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ATARI USER



Explore the Atari's hidden secrets

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Atari denies 8 bit customers ignored

ATARI has denied that it is treating 8 bit customers as poor relations. The criticism was levelled against Atari during a poll of 100 users drawn equally from the ranks of 8000X and 1300X owners.

More than 80 felt the company had turned its back on the 8 bit machines in favour of the ST range.

Typical of the comments

was: "The arrival of the ST machines meant that Atari just doesn't want to know us any more. It is annoying when you think that although the ST may be the thing on the case, we rate up the case itself".

When the dissent began among 8 bit users was brought to the attention of Atari boss Max Bambridge, he was quick to give assurances that the complaints were unfounded.

However he did admit the publicity that has surrounded the arrival of the ST machines has tended to put the less powerful models in the shade.

Sensitive

"We are very sensitive to this", he told Atari User, "or to say so we want any of our customers to feel as though they are being treated any less fairly than others."

"The truth of the matter is that we are totally committed to

the 8 bit market - just as we are to the 16 bit".

Max Bambridge points to the launching of a new low cost colour monitor for the 1300X as being an example of the company's on-going support.

"It is our intention to see that the 1300X remains the leader in its own sector of the market", he said.

As part of this plan the Atari UK boss has pledged his support for companies wishing to develop projects for the 8 bit machines.

"We are eager to help anyone in this area, whether it be with the loan of development machines, programming tools or just advice", he said.

"That's how important the 8 bit market is to us".

ST TOOLBOX

A COMMAND line processor has been released for the 520ST by Paperlog.

Called the ST-Toolbox it is a productivity tool aimed at enhancing the machine's efficiency and performance.

It costs £29.95.

Backing for Atari projects

HALF a million pounds is available for projects for the Atari range. The man with the money awaiting investment is Barry Krite, managing director of DataStar Systems.

"I am prepared to invest in likely looking products, avoiding ones that may need a boost, or any which still may be at the idea stage", he says.

"As a nation we are notoriously good at ideas but terrible at putting them into practice - often through lack of capital".

DataStar Systems manufacture the Magic Modem. It was this project with its heavy development costs which set Barry Krite thinking about investing in his own personal venture capital fund.

Flounder

Remembering the problems he had, he said: "The machine have easy it could be even for an exceptional product to flounder if you did not have enough capital behind it."

"Really there is no one out there you can turn to if you do not have money available."

"That is why I decided to make the offer, not just for profit for myself, but to help the industry as a whole".



THIS Atari version of the Zaxxon robot has been launched by Intergalactic Robots. It is an educational model designed to teach users the fundamentals of robotics and can be used as a Logo turtle. It costs £119.95.

GAMES BOOM IS ON ITS WAY

THIS year will witness a massive increase in the amount of software available for the Atari 8 bit machines, the 8000X and 1300X.

An industry survey carried out by Atari User has revealed that the boom is already underway, with at least 100 new titles expected to come on to the market in the next few months.

More programs - and more outlets stocking them - should end the longstanding complaint by Atari 8 bit enthusiasts that software for their machines is often hard to find. There are two

main reasons for the brighter outlook.

One is the deal with High Street giants Clares and Currys which increased the 8000X user base by 100,000 in Christmas.

The second release here of a host of 8 bit titles from the United States.

Software Express distribution director Ken Howells told Atari User: "A lot of software companies have suddenly realised there is a big market for products for the Atari 8 bit range."

Firms that previously wouldn't have bothered to

convert their titles for the Atari are now doing so in increasing numbers and programmes all over the country are being snowed under with convenient wares.

"American software houses are flooding large numbers of their Atari 8 bit programs to British firms. Some are even opening their own offices over here."

"We are in the process of introducing 80 new titles to this country, many originating in the USA, and I expect that total to be easily doubled by releases from other companies."

Two or three new outlets a week are contacting us to order Atari programs. If any users have problems getting Atari 8 bit software these days they should change their retailer".

Distributor Microdeal reports that all its Atari 8 bit software is selling extremely well.

A spokeswoman said: "We carry six titles at the moment. Perhaps we should be handling more - there's obviously a big demand for them".

Shiva Shop is currently releasing 30 new products, many of them American imports for Atari 8 bit machines.



▶ Activate
▶ Atari's
▶ hidden
▶ depths
▶ of sound

STEPHEN WILLIAMSON invites
you to turn up the music

INSPIRED by years of listening to the electronic sounds of rock groups like Tangerine Dream and Pink Floyd, I have written a synthesizer program that activates the hidden depths of the Atari sound chip.

It may not be up to the standard of Jean-Michel Jarre, who uses electronic sound-generating equipment costing many thousands of pounds, but the program is certainly fun to play with.

For best results connect your Atari directly to your stereo system via the rear/monitor output and suitable leads. Alternatively use a television with an earphone output and connect this to your amplifier. Turn the volume up.

Fortunately, you don't have to know a great deal about music or even computers to operate the program and produce a wide variety of sound ranging from the melodious to the cacophonous.

To control the program I have written Atari's big brother, the ST. Well, I admit that the program is not quite as sophisticated as the ST, but the principle is the same. The joystick acts as a poor man's mouse. Each screen display presents a number of options. The joystick moves a cursor to the chosen option, and a press of the fire button activates that option.

This user-friendly approach is an ideal way for those unfamiliar with computers or the qwerty keyboard to operate the program. Inverse characters indicate that an option has been activated.

For example, go to the One Channel Sound page and you will find that the sound is present to a 64kHz main base clock and pure sound. To switch on other sound attributes the cursor can be positioned anywhere on the line where the chosen option appears.

The program will not allow you to switch on incompatible options. For instance, if you switch on Distortion 2 any other distortion option previously turned on will automatically be cancelled.

When the desired combination of sound attributes has been chosen place the cursor over the Play box and press the fire button. Control then passes to the middle two rows of the keyboard.

The display at the bottom of the sound pages shows how the musical

notes have been allocated to the keys in a similar way to the piano keyboard with the sharps positioned above the natural notes.

The realist style is true for the present sounds, but other sound options may give various degrees of realism.

To exit from the play mode press the Select key and a keyboard music key at the same time. To return to the main menu go to the Return key.

The ADSR section enables you to define a sound envelope. If you are unfamiliar with the ADSR envelope study Figure 1 which shows a graph of the sound envelope.

Attack is the time taken for a note to reach full volume and Decay the time taken to reach the Sustain Level. Sustain is a measure of how long the note stays at the sustain volume level before the release when it fades to silence.

When the cursor is over one of the ADSR labels at the bottom of the option menu and the fire button pressed the label will flash to prompt a keyboard input. For Attack, Decay, Sustain and Release, enter a value of between 1 and 255. If the number is less than three figures press the joystick button or the Return key to pass control of the program back to the joystick.

The Sustain Level requires a value of between 1 and 14 and only needs the joystick button or Return key to be pressed if a single figure is entered.

The program will not allow an invalid number to be entered in the ADSR envelope parameters. To demonstrate the ADSR sound envelope enter Attack 2, Decay 10, Sustain 40, Release 50 with a Sustain Level of 9 to produce a triple piano type sound.

To obtain a woodwind type sound try Attack 20, Decay 30, Sustain 50 and Release 50 with a Sustain Level of 8.

A snare drum type sound is made by setting the 844Hz clock (option 1), the 1.79 kHz clock (option 4) the Distortion 3 (option 8) and the 9 bit poly-counter (option 9), followed by Attack 5, Decay 5, Sustain 5, Release 10 and Sustain Level 8.

In order to understand what each of the program options does it is useful to know something about how the Atari sound chip functions. (For a more detailed introduction to the

subject see the May and June 1985 articles in Atari User by Pete Sibbey.)

In Basic there is just one command to control sound - called appropriately enough SOUND. As well as accelerating the sound system by means of this command it is possible to work directly on the sound registers which are found at addresses 53760 to 53768.

53760,53762,53764 and 53768 control the pitch of sound channels 0 to 3 and addresses 53761,53763,53765 and 53767 affect the distortion and volume for each sound channel.

For example, a sound can be switched on using a command such as SOUND 0,90,10,10 or alternatively the same sound can be achieved by POKE 53760,90 followed by POKE 53761,234.

In the program the play mode runs



Figure 1: The ADSR envelope

a machine code routine that detects which key has been pressed and allocates a pitch value which is stored in the sound channel 0 register at address 53760 and, in the case of the two channel sound, calculates a pitch value an octave less which is put in the sound channel 1 register at address 53762.

This routine also handles the timing and volume controls during the ADSR section.

Options 5 to 8 decide which distortion value is placed in the distortion and volume registers at address 53761 - if the two channel mode is chosen a similar distortion and volume value is placed in address 53763.

Address 53768 is known as AUDCTL and affects the sound channels in ways that cannot be accessed directly from Basic. Options 1 to 4 and option 9 change the value contained in this address to give various effects.

Normally the Atari sound is

generated using a 844Hz system. The lower the frequency of the clock, the lower the note that results. Therefore lowering the 844Hz clock is 16kHz by choosing option 2 changes AUDCTL to give notes of a lower pitch.

The 1.79kHz clock (option 4) gives notes of a very high frequency.

The high bandpass filter (option 3) filters out lower frequency sound to give a higher tone.

During the distortion options (5 to 8) the distortion effect is achieved by something known as a poly-counter which merges random waveforms with pure sounds.

The value of the poly-counter affects the speed of these waveforms. Normally the Atari is set to a 17 bit poly-counter.

To see this in operation, switch on distortion number 3 in the One

Channel mode, but without the 9 bit poly-counter. Enter the Play mode and press Key L.

