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AMIGA

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FORMAT

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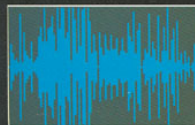
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Rainbow Arts get your trigger finger going with a playable demo of a wild and hectic shoot-em-up.

MENACE CODE and **DEMO**: First-level scrolling from Dave Jones' hard-hitting series ■ **PICPUZ**: Highly amusing puzzle games ■ **ULTRAPAINT**: Fully-featured paint utility with multiple screen use ■ **XOPER**: Display and control system activity ■ **WB HACKS**: More WB japes!

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CHANGE YOUR WORLD 15

The Amiga is taking the video world by storm – stunning effects can be achieved with incredible ease. We will show you how, armed with just your Amiga, a genlock and a video, you can take part in this revolution.



In Screen Play: Austerlitz rewrites history.

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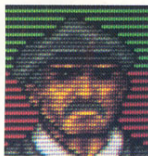
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THE UNTO

OCEAN £24.99



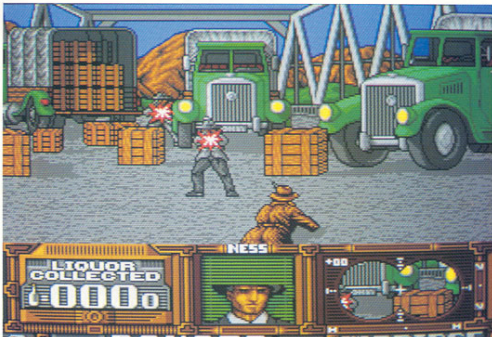
Ness



Malone

GRAPHICS AND SOUND

Every stage and every section has been well designed and drawn and overall the game looks terrific. The different views for the different sections is a plus too and all the sprites are smoothly animated. The sound effects are also good, as is the in-game music, and you can toggle between the two at the press of a button.



Level Two. Use the binocular sights currently located at the bottom of the screen to aim your shots at the baddies and at the bottles of booze.

LASTING INTEREST

This is a toughie – making it through each stage is a triumph in itself and it'll take ages to complete the game. It's also very frustrating at times but that just makes it more addictive. The six sections work



well together and although they wouldn't stand up as games in their own right they help to make the overall package very satisfying.

Chicago during the roaring '20s was one hell of a city. Alcohol was banned, the Mob had their fingers in just about every illegal pie in town and the police department were finding it hard to cope. Action was called for and the FBI's answer was to create a bunch of crime-busters who had a free hand to use whatever methods they deemed fit to bring the situation under control. This bunch of characters was lead by Eliot Ness and were later to be known as The Untouchables.

As Eliot, it's down to you to lead the gang and go after the biggest fish of all: Al Capone. There are six stages to the game, the first of which is set in a warehouse where Al's hoods are busy bootlegging liquor. In this section of the game you control Ness in a sideways-scrolling shoot-em-up in which you have to blast away at not only the gangsters, but also Capone's bookkeepers. The aim of this section is to kill the bookkeepers and grab the pieces of evidence they drop.

You didn't think it was going to be that easy, though, did you? Absolutely not, because the place is crawling with baddies all of whom are armed with machine guns and all of whom shoot to kill

– every hit you take reduces your health meter displayed at the base of the screen. To slow down this process you can pick up the violin cases dropped by the baddies when they're shot. As well as extra energy these cases can also contain extra ammunition and a time-based rapid fire benefit. Collect the 10 pieces of evidence and then you're into the next stage.

Here you're trying to prevent a liquor run that's taking place at the

American/Canadian border. Again it's shooting action, but this time it's more like *Operation Wolf* as the baddies appear from behind cases and trucks in front of you. Shoot the baddies and the bottles of booze lying around and try not to take too many hits, then when you've scored enough points you'll go through to the next stage.

In an alleyway you now have four Untouchables to switch between and a set number of men

IN THE AVENUES AND ALLEYWAYS...



In the first alleyway on Level Three. With five more baddies to kill and only 10 seconds to do it in, things are looking tough.

UNCHABLES

Joystick or Keyboard



Shoot the guy with the brown coat on and he'll drop some evidence.



And there it is. Simply walk over it to pick it up.

to kill in a very short space of time, using only a shotgun. Should you manage the required number the next stage is just the same except from the other side of the alley (there are eight alleys in all, four from each side).

