games its supply of 8 bit Atari software and hardware has dwindled dramatically.

It does appear that even though software houses are producing games for the Atari there are no shops willing to retail them.

With this poor attitude from shops and certain software houses Atari computers are fighting an uphill battle. It would be a crying shame if the popularity of the machine was marred because of ignorance. – **Pierre Chenier, London**

● The Gallup chart is compiled from sales figures taken from various shops around the country. It may be that when the charts are compiled the shop that you mentioned was not polled.

* * *

A FRIEND told me that there are a lot of good Atari software titles in America that have not been released in England. Is this true, and why aren't they available to people in the UK? – **Glenn Wilkinson, North Preston, Lancashire**

● There are a lot of games and business programs available in America that haven't been released in the UK. Unfortunately a lot of UK software distributors believe that the market for 8 bit Atari software is dead, which is a mistake on their part.

We receive an incredible number of letters about this subject and we can see a long life for Atari 8 bit computers in the UK.

* * *

IN November I went to the Atari User Show at the Novotel in London. It was the best show that I have been to and I was pleased to see the amount of interest in Atari products.

Unfortunately there was a lack of new software for the 8 bit Atari and this was a great shame. There were a lot of people there looking for new games for their trusty 8 bits and it was a shame that they had to go away unhappy.

On a lighter theme, I was very pleased to see that Atari is supporting the new XE systems and I send my thanks to Bob Gleadow who has done a great job since he arrived at Atari.

I do hope that it will now release its old cartridge games again at a budget price as I think that they will sell very well.

At the show I saw the new Atari light gun for the XE games system. Will it work on my 130XE computer? – **Jackie O'Malley, Harrogate, North Yorkshire**

● The new light gun will work on your 130XE, but the only game currently available for it is Bug Hunt on rom cartridge.

In the February 1986 issue of *Atari User* we published a game written to work with the gun and this listing should show you the techniques needed to incorporate the gun into your own programs.

These are just a few of the letters rolling in highlighting the lack of software for 8 bit users. Perhaps if we moan often and long enough somebody will do something about it.

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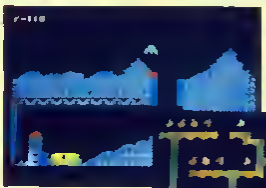
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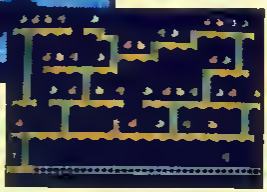
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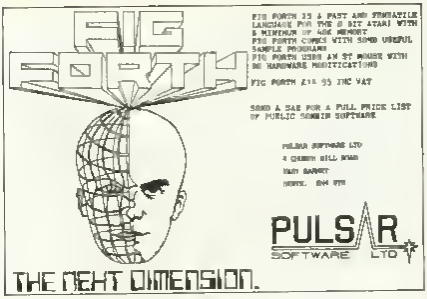
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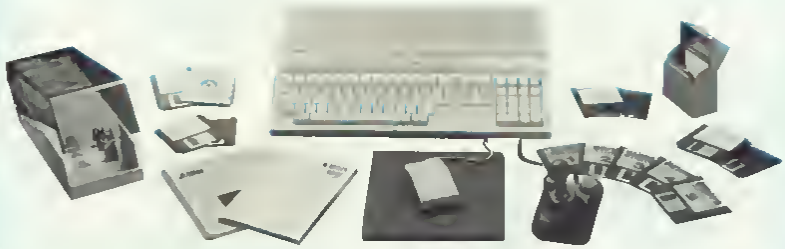
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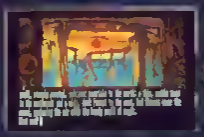
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