Exit from the Play mode and switch on the 9 bit poly-counter. Again press key L in the Play mode and you will notice how the change of poly-counter speed affects the distorted sound.

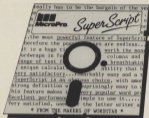
Of course when using pure sound the 9 bit poly-counter has no effect, and in other distortion and poly-counter combinations, the change may be difficult to detect.

Option 10, Repeat, is used only during the ADSR section and, as the name implies, causes notes to be repeated rapidly.

The best way to use a program like this is to experiment and see what you can find among the Atari's vast range of sounds. Have fun, but spare a thought for your neighbours.

Peter: The program will not run on a 16K machine.

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Have fun with the Nurds

WHIRLWINDS is one of the latest releases from US Gold, who have a reputation for quality Atari software. This is no exception.

The plot behind the game is that the four Nurd brothers have run out of food and decide to raid their friend's house, a green grocer called Squash.

He is on holiday and has boobytrapped his house and the Nurds have to avoid the traps and eat all the food.

Whirlwinds is basically a game of exploring rooms, avoiding traps and getting prizes. It may sound all too familiar but is in fact significantly different from other such games.

It is far one to four players who can work individually or as teams.

It consists of 50 rooms, each with a different set of problems or traps. You can start at the beginning of any block of 10 rooms by entering A-E at the start.

However the last 10 rooms are known as the Ultimate Feast and can only be entered by means of a password. This is gleaned in four parts by completing each of the previous groups of 10 rooms and is not easy.

Each room covers an area equivalent to about six screens, and the area shown on the screen scrolls very smoothly as you approach the edge.

You can imagine 50 rooms like this mean that the game is big and will not be exhausted quickly.

Your man is a Nurd, a squat plump figure with a stupid grin and a propeller stuck out of his head.

The four players are known respectively as Haymish Papkin, Naghas Yertz, Hoosahy Nurd and Ikelvin Lugly. They are identical apart from the colour of their skins.

The control of your Nurd is quite novel. When walking it's standard — he will walk left when the joystick is pushed left and right when the joystick is pushed right. However



when the trigger is pressed the propeller starts to rotate and your Nurd will begin to rise.

If you release the trigger or if he hits a wall or platform he will begin to descend slowly and will not rise again until he has had his feet on firm ground.

He does have an emergency super-lean which can be obtained by pushing the stick up. This is called a retro-boost.

You get only one leap per screen or life and here lies a small problem.

It is far too easy to accidentally use this leap in the excitement of play and jump straight into disaster or

at the least be deprived of it for later use.

Your man is manoeuvred around the room collecting food, strange creatures, Nurds — they eat anything from plants to light bulbs and bicycles.

The walls, platforms and floors are safe to land on or bump into, but anything flashing is deadly.

These hazards are excellent named and include sissy snakes, bug eyes, jump bugs, gobs, apocrits and the Nagpe of Death.

In addition there are keys which can be used to unlock closed off areas of the rooms, but beware — they can also

unlock further hazards. Small boxes in the floor known as blast squares will give you the same effect as a super leap, but also use up your ability to perform these at will.

The graphics are very good, if not spectacular especially the Nurds. They turn slowly in a 3D effect as changing direction.

The sound effects are also good and add considerably to the feel of the game.

The background music especially adds to the excitement. As the time limit for each team runs out the music gradually quickens, instilling a sense of urgency in your play.

There is also a second level in which the rooms are invisible, except for the flashing obstacles. The Nurd has a torch illuminating only a small area around him.

Whirlwinds is certainly well worth the price of £9.95, or £10.95 on disc. It is novel and has a definite goal to achieve which I feel always keeps a game's interest alive.

I certainly don't think I'll tire of this quickly.

Some of the rooms are extremely difficult and will keep even the most experienced player occupied.

Mike Rowe

Living dangerously in the city

YOU don't come across many fantasy role-playing games for home computers, and I don't class adventures as being in that category, so when one appears on the scene it's well worth taking a closer look at.

Alternate Reality is such a game and is the best of its kind I've seen. It has excellent graphics, bags of action and options and uses visuals to good effect.

You've been kidnapped by aliens and dumped in a room with only one exit. At the start you are presented with a view of the exit gate through which the impressive city of Xabac's

Gardies can be seen.

Search me who Xabac was, but since he's described as deceased you can draw your own conclusions about the city's safety.

Near the gate, which is itself barred by a force field, are a collection of recording numbers. These relate to your individual characteristics — strength, intelligence, stamina, charm, wealth, wisdom, skill and hit points.

As you pass through the gate the numbers freeze and these values then determine your character's attributes. The higher the numbers, the better your chances.

The aim is to explore the city, increase the value of your attributes and above all survive.

During the first few days (game time) you are very

vulnerable to foul play as most take care to build up your qualities gradually.

Details of your status can be called up by pressing the Select key at any time. Movement through the maze-like site is controlled by joystick or keyboard.

All other commands, mostly single characters, are entered through the keyboard.

Your current position in the city is shown in the top half of the screen, the lower portion being reserved for commands, options and status text.

Much of the city consists of walled avenues. Closer inspection of any wall may reveal the entrance to a building or even a secret passage.

When you enter a building the screen changes to show a three picture, often animated, of the building's inhabitants and interior.

There are many buildings in the city. Some are for your rest and recuperation, like after lodgings and give time and care information.

Taverns, whose menus change hourly, sell food and drink. Alcohol, as you'd expect, should be taken in moderation. Get drunk and your movements will be inhibited - you may even black out.

Sometimes, easily detected by the sound of an axel being struck, provide weapons. Prices and quality may vary and you'll almost certainly need to haggle.

You can earn interest on your money by leaving it in a bank and can exchange gems for cash. Shops sell a variety of clothes and goods, mostly ornamental. If you become ill or wounded visit a healer.

Weapons can be magical (magical or cursed) or just normal, and can be found or purchased. If you want to rid yourself of a cursed weapon try a Guild.

There are many life forms in the city. Guards, gladiators, merchants, clerics, magicians, assassins and bums are just a few. All have their own specialities.

The novel is reported to be the legendary Night Blaster, an extremely powerful creature of the night.

Encounters are common



and take one of five forms - you surprise a life form, it surprises you, you see each other at the same time, it sees you first or you see it first.

At an encounter you are either engaged or disengaged. Engaged means you do battle and options include lunge, attack, parry and break attack.

If disengaged you may try less violent means - charm or trick an opponent, for example. The size of magic cannot be

ruled out either.

Other hazards include being poisoned from a variety of sources - like being cursed by a poisonous creature, and catching a disease - such as contact with bacterial spores of meat.

Persons can be acquired and take four forms: benign, advantageous, disadvantageous and dangerous. Each can be opened, examined for colour, sipped and used. All

text is presented in side English type script and musical effects are used throughout the game. Both add to the atmosphere while the latter can hold clues - the songs played in the tavern often provide important hints.

The city is intended to be just the first in a linked series, and since you can save and later reload your character, this means you can retain any character for use in later releases. Future additions include the dungeon, wilderness, areas and places.

The game plays a bit slowly, mainly because it has to make so many accesses to the disc during play (the program and data is spread across four sides of two discs).

That apart, it is very enjoyable. The atmospheric detail and presentation, the wide variety of content and the planned expansion route make *Spellbreaker* an excellent buy at £79.95.

Bob Chappell

Spellbreaker's something

ONCE upon a time when I was but a mere apprentice necromancer to whom the word 'god' meant nothing, I had the good fortune to tread the soil Warwick felt.

He was an ambitious wizard, aspiring somewhat immediately to rule the world. I managed to frustrate his little game, my inexperience succumbing where others more learned had failed.

For my efforts I was admitted to the famed Circle of Enchanters and regarded as second only to the great Bellon.

Then Bellon himself landed in the next town and I had my work cut out trying to rescue him from the clutches of the odious Jester. That's how I came to be where I am today, top dog of the Circle of Enchanters.

Having thus completed those two superb infomags *Enchanted* and *Spellbreaker* (rated as standard and advanced level), it was

with anticipated pleasure and a touch of amazement that I took delivery of the third in the Enchanter trilogy, *Spellbreaker*.

Those obliging people at Software Express valued their magic wand and sent a review copy of *Spellbreaker* winging towards me as soon as it arrived in the UK.

Removing the usual gloss and handsome box from the sturdy packaging the eyes fell on two words which gave the old ego pause for thought - *Expanded*.

Spellbreaker begins in the usual chamber of Sorghus where the Guildmasters are up in arms. You stand at the edge of the gathering, listening to the complaints.

Snaffle the baker means that he now has to make his butter pasties by hand. His usual method of casting a *Glush* spell to fold the pastry 50 times is no longer reliable.

Horribly the Brewer grumbles that his spells are

not working either and as a result he's getting plenty flummoxed liquid from his cats and the beer tastes like gums have been bathing in it.

Geometric the hatterman sees wild animals are over-running the town. The Friggle spell no longer keeps the animals outside the boundaries and only recently one of his men was attacked by a troop of rat ants.

The Guild think the Circle of Enchanters have a lot to answer for and many eyes turn contemptuously on you.

And the poet starts to speak about magic rhyming and spelling aids when, in the midst of his splendid persuasion, just as he's skimming out a mythological allusion in iambic hexameter, he turns green (well, greener than usual). His chain elongates, his skin slimes up and he promptly turns into a newt.

He's not alone - all the Guild have turned into frogs, salamanders or other amphibio-

The ST deserves better graphics

LANDS of Haze was one of the first graphics games out for the ST. Not surprising though, as it is a translation of a program for the Sinclair QL, which uses a cut-down version of the 88000 microprocessor in your ST.