Next comes a viewed-from-above section of the game which is set in a train station where Ness not only has to shoot baddies, but also must guide a baby's pram through the station by nudging it gently past obstacles.

The penultimate scene has you trying to kill the last henchman who's taken a hostage before the poor innocent gets his brains blown out. Then you're into the final scene as you chase a baddie across the rooftops of the court where Capone is standing trial. ■

GRAPHICS	8
SOUND	7
INTELLECT	3
ADDICTION	8
OVERALL	87%

JUDGEMENT

The only minor quibble is the fact that there's an awful lot of shooting to be done. None of the levels are brilliant games in themselves, but put together they do work well and the overall effect is a brilliant translation of the film. It's not quite worth the Format Gold award simply because of a lack of variety on some levels. Still a goodie, and even if you didn't get to see the film, but you like a challenge, you'll enjoy this.



Wallace



Stone



At the top of the pile of crates, collect the violin cases that the baddies drop to gain extra energy, ammunition and so on.

Reviewer Andy Smith



Left: The second alleyway on the third level and this time you're firing from the other side.



After every second shot your character is forced to duck behind the wall in order to reload his gun. Could cause problems...



In the Parsec trying to get past a disabled car you blew up on an earlier lap.

GREMLIN £19.99 ■ Joystick

SUPERCARS

Ferrari Testarossas, Porsche 944s, Jensen Interceptors, pah! They're all chicken feed compared to the cars in Gremlin's latest. Retron Parsecs, Vaug Interceptors, Taraco Neoroders and variants rule the roost here.

It's a single-player racing game, viewed from above, that gives you nine tracks to race on at three different levels making a total of 27 races. It's not solo stuff though: there are between three and seven computer-controlled cars to compete against for each race. You start against three and more cars join in as you move up the levels.

Before setting your wheels on the first track, though, you'll have to check out your equipment. You're given the basic Neoroder car to start with and new tyres, engine, body and a full tank of fuel. But as the season goes on all of these things become damaged - by bashing into the other cars, by skidding too much and so on - so before each race the gauges at the base of the screen have to be checked to see if you'll be able to survive the next race.

A race lasts a set number of laps, the number increasing as you step up the levels. If the race is long, your damage is high and things look dodgy, then pop into

the garage and buy some new equipment. Note that improvements and repairs cost money and the only way to make money (and continue driving) is to complete each race in the top three and get some prize money. Coming first, obviously, gives you more prize money than coming third.



The Retron Parsec, top-of-the-range technology.

Win a couple of races and the coffers swell allowing you the luxury of buying some handy extras like a turbocharger for faster acceleration, power steering for a smaller turning circle and spin assist which points your car in the right direction after hitting an oil patch. Yes, oil, water and mud patches can all be found on tracks and all of them have detrimental effects on the speed or handling of your car. Then again, you could go for some down-right dirty tricks

like front and rear missiles which, if aimed correctly, can knock a rival car right out of the race.

Start winning some serious money and it may be time to start thinking about a new car. A visit to the showroom before a race gives you the opportunity to select either the same type of car, but with a bigger engine, or a completely new model. There's even a chance to haggle with the dealer and try to knock the price down, but upset him and he'll throw you out of the showroom and not allow you back in until you've won another race.

Keep going until you fail to finish in the top three or until you manage to either blow the engine, tyres, or run out of fuel - easy to do if you don't watch your gauges closely and repair them between races. Then there's a full results service at the end of the game where two commentators give all the stats of who performed best on which tracks. ■

JUDGEMENT

It may not be an original idea but it's one of the best of its kind. Gremlin seem to be keeping up their new-found form of quality products, like Switchblade, which is pleasing to see.

GRAPHICS AND SOUND

The tune which plays throughout is fine, as are the skidding and bumping sound effects: they're not brilliant but they're certainly adequate. The graphics are much better: not only is the animation very smooth, but there's a high level of detail with things like shadows from bridges and trees included.



In the garage and buying a front missile should ensure a better placing in the next race.

LASTING INTEREST

It's not easy and the difficulty tuning has been set just right, making it highly addictive. The gameplay is great and it's fun to see things like losing off a missile at one car, say on a bend, the car becoming a write-off and all the other computer-controlled cars bashing into it. With 27 races to win it's going to last you some time.