This is a graphics adventure game boasting over 2000 screens. The theme is laid out in a small, attractively printed booklet.

The land of Haze, which was cursed for by a heretic magician, High Wizard, has been turned into an evil land, Haze, by the Dark Lords.

You play the role of Sator, half man - half reptile and have to find your way around Haze following clues and instructions left by the

magician. The program is well packaged in a sturdy box which also contains nine colour maps.

The game starts by writing out the line press these maps over in a random pattern and you file out the maze in the same pattern.

Each map covers nine screens giving a total of 81 screens to explore in the opening section.

The screens are similar, consisting of passages and junctions separated by walls.

The walls in each screen are always made up of the same blocks of graphics characters in one colour only.

However they vary from screen to screen and are effectively detailed. The pas-



sages are colonised by various creatures including skeletons and ghosts who try to attack you, sapping your energy or capture.

You have a gambit on only fire horizontally. The creatures move smoothly and are vividly animated but unfortunately Sator flickers badly. In this

part of the game you must find the entrance to the following part by collecting or locating various items in a specific order.

Instructions are given as you go along after finding the first item, the Book of Change, which is the most difficult to spot.

As you find objects the creatures chasing you get faster and more deadly.

After the first ST screens are completed you are transported to the underground caverns, the Lair of the Trolls.

The graphics and game is similar except that the walls are all in one colour.

Here you must collect fire tokens and then touch the portal to the next section.

By now the creatures are even faster and are difficult to avoid.

The maze of corridors is challenging, as you can often see where you want to go but may have to retrace many rooms in a round-about fashion to get there. I suggest you make a map as you go along.

On completing this task you enter the base of The Dark Lords. This is similar to the last section except more difficult still.

You are told that here you must destroy the Lords by touching all nine of them in turn - your gun has no effect on them.

This is as far as I have been able to reach. The game is obviously considerably larger because when killed off I was told that I had only completed 8.5 per cent of the adventure, even at this stage.

Overall the program is somewhat disappointing considering the capabilities of the ST. Graphics are mediocre, sound consists of occasional hisses although the music is good. The flickering is not really good enough.

On the plus side the plot is good, and it is quite playable, but with little variety.

At £19.95 it is a good value.

Having said the game was a slight let down, I did have the urge for one more go to get further on - this is often the sign of a game with lasting appeal.

of a spellbinder

tain. All except you - and one other, a shadowy figure in a dark cloak who slips out of the door. You pursue him to the town square where he disappears, engulfed in a cloud of orange smoke, leaving behind (since the amber fog has dispersed) nothing but a featureless white cube.

And so the battle of good against evil begins. Magic is going awry. It is your task to get to the root of this paralyzing blight that threatens to destroy the kingdom.

Your journey will take you to strange places where you'll meet even stranger beings.

Among the earlier difficulties you'll encounter is a tall, unfeeling ogreoid whose mismatched body forms a huge loop through three tunnels of a cave.

Another is a beautifully detailed mountain ogre. He has brilliant purple carabuncles and hair matted down with something slick and pungent.

Watch out for a rod the

size of an elephant whose hatching egg is itself as big as a small wagon.

As well as a knife and magic burlin engraving tool, you also start out with your indispensable book of re-usable spells.

Other spells can be added to the book by finding spell scrolls, of which there are many scattered around the kingdom, and then writing them into the book by using the special Quartz spell.

Some spell scrolls are too powerful to be written in the book. These spells can be used directly from the scroll but will only work once.

If you've played Enchanter or Sorcerer you'll be familiar with casting such spells as Yomic (level grab), Reviv (Open a locked or enchanted object), Prot (give light from an object) and Malvov (charm).

There are plenty of new ones here - how about Casky, Thrax and Gargol.

This is Infocom's fifth

adventure and the standard remains as high as ever - just how many companies can you recall that have produced almost a score of first-rate pieces of software in a row?

You've even added a new command to their already sophisticated games.

If you type in a sentence with one word wrong, for example "Put the pistol outw in the green box" you can correct yourself simply by making your next command OOPS word (Oops cubed). This saves you typing in a long sentence all over again.

A gripping story, huge vocabulary - over 800 words - vivid descriptive prose, tantalizing puzzles and delightful humour, in a word, Spellbinder.

Don't hang about - Repro your cassette. Malvov those legs down to the nearest phone and order Spellbinder from Software Express or your local dealer now.

Bob Chappell

Mike Rowe

Comp



This month's best

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THE Adrian Mole Industry that has grown up around the Sue Townsend books was certain to spawn a computer game.

The Secret Diary of Adrian Mole arrived from Mosaic Publishing on tape for the Atari 486 range with a dog's head toothbrush and shaving kit depicted on the cover, accompanying the rather more impressive credentials of Level 9 as the programmers.

The blurb to the game is predictably in Mole-ese, something I will try to avoid. It comes in four parts and you have to assist Adrian in his quest to become more popular.

The Mole with a personality crisis?

By Brillig

Alternatively, as the game suggests, you could try to become as unpopular as possible.

Each chunk of game covers three months of the unfortunate Mole's life. You are presented with a scolding diary in the normal Level 9 text fashion, below the now obligatory graphics.

Occasionally you are asked to select a course of action for Adrian to follow from the three or four provided. Sometimes you are given a percentage before and a comment as to your status.

And that is about all that does happen. It is a shame that such a good idea has been wasted.

The text is excellent not only, as you would expect from the best selling books, but also from the extra text added by Pete Austin.

But the graphic screen at the top

adds nothing to the atmosphere of the game, and yet its very existence results in the increased requirement of the "Press any key to continue" prompt which dogged my progress throughout.

The scoring routine adds little either, firstly because the remarks are rather wearing once into the second half of the year, and secondly because as it appears as a prompt during the diary you can not see how your actions are affecting the score.

I must stress that at times the game did make me laugh at the antics of Master Mole. The beauty of the books, however, was that the themes were developed throughout, with suitable hilarious incidents woven around them. In the game the themes such as Mrs Mole leaving home and the red socks episode become small incidents that suddenly happen. The

Help!

I've had some appeals for help.

Craig Pippard offers his maps of Woodstock Castle, Zork 4, Colossal Adventure and Feasibility Experiment. Quite a mixed bunch there and although we offer no prizes for such contributions, they are most welcome. Craig is trying to repair the damage to Feasibility Experiment and wonders whether anyone else can help him.

S. Garing has gone as better and sent his map of Colossal. However, this does not include the 70 location and game of Level 9 as it was taken from a DEC machine.

The map is detailed and well drawn - obviously the culmination



of several months' lunch breaks.

Compass directions are deeply noted for reference, a point often neglected by adventurers when they play but regretted when they return to the game several weeks later.

Given that I would like some hints on *Warden's Quest*, I don't not know it was available on the Atari.

but diligent research has discovered you need to stop the master to prevent the sinking feeling, a public kind of accolade is called for to get through the waterfalls and there is a place where you can *NO* the aqueduct to stop showing.



books years in the first person and secreted because everyone who read them identified with and, to an extent, became Adrian Mole.

The game is purely an exercise in route finding through a series of set pieces, and the player becomes essentially a reader, without the benefit of real inventiveness.

Often just as I was getting into a route which appeared to be entertaining, up would come a screen full of text and the game would change direction once again.

I think this is a great shame. We saw what can happen to a comedy classic in Hitchiker's Guide to the Galaxy. The Secret Diary of Adrian Mole had the same potential. Unfortunately it seems to be left peering contemptuously at itself in the bathroom mirror.

■ Next month I hope to review a load of new adventures released at the Atari Show, as well as seeing what is new and exciting in the world of Atari.

Glitches of the Month:

Glitch of the Month brings two similar problems in different Level 9 games.

As in Morden's Quest breathing underwater features in both Red Moon and Adventure Quest. In the latter S. Watson points out that if you cross the river with nothing, go to the shelf, get the fish, enable your breathing and return to the river you no longer need go through the process of getting

and dropping the fish to be able to breath in different environments.

S. Cullen has found in Red Moon that once you have the pipes and helmet you can wander for miles underwater without ever having to fix the pipes or worry about them being too short.

Thank you folks, your T shirts are in the post. Met me the T shirt for Geoffrey McHugh, who supplied our December Glitch. Sorry but we've lost your address in the editorial maze, if you contact the office all can be resolved.

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BASIC COMPILER

Part Two of the series by FRANK O'DWYER that helps you speed up your programs

HERE is the second part of the Basic compiler program — the compiler library. You should type it in using the Atari assembler/editor cartridge or compatible assembler, and save it on a cassette by itself.

This cassette, and the one containing the compiler program given last month, will be required every time you compile a program.

You don't really know enough about the compiler to begin to write and compile your own programs yet, so for now let's try to compile the Basic program given as Program 1.

This is simply a demonstration program — don't worry about how it works for now. It produces random sounds and patterns until a key is pressed. An equivalent program, written in Atari Basic, is given as Program 11. You can type this in to compare the speed of Atari Basic with Compiler Basic.

Compilation is essentially a three stage process. First you create your program — this is called editing. Then comes compilation, where the program is translated from Basic into Assembly language. Finally comes assembly and execution. Here you assemble the program and run it. If at any stage you make a mistake you must go back to stage one.

Let's go through the three stages with the example, Program 11.

■ Editing

For this you will need a text editor. If you are using the Atari assembler cartridge this is no problem since one is included in the cartridge. If using some other assembler program then you can probably use its text editor for this purpose. If not you will have to beg, borrow or steal a text editor from somewhere.

Type in your program using the text editor — the NUM command of the Atari assembler/editor cartridge can be used to supply automatic line numbering. Type in Program 11 in this way, making sure you have the assembler cartridge plugged in since Atari Basic will reject Compiler Basic with syntax errors.

Type in the program as given. Note that the compiler does not recognize abbreviations such as POS for POSITION and P for PRINT. When sure you have typed the program correctly save it on its own cassette.

Use the USTBC command of the

assembler cartridge. This saves the program in ASCII character form on the cassette and is the only form the compiler will recognise — so if you are using an assembler other than the Atari version you must use an equivalent command. The cassette you have just made will now be referred to as the source program or source file.

■ Compiling

Plug in the Basic cartridge and load the compiler program given last month. Now insert the cassette containing the source program. Don't forget to rewind the tape. RUN the compiler which will prompt you for the source file name. The correct response is C for cassette. Press Play on the cassette drive, and Return on the computer as if you were loading a program.

You should see Program 11 being listed out on the screen and the compiler will prompt you for the start address of the Assembly language. The answer to this is really up to you, but I suggest 14336 for this example which is the address of the last 2K on a 16K Atari.

Now you will be prompted for the start line number for the Assembly language — almost any number greater than 1000 will do here, so just enter 1000 for now. Almost invariably you will enter 1000 in response to this question — other responses are only required if you want to have more than one compiled program share the same compiler library, and this is a topic which I will return to in a later article.

The next question to answer is the filename for the Assembly language. Assuming you are using cassette, the correct answer is C. Before you respond you should insert a cassette ready to take the program which the compiler is about to generate. Press Play and Record on the cassette, then Return when you hear the two beeps.

The compiler will display each line number as it is compiled, and will finish by telling you how many errors it discovered in your program. If there were none you can proceed to the next step. If there were errors then you must go back to stage one.

■ Assembly

Insert the assembler cartridge and rewind the cassette you have just made. Type ENTERBC to load the

Assembly language. Now insert the cassette with the compiler library on it, and merge it with what you have already using ENTER+C.M.

If all has gone well you now have one large assembly language program equivalent to the Basic program you originally entered. You must assemble this program and since it is likely to be large, you should do so directly to cassette using ASM_4C. This produces yet another cassette file.

Before telling you how to execute your program, I must draw your attention to a problem with the ASM_4C contained in the Atari cartridge. It falls down badly when files are long.

Since the assembler is quite slow in this circumstance a long leader is formed on the tape if the cartridge is left to its own devices (the leader is the jone you hear prior to a tape file being loaded or saved).

Press Pause on the tape drive, and Del-1 on the computer which freezes the listing.

After a minute or two the cursor disappears, and you disengage the Pause on the tape drive, and press Del-1 so that the listing begins to appear on the screen. You can now leave the computer to get on with the assembly. Any errors mean that you must go back to the first step.

After the assembly process you are left with a cassette containing the machine code bytes for your program. Typically this exceeds for 2k of machine language and so I recommend 14338 as the start address of the Assembly language.

Once you have chosen this address you are stuck with it and you must poke the bytes for the machine language to this location in memory since it will not run properly if it is placed anywhere else in memory — it is what is known as position-dependent code or non-relocatable code.

The problem you are faced with now is how to get the bytes from the cassette into memory. Below is a

```

1000 REM COMPILER COPY
1010 CLOSE #4:OPEN #4,13,3,"B":USH SHW#4:CS 3-11
1020 G=0:POKE 704,255:FOR CLEAR ANY GRAPHICS
1030 F=32768:GOTO:USH RANDOM NUMBER BETWEEN 0 AND 100
1040 POKE G+F,32768+RANDOM POKE RANDOM #770 TO SCREEN STOP:PA
1050 GING R:FOR R TO 5:FOR CYCLE THROUGH SOUND CHANNELS
1060 SOUND R,32768,16,8:FOR RANDOM PITCH
1070 NEXT R
1080 IF 7044+255 THEN GOTO 1000:END:FOR LOOP BACK IF NO KEY PRESSED
1090 GING R:FOR R TO 5:FOR SILENCE SOUND CHANNELS
1100 SOUND R,A,A,A,A
1110 NEXT R
1120 GND
    
```

Program 11: Compiler demo program

```

1000 CLOSE #4:OPEN #4,13,3,"B":*REM ON
1010 *EMPTY GRAPHICS 3:PA
1020 G=POKE 0:G+256:FOR 0:G+256:POKE 0:G+256,704,
255
1030 F=32768:GOTO:USH
1040 POKE G+F,POKE 0:G+256
1050 FOR G=0 TO 1
1060 *RANDOM R,POKE 0:G+256+R,0,R
1070 NEXT R
1080 IF POKE 0:G+256 THEN GOTO 1000
1090 FOR G=0 TO 1
1100 *RANDOM R,A,A,A,A
1110 NEXT R
1120 GND
    
```

Program 12: Copying Atari Basic to Program 11

short Atari Basic program which will do the trick (Program 12).

To use this routine insert the cassette with the machine language and press Play on the tape drive. Run the program, and press Return when you hear the beep. Let the program run until it comes up with Error 136. This means, somewhat conveniently, that the program was successfully loaded.

Do not press System Reset since

this will wipe the machine language program from memory.

To invoke the machine language type X=USR(14338) in the case of the example, Program 11. You should now hear random sound and see random patterns on a Graphics 3 screen. When you are tired of this, press any key, and you will be returned to Basic. You can return to the machine language any time — provided you don't reset the machine — by typing X=USR(14338).

■ That's how to use the compiler. Next month I will discuss the features of the Compiler language and begin to explain how you can write your own programs in Compiler Basic.

```

90 CLOSE #4: OPEN #4,A,B,"C:"
95 FOR N=1 TO 5:GET #1,C: NEXT N
98 POKE 108,48: GRAPHICS 0: REM RESERVE SOME
MEMORY FOR PROGRAM
99 FOR A=14338 TO 16384: GET #1,C: POKE A,C: NEXT A
    
```