LET'S GO SHOPPING



Your nice shiny red Vaug Interceptor won't stay nice and shiny for long.



Into the showroom and it's time to start haggling for a new car.

GRAPHICS	8
SOUND	6
INTELLECT	4
ADDICTION	8
OVERALL	86%

GRAPHICS AND SOUND

The ball movement is what it's all about, Brian, and fortunately the ball movement is spot on, being both smoothly animated and very realistic. The rest of the graphics are somewhat basic, but at least they're colourful. The clunks and pings and other spot effects are fine, but a bit of background music wouldn't have gone amiss.



The third table and now you have to light each letter individually (before, landing in an 'A' hole lit all the As - not any more).

LASTING INTEREST

If you don't like pinball simulations you won't be playing anyway, but if you do you'll find it's superly addictive and with 12 tables to get through it'll take quite a while. Shame the high score table isn't saved to disk.



Table Four and the first of the Breakout games.



Notice the one-armed bandit reels in the bottom right? Just you try scoring a jackpot!

PINBALL MAGIC

LORICIELS/US GOLD £24.95 ■ Keyboard



Curious things, pinball tables: you either love them or you hate them and if you love them, well, they're impossible to resist. Pin tables have not changed radically since the '50s when they first became popular: the electronics revolution had its effect, but the basics remain the same.

This latest offering from Frenchies Loriciel is a computer version of the popular arcade pastime. There are 12 tables in all, and the game is a mix between realistic tables, complete with

bumpers and blocks to knock down, and abstract tables with breakout elements.

Starting with five balls each - two players can play each taking alternate turns - the idea is to work your way through the tables by lighting a series of lights (the exact number varying for each table) and then getting the ball through the exit at the top of each table. Fortunately, should one player manage to do this then both players will continue playing on the new table.

Of course, lose a ball between the flippers and it's gone for good, but there are ways to gain extra balls. One easy way is to work your way onto a new table, where you'll become the proud owner of five shiny new ones, or by getting the ball that's in play into a bonus hole or by knocking down a set number of bricks on certain tables. There are several other bonuses, but most are points based. ■

JUDGEMENT

Almost everything you could wish for in a real pin table has been included and the realistic ball movement and high lasting interest factor help to make this the best pin sim to have appeared to date.

GRAPHICS	7
SOUND	6
INTELLECT	2
ADDICTION	8
OVERALL	75%

PANDORA £19.99 ■ Joystick or Keyboard

OUTLANDS

Just for a change, here's a vertically scrolling shoot-em-up for one or two players.

After all but wiping out humanity, the aliens are planning on coming back and destroying those few survivors who managed to escape to Mars. Attack is the only solution, so it's into your viewed-from-above space ship and the start of four levels of blasting.

As you might expect there is wave after wave of aliens to destroy, but your job is made easier if you can pick up some of the extra weapons amongst which are included twin fire and drones that shoot.

The graphics are fine, if a little basic, and though it scrolls slowly, the ships move well enough and everything is smoothly animated. Unfortunately, the gameplay is not

The wave on the left has come up from the bottom and the thing on the right has come down from the top - sound familiar?



so hot. When you're playing, it's hard to be gripped by that sense of urgency and you're just left feeling 'so what'. It's not very addictive even though the difficulty tuning has been set about right, and after a short time you'll be bored of it.

There's nothing glaringly wrong with this game: it's just that there are several others around that have much more to offer. ■

GRAPHICS	6
SOUND	5
INTELLECT	1
ADDICTION	4
OVERALL	51%

The P47 Thunderbolt was one of the American Air Force's best fighters during World War II. From 1943 onwards, P47s were based in Britain and were principally used for short-range sorties over northern France.

In this one or two player shoot-em-up, converted from the Jaleco coin-op of the same name, the player gets the chance to climb in the cockpit of one such plane and work his way through eight stages of mayhem.

It's a side-viewed horizontal scroller which moves slowly from left to right, where the player has to destroy not only ground targets, such as gun turrets and tanks, but also enemy planes which attack from all parts of the screen and usually come in waves.

You're armed with a front-firing gun initially but extra weapons can be collected by shooting the small helicopters that appear occasionally and collecting the symbols which they leave behind.

The power-ups that are available include bombs that fall from your plane every time you press the fire button – whilst still firing forwards as well – and spray missiles which fire from the front of your plane and then spread out in a fan formation killing anything they touch (very handy).