Program 13: Putting the bytes into memory

Listing overleaf

0074 0L 100 0-1,1	0021 00 0101	0068 10	0004 00 0001,1
0075 0A 0-1,1	0022 00 010	0069 10A 100	0005 100 00 100
0076 00 01	0023 000100 100 01	0070 100 0001	0006 000 01 000
0077 000 0L	0024 010 00	0071 010 0	0007 100
0078 100 0001	0025 000 01	0072 010 000	0008 100 000
0079 010 1	0026 010 00	0073 010 000	0009 000 010 00
0080 100 00010	0027 010	0074 010 000	0010 000 100 00
0081 010 101	0028 010000 100 00	0075 010 100 0,1	0011 000 000
0082 100	0029 100 01	0076 010 0100,1	0012 100
0083 1 0000 0	0030 000 01	0077 00	0013 000
0084 0 0010 "1,1,1,0,1,1,1,1,1"	0031 010 000,1	0078 00	0014 000 000
0085 1011 100 000	0032 010	0079 00	0015 100 000
0086 0L 100 0-1,1	0033 000 0	0080 00	0016 100
0087 010 0-1,2	0034 000 01	0081 00	0017 100
0088 000	0035 010 000,1	0082 00	0018 100
0089 000 0L	0036 010	0083 00	0019 100
0090 100 1	0037 0000 010 10100	0084 00	0020 100 000
0091 010 000	0038 100 01	0085 010	0021 100 000
0092 010 101	0039 010 1010	0086 010 000	0022 100 010
0093 010 00010	0040 100 01	0087 010 00	0023 100 010
0094 010	0041 000 0	0088 010 00	0024 100 010
0095 0000 100 000,1	0042 100	0089 010 00	0025 100 010
0096 010 01	0043 100 01	0090 010 00	0026 100 010
0097 100	0044 000 0	0091 010 00	0027 100 010
0098 010 010	0045 000 0	0092 010 00	0028 100 010
0099 010	0046 000 0	0093 010 00	0029 100 010
0100 0000 100 000,1	0047 000 0	0094 010 00	0030 100 010
0101 100	0048 000 0	0095 010 00	0031 100 010
0102 000	0049 000 0	0096 010 00	0032 100 010
0103 100 001,1	0050 000 01	0097 010 00	0033 100 010
0104 010 010	0051 010 000,1	0098 010 00	0034 100 010
0105 010 01	0052 010	0099 010 00	0035 100 010
0106 001	0053 00000 010	0100 010 00	0036 100 010
0107 010	0054 010 000	0101 010 00	0037 100 010
0108 001	0055 010	0102 010 00	0038 100 010
0109 000 100 01	0056 010 0001	0103 010 00	0039 100 010
0110 010 001,1	0057 010 000	0104 010 00	0040 100 010
0111 010 01	0058 010 0001	0105 010 00	0041 100 010
0112 001	0059 010 000	0106 010 00	0042 100 010
0113 000 100 01	0060 010 00	0107 010 00	0043 100 010
0114 010 001,1	0061 010 000	0108 010 00	0044 100 010
0115 100 010	0062 010 000	0109 010 00	0045 100 010
0116 001	0063 000 000	0110 010 00	0046 100 010
0117 010 001,1	0064 010 00	0111 010 00	0047 100 010
0118 010	0065 000 000	0112 010 00	0048 100 010
0119 000 100 01	0066 010 00	0113 010 00	0049 100 010
0120 010 010	0067 010 00	0114 010 00	0050 100 010
0121 010	0068 010 00	0115 010 00	0051 100 010
0122 101 100 0,1	0069 010 00	0116 010 00	0052 100 010
0123 010 01	0070 010 00	0117 010 00	0053 100 010
0124 010 01	0071 010 00	0118 010 00	0054 100 010
0125 010 010	0072 010 00	0119 010 00	0055 100 010
0126 010 010	0073 010 00	0120 010 00	0056 100 010
0127 010	0074 010 00	0121 010 00	0057 100 010
0128 001000 010 010	0075 010 00	0122 010 00	0058 100 010
0129 010 010	0076 010 00	0123 010 00	0059 100 010
0130 010 010	0077 010 00	0124 010 00	0060 100 010
0131 010 010	0078 010 00	0125 010 00	0061 100 010
0132 101 100 0,1	0079 010 00	0126 010 00	0062 100 010
0133 010 01	0080 010 00	0127 010 00	0063 100 010
0134 010 010	0081 010 00	0128 010 00	0064 100 010
0135 010 010	0082 010 00	0129 010 00	0065 100 010
0136 010 010	0083 010 00	0130 010 00	0066 100 010
0137 010	0084 010 00	0131 010 00	0067 100 010
0138 001000 010 010	0085 010 00	0132 010 00	0068 100 010
0139 010 010	0086 010 00	0133 010 00	0069 100 010
0140 010	0087 010 00	0134 010 00	0070 100 010
0141 010 010	0088 010 00	0135 010 00	0071 100 010
0142 101 100 0,1	0089 010 00	0136 010 00	0072 100 010
0143 010 01	0090 010 00	0137 010 00	0073 100 010
0144 010 010	0091 010 00	0138 010 00	0074 100 010
0145 010 010	0092 010 00	0139 010 00	0075 100 010
0146 010 010	0093 010 00	0140 010 00	0076 100 010
0147 010	0094 010 00	0141 010 00	0077 100 010
0148 001000 010 010	0095 010 00	0142 010 00	0078 100 010
0149 010 010	0096 010 00	0143 010 00	0079 100 010
0150 010	0097 010 00	0144 010 00	0080 100 010
0151 010 010	0098 010 00	0145 010 00	0081 100 010
0152 101 100 0,1	0099 010 00	0146 010 00	0082 100 010
0153 010 01	0100 010 00	0147 010 00	0083 100 010
0154 010 010	0101 010 00	0148 010 00	0084 100 010
0155 010 010	0102 010 00	0149 010 00	0085 100 010
0156 010 010	0103 010 00	0150 010 00	0086 100 010
0157 010	0104 010 00	0151 010 00	0087 100 010
0158 001000 010 010	0105 010 00	0152 010 00	0088 100 010
0159 010 010	0106 010 00	0153 010 00	0089 100 010
0160 010	0107 010 00	0154 010 00	0090 100 010
0161 010 010	0108 010 00	0155 010 00	0091 100 010
0162 101 100 0,1	0109 010 00	0156 010 00	0092 100 010
0163 010 01	0110 010 00	0157 010 00	0093 100 010
0164 010 010	0111 010 00	0158 010 00	0094 100 010
0165 010 010	0112 010 00	0159 010 00	0095 100 010
0166 010 010	0113 010 00	0160 010 00	0096 100 010
0167 010	0114 010 00	0161 010 00	0097 100 010
0168 001000 010 010	0115 010 00	0162 010 00	0098 100 010
0169 010 010	0116 010 00	0163 010 00	0099 100 010
0170 010	0117 010 00	0164 010 00	0100 100 010
0171 010 010	0118 010 00	0165 010 00	0101 100 010
0172 101 100 0,1	0119 010 00	0166 010 00	0102 100 010
0173 010 01	0120 010 00	0167 010 00	0103 100 010
0174 010 010	0121 010 00	0168 010 00	0104 100 010
0175 010 010	0122 010 00	0169 010 00	0105 100 010
0176 010 010	0123 010 00	0170 010 00	0106 100 010
0177 010	0124 010 00	0171 010 00	0107 100 010
0178 001000 010 010	0125 010 00	0172 010 00	0108 100 010
0179 010 01	0126 010 00	0173 010 00	0109 100 010
0180 010 010	0127 010 00	0174 010 00	0110 100 010
0181 010 010	0128 010 00	0175 010 00	0111 100 010
0182 101 100 0,1	0129 010 00	0176 010 00	0112 100 010
0183 010 01	0130 010 00	0177 010 00	0113 100 010
0184 010 010	0131 010 00	0178 010 00	0114 100 010
0185 010 010	0132 010 00	0179 010 00	0115 100 010
0186 010 010	0133 010 00	0180 010 00	0116 100 010
0187 010	0134 010 00	0181 010 00	0117 100 010
0188 001000 010 010	0135 010 00	0182 010 00	0118 100 010
0189 010 010	0136 010 00	0183 010 00	0119 100 010
0190 010	0137 010 00	0184 010 00	0120 100 010
0191 010 010	0138 010 00	0185 010 00	0121 100 010
0192 101 100 0,1	0139 010 00	0186 010 00	0122 100 010
0193 010 01	0140 010 00	0187 010 00	0123 100 010
0194 010 010	0141 010 00	0188 010 00	0124 100 010
0195 010 010	0142 010 00	0189 010 00	0125 100 010
0196 010 010	0143 010 00	0190 010 00	0126 100 010
0197 010	0144 010 00	0191 010 00	0127 100 010
0198 001000 010 010	0145 010 00	0192 010 00	0128 100 010
0199 010 010	0146 010 00	0193 010 00	0129 100 010
0200 010	0147 010 00	0194 010 00	0130 100 010

Note: For presentation purposes, lines 02, 03 and 0000 have been "wrapped round". They should be entered as continuous lines.

As the memory of Atari II bit computers (successively models 400, 800, 1200, 800XL, 800XE and 1300XE) gets larger — it seems that the manual supplied with them gets smaller.

The old 16k Atari 400 computer came with two thick manuals detailing the use of the machine. The latest 128k Atari 1300XE has only a small instruction booklet which does little beyond revealing the permitted Basic key words.

This is a pity, because some powerful capabilities are hidden within these machines which are not referred to by any of the manuals nor by the beginner's books supplied by other authors.

The experienced Atari user will doubtless be aware that there are three well-documented text modes in Basic, Modes 0, 1 and 2; and a further six graphics modes (Basic Modes 3, 4, 5, 6, 7 and 8). There are also three GTIA graphics modes (Basic Modes 9, 10 and 11) which can be found in the later models.

The trouble with the text modes which print characters on the screen is that the background colour remains the same for each printed character, even though it is possible to alter the colour of the characters themselves.

For example, you can print the letter A on the screen in four different colours in text Modes 1 and 2, but the background remains the same for each. Any attempt to change the background colour equally alters the background of all the different coloured characters.

Suppose you want to make a chess board. This requires black and white pieces to be placed on, say, blue and red background squares. Clearly text Modes 1 and 2 are not suitable for this purpose.

However a poorly documented solution exists to this problem. The Antic graphics chip is responsible for all the graphics and text modes known in Basic, but also permits a few interesting extra modes.

These were only accessible in the early Atari computers by writing a custom-designed display list — a short machine code routine which called the necessary extra Antic modes. Some of these extra options are now directly available to the Basic programmer who has a 800XL,

A colourful combination

JOHN WHITE demonstrates the way to brighten up your screen display by using Modes 12 and 13

800XE, or 1300XE computer.

Text Modes 12 and 13 in Basic on the later computers correspond to Antic Modes 4 and 5 respectively from the older Atari machines. They permit text to be printed on to the screen in any combination of four colours per character, with up to five colours available on one screen.

Before going any further it is necessary to examine how the Atari display characters on the screen. The main difference between the graphics and text modes is that the former display only a single byte of data by PORING it onto the screen, whereas the latter takes the character code, looks up the corresponding eight consecutive bytes from the character set and POREs all eight of the data bytes one underneath another on the screen.

A character therefore comprises eight bytes placed vertically on the screen. Each consists of eight bits, each of which may be set, 1, which means that a colour is shown in that pixel, or not set, 0, meaning that the background colour is assumed.

The letter A is the 33rd character in the Atari character set. Figure 1 shows exactly how the eight data bytes for the letter A are held in memory.

The head of the character set is indexed by memory location 224. Thus the first character in the set has its data bytes stored in memory

locations 224*256, 224*256+1, 224*256+2, ..., 224*256+7.

Since A is the 33rd character and each character has eight data bytes, we must look for the data for letter A from positions 224*256 + 32*8 to 224*256 + 33*8 + 7.

You can test this statement with program 1. The results which are printed out should agree with those displayed in Figure 1.

```
10 FOR I=0 TO 7
20 PRINT POS(CHAR$(CHR$(I)))
30 NEXT I
```

Program 1

Now try Programs 11 and 111, watching the screen carefully. Program 11 puts the letter A on the



Figure 1: Data bytes for letter A

screen in text Mode 0. Program III develops and prints the same letter A in graphics Mode 8 by placing graphics data bytes taken from the character set for the letter A sequentially, one underneath each previous byte.

```

10 REM *** ASCII: THE MEMORY LOCATION OF
11 THE 128-BYTE CODES OF THE SCREEN
12 ON GRAPHICS 0:PRINT 101,0
13 ON GRAPHICS 0:PRINT 102,0
14 ON PRINT 100,0
  
```

Program II

```

10 GRAPHICS 8
11 FOR I=0 TO 255:PRINT I;
12 NEXT I
13 FOR I=0 TO 7
14 FOR J=0 TO 255:PRINT CHR$(I+65)+CHR$(J)
15 NEXT J
16 NEXT I
  
```

Program III

We have seen that the letter A can be poked to the screen with the code 33. On colour test screens (Modes 1 and 2), the sixth and seventh bits of code are combined to show the colour of the character.

Since four combinations are available by changing two bits, four colours can be permitted on the screen. Thus, repeatedly adding the value 84 to the original character code will change the colour up to four times. Try Program IV and see.

```

10 GRAPHICS 1
11 FOR I=0 TO 255:PRINT I;
12 NEXT I
13 FOR I=0 TO 3
14 FOR J=0 TO 255:PRINT CHR$(I+65)+CHR$(J)
15 NEXT J
16 NEXT I
  
```

Program IV

Binary	Decimal
00000000 =	0
00010000 =	16
00110100 =	44
01100110 =	102
01100110 =	102
01111110 =	126
01100110 =	102
00000000 =	0

Now return to Program II and change line 10 to read 10-GRAPHICS 12. Run the program. What has happened to the character?

In Modes 12 and 13 the character data bytes are used differently to their role in Mode 0, although a full character of eight bytes is still displayed.

Each different pair of bits in a data byte tells a separate colour register to colour the pixel described by the two bits. Again there are four permutations of two bits - 00, 01, 10 and 11 - so four colours can be permitted in one character byte.

Let's look at letter A again in the light of this information.

00	00	00	00
00	01	10	00
00	11	11	00
01	10	01	10
01	10	01	10
01	11	11	10
01	10	01	10
00	00	00	00

Figure 8: Mode 12 character data byte

Note that the character is now only four pixels wide, whereas it was eight pixels wide in text Modes 0, 1 and 2. If you have colouring pencils handy colour in Figure 8 with the default Atari colours thus:

00 - black
 01 - orange
 10 - green
 11 - dark blue

Compare the coloured picture with the screen character. They should be similar, although colour bleeding on the screen tends to blur the colours.

Now try changing line 30 in Program II to 30 POKÉ SCR, 33=128.

One of the colours of the character on the screen has altered. As was the case in text Modes 1 and 2 changing one of the top bits of the character code has affected a colour register, although in text Modes 12 and 13 only the top bit can be altered.

Table 1 illustrates the effect of the character code and the values of the

data bytes on the colour registers used. Use SETCOLOR N to alter the colours, where N is the value of the colour register shown in the table.

Bit Pair	Colour registers affected	
Character code	code = 128	
00	4	4
01	0	0
10	1	1
11	2	2

Table 1

The colour registers can be changed in the ordinary way from Basic with, for example, SETCOLOR 0,12,8 SETCOLOR 1,14,8 according to wishes.

The character set provided by Atari in ROM is designed for use with text Modes 0, 1 and 2, and is rather useless in text Modes 12 and 13.

However if the original character set is copied into RAM, individual characters can be altered to give interesting pictures. A machine code utility for copying the set into RAM is given in the Chess Board program at the end of this article.

There is one important disadvantage with this method of displaying multi-coloured graphic characters on the screen. For each character byte which has been modified there is one less of the original character set to be displayed. It is easy to consume part of the original alphabet stored in the character set so that only garbage will be printed out in the text window.

It is possible to divide a single chess piece into four different characters which are then POKÉ'd on to the screen in this order:

A B
 C D

The character data for a chess rook is shown in Figure 9. The rook is divided into four characters, each of which has eight associated data bytes. I have drawn the pieces in such a way that each byte is part of a twin pair of identical bytes. This saves space in data statements in the Chess Board program, but higher resolution could be achieved by making each byte of the pair different.

The program places a chess board on the screen in five colours. When you have finished with it alter the GRAPHICS 12 in line 890 to

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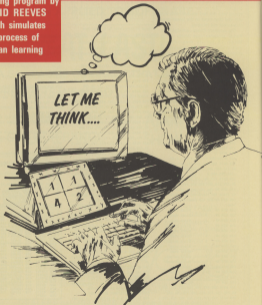


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MANC



UNAI

THIS game-playing program is basically an exercise in artificial intelligence. Unlike most game-playing programs however, this one is different in that the computer actually learns as it goes along.

The program partly simulates human learning as the computer remembers positions which led it to lose, and then, given the opportunity, plays those back against its opponent.

The game is a simplified version of an Arabic game called Mancala. I chose this game for the exercise because it is fairly challenging while not being too complex and it may also be new to many people.

This simple version is played by two players using eight counters on a 2×2 square board. The game begins with two counters on each square, and the players face each other across the board.

Taking turns, each player picks up the counters from one square on his/her side of the board and moves them anticlockwise round the board putting one counter on to each square in turn until they are exhausted.

Thus if one player picks up three counters from the bottom left square he must put one counter on the bottom right, one on the top right, and the last one on the top left, leaving no counters on the original square. The winner is the first player to have all eight counters on his/her side of the board.

The program allows you to play against the computer. On your turn move the joystick left or right to choose the square you want to move from, and then press the fire button.

At the start the computer is totally naive, knowing only the rules of the game. Each time it loses, the computer remembers the position which led it into a losing sequence of moves. In future it will avoid getting into this position itself, but will put you into it if it can.

Humans also learn like this — but

PROGRAM STRUCTURE

10-80	Initialize variables and screens.
80-240	Player's move.
250-380	Get ready for computer move.
390-520	Compute destinations for both possible moves by computer.
530-660	Computer's move. Random choice unless one move leads to a certain win or a certain loss.
670-880	Reposition as "lastmoves" if not coded as win or loss.
890-920	If computer loses, code learnings as certain loss. Then compute positions which lead to learnings. For each of these determine both possible destinations, and if both lead to losses the position is a certain win — for the player. Compute the corresponding position for the computer ($100 \times C + 10 \times D + A$) and reinitialize win.
930-960	End of game and initialize for next game.
970-980	Subroutine for coding winning positions.
990-995	Subroutine for setting up screen.
1000-1005	Subroutine for scoring counters.

MAJOR VARIABLES

SQUARE	The squares are called 1, 2, 3, and 4 anticlockwise from bottom-left.
A, B, C, D	Number of counters on squares 1, 2, 3, 4 respectively.
CODE(100)	Waits status codes for each position: 1=losing position, 2=winning position. 0=unknown. Positions are identified by computing $100 \times A + 10 \times B + C$.
DEST(2)	The two possible positions which can arise from the next move.
DEST1, DEST2	Current status codes for DEST(1) and DEST(2).
LASTUNPOS	Last position created by computer with an unknown outcome.

unlike a human the computer learns nothing from winning, nor can it formulate general rules of strategy to guide its play.

Against this however, the computer does have the advantage that it never forgets positions which it knows must lead to a loss, or those which must lead to a win. It learns rapidly from its mistakes.

After five losses it is quite a fair player, and after 10 it can be difficult to beat. Try playing it 'the first one to 10 wins', and see who learns quickest.

The program works on the principle of giving a code of 1 to positions which lead to losses, and 2 to those that lead to wins. Initially all positions have a code of 0.

Whenever it loses, the computer recalls the last position it created which had an unknown outcome, that

is coded 0. That position is then given a code of 1 so that the computer knows not to create it again.

Next, all possible positions from which that position can be created are computed. If it is found that all moves made from one of these positions lead to losses the position receives a code of 2, so that given the opportunity the computer will create the position, knowing that it leads to a certain win.

In this way, as the number of its losses increases the computer identifies moves leading to losing sequences earlier and earlier, and learns longer and longer winning sequences. If played against long enough it becomes a perfect player.

THOSE of us who started with DOS 3 and have subsequently changed to the new DOS 3.5 will at some time wish to have a printout of files contained on a disc.

While this was possible with DOS 3 the option seems to be omitted on the newer operating systems. You can however get a printout of disc files with Atari Writer but like DOS 3 this presents you with a not-too-near three inch strip, a bit off if you have an 80 column printer.

This disc index printout utility resolves these problems and allows you to neatly catalogue your disc directories on standard A4 paper. In addition it allows the directory to be named, disc numbered, and slide identified. The program also summarises the number of files, the used sectors, and the free sectors.

The program was written on my 1300E but works fine on an 800XL. It was designed for the Atari 1027 printer but works with an Epson FX-80 and should do so quite happily on any other 80 column printer.

As the layout of the directory is dependent on the number of blank spaces in the PRINT statements I've included some REM statements to help get it right.

They refer to the line immediately following—for example the statement in line 170 refers to the layout of line 180. None of the REMs are necessary and you can omit those lines if you want to save yourself some typing.

Your disc data on tap

... with the aid of this utility by **DOUGLAS EWAN**

The screenshot shows a directory listing for a disk. It is organized into three columns of files. Each file entry includes its name, size, date, and time. The listing is for a disk named 'DISK 1' and shows various files and subdirectories.

```

10 DIM DIR$(100) DIM DIR$(100)
15 DIM DIR$(100) DIM DIR$(100)
20 DIM DIR$(100)
30 PRINT "DISK INDEX"
40 DIM DIR$(100) DIM DIR$(100)
50 DIM DIR$(100) DIM DIR$(100)
60 DIM DIR$(100) DIM DIR$(100)
70 DIM DIR$(100) DIM DIR$(100)
80 DIM DIR$(100) DIM DIR$(100)
90 DIM DIR$(100) DIM DIR$(100)
100 DIM DIR$(100) DIM DIR$(100)
110 DIM DIR$(100) DIM DIR$(100)
120 DIM DIR$(100) DIM DIR$(100)
130 DIM DIR$(100) DIM DIR$(100)
140 DIM DIR$(100) DIM DIR$(100)
150 DIM DIR$(100) DIM DIR$(100)
160 DIM DIR$(100) DIM DIR$(100)
170 DIM DIR$(100) DIM DIR$(100)
180 DIM DIR$(100) DIM DIR$(100)
190 DIM DIR$(100) DIM DIR$(100)
200 DIM DIR$(100) DIM DIR$(100)

```

```

210 DIM DIR$(100) DIM DIR$(100)
220 DIM DIR$(100) DIM DIR$(100)
230 DIM DIR$(100) DIM DIR$(100)
240 DIM DIR$(100) DIM DIR$(100)
250 DIM DIR$(100) DIM DIR$(100)
260 DIM DIR$(100) DIM DIR$(100)
270 DIM DIR$(100) DIM DIR$(100)
280 DIM DIR$(100) DIM DIR$(100)
290 DIM DIR$(100) DIM DIR$(100)
300 DIM DIR$(100) DIM DIR$(100)
310 DIM DIR$(100) DIM DIR$(100)
320 DIM DIR$(100) DIM DIR$(100)
330 DIM DIR$(100) DIM DIR$(100)
340 DIM DIR$(100) DIM DIR$(100)
350 DIM DIR$(100) DIM DIR$(100)
360 DIM DIR$(100) DIM DIR$(100)
370 DIM DIR$(100) DIM DIR$(100)
380 DIM DIR$(100) DIM DIR$(100)
390 DIM DIR$(100) DIM DIR$(100)
400 DIM DIR$(100) DIM DIR$(100)

```

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410 DIM DIR$(100) DIM DIR$(100)
420 DIM DIR$(100) DIM DIR$(100)
430 DIM DIR$(100) DIM DIR$(100)
440 DIM DIR$(100) DIM DIR$(100)
450 DIM DIR$(100) DIM DIR$(100)
460 DIM DIR$(100) DIM DIR$(100)
470 DIM DIR$(100) DIM DIR$(100)
480 DIM DIR$(100) DIM DIR$(100)
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590 DIM DIR$(100) DIM DIR$(100)
600 DIM DIR$(100) DIM DIR$(100)

```



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DEALER ENQUIRIES MOST WELCOME

BY 1050 was supplied with DOS 3.0. How does it compare with DOS 2.0?

What is the minimum I need to use my Atari to get Prestel? The Mirabe Modern is expensive at £155 compared with the other currently made by Amal of Scotland or CDS for a separate system. — **Simon Firth, Middlesbrough.**

■ Use DOS 2.5 if you get the chance. It is much more efficient in terms of memory, disc storage space and time taken to operate a given function.

DOS 3 is very user-friendly, but this is where it falls down, since once you know how to use it the prompts and defaults system proves very time-consuming.

See the review in the July 1985 issue of Atari User for more details.

If you just want to use Prestel then you are right — a dedicated unit would be far cheaper than a computer interface and modem.

However the Mirabe Modern offers as much more — MicroLink, bulletin boards, inter-computer communications, and so on.

Which unit you should buy depends on what you want to use it for, and perhaps more importantly, what you may want to use in the future.

Best buy printer

I HAVE found that there are very few people in my area with Atari computers who I get my 8000X, or Christmas, and was wondering if you could please send the address of the nearest Atari Users Club to my home address.

I would also like to know if it is possible to buy a cheaper printer than the Atari 1025 which costs £157.90, and buy an interface lead to make it compatible with my 8000X. — **Jonathan Coles, Barb.**

■ There are printers cheaper than the 1025, the replacement for the 1025 which was never made available.

However you'd need an interface for them which

But is Prestel all you need?

would break the cost book up again.

Atari's own printers are about the cheapest to run with Atari computers.

You could, of course, get the 1027 laser quality printer or the 1020 pin-impact printer, which is less than £100, but have a good look at that one first as it can't see anything other than 48x roll paper.

Atari's own

I AM going to buy a 1020E interface after I currently own an 800 and expect a 410 cassette recorder.

When I have bought the system I would like to purchase a printer. Please could you tell me one which will match up to the following specifications:

Be able to print on A4 size paper, have friction feed, have the ability to do screen dumps and cost around £200 or less. I am not too concerned about colour or printing speed. — **Andrew Young, Milton Keynes.**

■ Why not take a look at Atari's own 1025 printer? It has the advantage that it is completely compatible with your system.

Search for an Indus

I AMNEE bought the new Atari 1020X, a cassette drive and a television. I now want to get a disc drive and have decided to buy the Indus 0.5.

The problem is that I can't find any shop which sells the Indus in this country. I have thought of importing it from America.

Is there a shop which

sells the Indus in this country? — **Harold Harbo, Middlesbrough.**

■ The Indus 0.5 is a superb disc drive, but you will find great difficulty in obtaining it and maintaining it in the UK.

Before it went bankrupt, the Home Entertainment Atari Centre in Broad Street, Birmingham, imported a limited quantity, but the prices proved to be prohibitive (around £400), and service cover could not be provided.

I would say your best bet would be to purchase an Atari 1050 drive for which there is excellent service cover, and fit a US Double Buffer 0.5, which will provide you with all of the facilities that the Indus can offer.

OK, so you don't get the pretty lights on the front panel, but are they really worth about £200, and so service cover?

I have done this, and am very happy indeed with the results — especially the three-fold speed improvement.

André Willey

Wiring worries

I USED to have an Atari 8000X and the computer to television lead was just a wire with a plug on each end.

I have just bought an 8000X and the cable to the TV has a small Mach box a little way along it. Do you know what this is for?

Would an ordinary computer-TV cable work with my computer?

Also do you know if there is any difference between Atari's Pure Position and the one imported by US Gold? — **Peter Graham, Lincoln.**

■ The black box in your cable

is simply a ferrite core, a device which helps to reduce interference.

You can use the old cable with no problems, although you might find that the picture is slightly less clear.

The game play on Atari's and US Gold's Pure Position is the same. Datasoft in the States bought the rights to the game when Atari relinquished them last year.

Thus US Gold now produces a version under licence from Datasoft, while the Atari one is basically a re-release from the old deal.

The game is the same in both cases except for the Datasoft or Atari banners.

Expansion plans

I HAVE an Atari 400 with 128K memory and am planning to buy a 48K memory expansion unit, partly so that I can use my assembler written in Basic in 64-bit graphics modes and also so I can play the latest memory-pushing games.

Atari no longer make the units and none of the dealers I have rung can get hold of one.

Can you help? Someone in the country must have one to sell now!

How about a private advertisement section in Atari User, then it's a sort of problem would be easy to solve.

Also can you tell me of a 8-bit emulator on cassette or ROM that I can use? — **S. Holden, London SW16.**

■ We don't know of any 8-bit emulator that will run in 128K — if anyone has found one, let us know.

On the memory point, the best price on 48K memory boards for Atari 400s was £80. Even if anyone had any left, it would still be cheaper to buy a new 8000X from Dissons — for which you would have a 88K machine with a real keyboard, a new recorder, five games and a new joystick.

You can then recoup some of your expense by selling your old 400/500cassette/joystick to a friend, or via a local newspaper.

Maze Munch score

UNFOUNDED Maze Munch, your first game-thing to date. However the score does not increase on screen (it's POINTS) when you see the 00000, whereas it works perfectly on an 80000.

Is this connected with a bug in Atari ROM or PEEK (M2234) which is responsible for unnecessary Error 3 reports and worse still, caused keyboard lock up with total loss of program control?

The value of this address on the 80000, is 99, it should be 224. Are there any 80000s with the bug-free Day C disk available, as I have had problems with a few other settings and commercial tapes?

Finally, here is a cheat routine for readers to experiment with, or add to a program:

```
00 00 00 00 00
01 00 00 00 00 00
02 00 00 00 00 00
03 00 00 00 00 00
04 00 00 00 00 00
```

— M.A. Phillips, Bristol.

• Your problem is much more likely to be caused by lack of memory than by the error 3 bug. To the best of our knowledge, however, none of the UK 80000s or 80000s have the C disk in them.

This is only available on the 13000, or in cartridge form from main Atari dealers. If anyone has found differently, please let us know.

Cartridge port

I HAVE an Atari 400 and am thinking about buying the 13000, but I am not sure if it has a cartridge port or not.

Second problem: I have a right ear made by Datas and wonder which joystick unit it would connect to. — Ross Gifford, Dorsetshire.

• Yes, the 13000 does have a cartridge port (at the back), and everything else that the 80000 has, plus 128k, of

ATARI Mailbag USER

WE welcome letters from readers — about your experiences using the Atari micros, about tips you would like to pass on to other users... and about what you would like to see in future issues.

The address to write to is:

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course. Else our review in issue 21.

It only has two joystick ports, but then has many four-player games do you know?

The light pen, assuming it works with the Atari, can be plugged into port 1, or sometimes, on older 400s, port 4 — I don't know why.

You can PEEK locations 584 and 585 to get the x and y positions. These range from 0 to 228, but may need a little modification to correct the zero and maximum points for the edge of your TV set.

Use STICK(0) or STICK(1) to check for the pen button being pressed.

— Andrew Willey

Loading problems

I AM tired of floppy tapes. The problem is some just do not load at all.

For instance, I bought a pack of C18 disks yesterday. I typed in a program and saved it, but it wouldn't load.

At the beginning of loading the cassette spoke through the speakers slowly makes a whine, but as the disks cassette it does not make this sound.

Could you tell me which cassette work and which do not? — Chris Beard, Nottingham.

• If your recorder has so far

only been used to load games, you may find that your recorder is faulty and will not serve, although it will load correctly.

Try saving to other tapes, such as TRK C-80, to see if this is the case.

If you still don't get anything take your recorder back for repair. If it does work, then your question is answered.

Price of memory

I AM pleased to see the efforts being made to increase Atari popularity, but feel that purchasers of the 80000 have been badly let down.

The 80000 has become available for approximately £100 and yet the necessary expansion for the 80000 is still priced at approximately £90.

Have Atari any plans to make the expansion cheaper for the people who supported the launch of the 80 range?

I think your magazine is superb and hope the standard set with the first three issues is maintained.

I would like, though, to make a couple of small points. Please include memory requirements when reviewing software and don't spoil the entire page by including "my score is higher than your score" letters. — S. Harrington, Murren.

K-Spread comments

HAVING just read the review of our program K-Spread for the Atari ST in the March issue of Atari User, we would like to make a few points known to your readers regarding some of the comments made. Some of this information was given to André Willey, however it obviously missed being mentioned in the review.

1: Copies of our ST application software are now provided, however this does allow users to make a back-up copy for day-to-day use. It can also be copied to a hard disc without problems.

2: Two bugs were mentioned regarding the Save routine. The first does not exist, the second was only present on a few early discs and has since been rectified.

3: The version on tape affects the formulas when alterations are made. If no formula are present the changes are accepted straight away. If there are formulas the user is prompted with an option regarding changes.

4: We have an intensive development program under way and are working on a large number of added features. We have a positive upgrade policy whereby users of current versions will be able to upgrade to new versions at minimal cost.

5: Business graphics will be available when the data compatible program K-Graph is released towards the end of this year.

I hope you will be able to make this information available to your readers. We will of course keep you updated regarding new and improved products in our ST software range. — Jan Dary, Sales Manager, Kuma Software.

• André Willey replies: I did get a new copy of the program — but the March issue containing the review was already at the printers.

As to Jan's points:
1: Fair enough, if Kuma can protect software and still allow use of a hard disc without

needing to use the master-disc again, great! Good luck to them. It seems to work too.

2: The GiveTake bag does work. If you GIVE a file with long text items in it, the TAKE does not retrieve the same information. This has been corrected on later revisions. The same applies to the "Can't drag cell on to desktop" bug. Both of these are present on a number of shop stock copies, although exchanges have now been arranged by Rama.

3: Good. What else can I say?

4: Also good. The new version contains a couple of nice new features, including leaders/followers, minus sign brackets, an option to turn off the coloured banking to text fields, and a few others. Well done to Rama for listening to their customers - not all companies do!

5: Strange, that's just what I said.

My conclusions still stand, anyway, and we're grateful to Jim for giving us an update on the situation.

Memory module

On the February issue of Atari User J.B. Gibbet asked for information on the 64k memory module. Silica Shop (07-301 1111) will supply him with one.

I think the best game available for Atari means at present is *Chinese* by Firebird. It is a 3-D action game in a similar style to *Delta II* - only much, much better.

I'm sure any Atari owner would agree that the loading screen is better than anything ever seen before and the post race will shame even *Outspace*.

Is it possible to emulations generated on the Atari Touch Tablet in your own programs - for example an adventure game with graphics drawn on the tablet?

Clearly I must say I was shocked to hear you say that a very annoyed person's party should be cancelled lightly and served in a white paper.

Anyone knows that the best way to cook a gambit is to put it for 10-20 minutes, put a slice of cheese on it and put it in between two slices of bread - L. Whelan, *Sturfield, PS*. What is it about Rob Handley? We get his picture in every issue.

Good service

I AM not normally prone to putting pen to paper especially to compliment a company.

However my recent dealings with Computerm Ltd have prompted me to do so. As I am a regular reader of Atari User I received the best piece to voice my compliments.

My initial dealings with Computerm were by way of an order for a 1027 Atari printer on special offer. On contacting the firm I received some very helpful advice and answers to my questions.

The order was promptly dispatched and arrived within 48 hours. However within a few weeks it was apparent that the printer was defective. On contacting Computerm they offered their apologies and an immediate replacement printer.

In addition they gave me the option of swapping the 1027 model with a 1029 dot matrix machine.

On reflection this should have been my initial choice. In doing this they will have to refund the money from the initial order.

It's so pleasant to find a company that really does have the customer at heart and the professionalism to match.

As a new Atari user, I am very confident that with Atari stock, shops like Computerm and the quality of Atari User things would not look better - M.S. Allen, *Havant, Hants*.

Not so far Right!

I'M sure it must be tedious to

describe my politics as "a little to the right of Gandhi's knee" as Drilling, presumably does that while hiding behind a pseudonym, did in the March Atari User. Conservative MPs have voted the BBC for spying last!

Fortunately, I'm just a wily, wily liberal voter so I'll be satisfied if you print this letter to correct the matter.

Drilling is equally wrong when he claims that any of Level 2's own adventures are based on existing books. They aren't - I do my damndest to avoid similarities when designing game worlds.

However when writing the introductions to games I have occasionally lifted my favourite 2D books on similar themes. For the benefit of readers, that's all.

To complete the list Drilling describes the firing of paratroopers against from an orbiting spaceship to destroy a

target on the ground as being impossible.

Would that it were. Atargis's Starwars system proposes to use just this type of technology and while there are difficulties in firing thousands of fast moving warheads, a "suicidal" first strike against a stationary target on the ground seems simple, given enough energy in the beam.

The fact that SDV could be used offensively is one reason why it would be so dangerous.

I've not seen the exact idea used before in 2D, but Larry Niven proposed something similar in "The Warriors" (*Tales of Known Space*, Level Orbit) - Peter Axton, *Level 3 Computing*.

As Alex would be doubtful to point to point out after such a dressing-down, he does not wish Drilling's adventure column.

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That 'k' rating

I SUGGEST that you might ask your software reviewers to indicate the "k" rating of the games they advertise — i.e., 2k or 4k or whatever as I have found it an expensive mistake having to write to firms, requesting an SAS to find out if a game is suitable for my 8000k.

Also could you please advise me if it is possible to obtain a RAM pack to upgrade to 40k. I have written in several times but had no word so Mr. Midge came of your other readers could help me —
B. Cottrell, Irvine, Ayrshire.
 ■ Since shops should have the RAM pack, but at present-day costs you might be able to find an 8000k for less.

1020 and Atari Writer

WIKI references to the letter from E.C. Jones in the February issue of Atari User, I also had problems using the 1020 with Atari Writer. After much experimenting I found the following procedure solved them.

Select option 1 when asked for the type of printer. Then, for Ctrl-D 27 at the beginning of each instruction, in place of the ESC ESC in the 1020 instruction manual.

This type Ctrl-D followed by the 4,0,4 and number corresponding to the instruction.

For example, to change to the red pen, instead of typing ESC ESC Ctrl-D "C" "4", you would just Ctrl-D 27 Ctrl-D 40C4.

Finally, just test and practice instructions on separate paper. — **Steven Burke, Boxley Heath.**

Attract mode

ANYONE bought an Atari 8000k, six weeks ago I had myself with a major problem. I am running on a football manager foot game which is

coming on well.

The problem is that after 10 minutes or so the screen changes colour when the program is running. The game is almost as enjoyable as when it is in the best (from Atari User) which does the same thing.

Is there a patch or some way of preventing this change of colour?

I have just dropped my Spectrum to buy the Atari and I'm impressed to say the least after a year of the Spectrum. — **Steve Kennedy, Strassburg.**
 ■ To prevent the colour mode you need to POKE 77,0 at regular intervals in your program.

Problems solved

I HAVE answered to two questions raised in February's Atari User Mailbag — and one question.

Ferris McDonald's problem on cassette loading technique could well be the location of his recorder if it is within line feed of his TV or within the very strong magnetic field generated by this equipment will often corrupt data stored on magnetic tape. I had the same problem and relocating the recorder away from the TV solved it.

He may or may not be lucky in salvaging the existing information on his tape. Better buy a disc drive.

Mr A.S. Foreman's question on Bridge programs for the Atari is easily answered. I have two. Both are American and use the German convention which always presumes no affinity to an experienced player.

They both include Blackwood for alien bidding and one of them keeps score including vulnerability.

Both my wife and I keep in practice by regularly playing bridge with our Atari. It doesn't drive either, or pay when it loses!

One program is by Arthur the other by CRC. I got them in the US but I'm sure they are available here from Software Express or Silva Shop.

If anyone wants more information they can call me

on Farnborough 266994.

My question is whenever we going to see a RAM pack addition for the 8000k to match the 1000k and when are software writers going to take advantage of this facility to add more features and effects to their programs?

Also I am looking for an 80 column word processor — I'm tired of my 40 column AtariWriter!

On last thing. Would you please give a plug to T960 — the TurboLink World Atari Group — A.C. (Tony) Blackburn, Tunbridge Wells.

Not worth changing . . .

As a prospective Atari buyer and a current Commodore 64 owner, I was very interested to read in the February Atari User of the difficulties some of your readers have experienced with their Atari computers and

hardware, particularly about the reader who complained changing to Commodore.

This is because since buying my Commodore 64 in August 1984 I have had to change it three times due to faults with the computer or missing accessories.

The COMMOD 64 finally failed for developed a fault with its 512 chip and had to be sent for repair, taking seven weeks.

On the day I received it back, and having also bought a new drive, I contacted them up only to find the computer would not work with the new drive.

I had to wait 75 weeks for the computer to be repaired.

I hope your readers will see that it is not just Atari who have problems, and that if Atari's future looks anything like the proposals of other computer manufacturers food profitability is outrageous. — **Sanjiv Mahajan, London SE3.**

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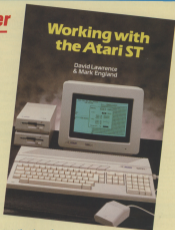
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