Unlike most games of this ilk, the strength of your power-up is governed by the strength of the plane. Every time you collect a power-up your energy level increases, starting at one and rising to a maximum of four.

Your energy level determines the number of extra weapons that each power-up releases: for example if you collect a bomb power-up, one bomb is released for each level of energy, so you will find that you can have four bombs dropping out each and every time you press the fire button.

Note though, that once you've collected a power-up, collecting another will discard the first because you can not have more than one at once. The nice thing is that you don't lose the extra weapon when you lose a life, it just steps down a strength level.

Work your way through the stages (avoiding the scenery on some levels) and before progressing to the next level you have to destroy the end-of-level guardian which could be either a train, a battleship, a plane or a tank. Should you make it through all eight stages you can then go back and do the whole thing again at a higher difficulty level (of which there are four), which is where the simultaneous two player option comes in extremely useful. ■

GRAPHICS AND SOUND

The parallax scrolling on each level is good and the background graphics in general are excellent. The sprites are all well drawn and well animated and the game has ended up looking very much like its coin-op parent. The sound is limited to either 'on' when you get the standard coin-op tunes plus spot effects (explosions and the like) or 'off' when you get nothing at all.



That's you on the far left of the screen, in the middle of a heavy attack headed up by that large Heinkel-like plane.

P47

FIREBIRD £24.99 ■ Joystick or Keyboard

DEATH FROM THE SKIES



Bombing away at the first end-of-level guardian...



...and there he goes! Phew!

There's no rest for the wicked, though, as you're straight into the next level.



LASTING INTEREST

Like all shoot-em-ups, it has a limited life span. It's a goodie though, so if you really fancy a new challenge this is as good as anything that's around at the moment (and a lot better than some others).



Collect the 'M' symbol to gain some extra missiles.



Another game and here you're equipped with bombs.

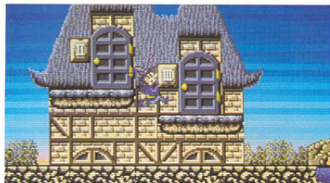


Later in the game you also have missiles to bomb and dodge: it's so annoying when you miss a power-up, like the 'T' bottom left.

JUDGEMENT

A nice example of the genre. It doesn't offer much new, but blast fans won't be disappointed and the two player option, as ever, makes for a lot of fun.

GRAPHICS	8
SOUND	6
INTELLECT	1
ADDICTION	8
OVERALL	80%



SEVEN GATES OF JAMBALA

GRANDSLAM £24.99 ■ Joystick

Everyone must know the story of the Sorcerer's Apprentice, of how the young student always caused trouble with his meddling. Dravion is a student similar to the one in the story. All he's ever wanted to be is a fully-fledged wizard, but he always manages to do something wrong and get into a terrible scrape. It's not really his fault - after all he can't really help being clumsy. But in the world of

magic, innocent accidents can have serious consequences.

For too long Dravion ruined the Old Master's spells, making the wrong thing appear or creating spells of his own which caused no end of confusion. The Old Master told him that the next time he makes a mistake he'll be sent to the realm of Jambala. Dravion knows exactly how serious the Old Master is when he says this. He

JUDGEMENT

Seven Gates of Jambala continues the tradition - not to quite as good effect as USG but admirably enough - and manages to hold its own against the current glut of coin-op conversions. If you like a bit of wizardry and fancy a change from 3D racing or alien blasting then give *Jambala* a try.

has often heard tales about the mysterious Jambala - of how even strong wizards enter the realm, never to return.

During the casting of his last spell, the Old Master was just at the climax of his incantation when Dravion accidentally leant on a lever which caused the spell to be ruined and the room to be plunged into total darkness. The last thing he remembers is the Master's voice muttering darkly and then blackness. Next thing he awoke in the realm of Jambala!

You must guide Dravion through the seven levels of this magical world searching for the one way that he can escape - the Great Wand. The seven pieces of the wand have been scattered throughout the passages of Jambala, waiting for a wizard to reconstruct them. Dravion must find these pieces and collect clues from creatures behind certain doors in the passages to help him rebuild the wand and escape.

The passages are guarded by a variety of strange creatures, all intent on keeping intruders like Dravion away. All the young wizard has to help him is a bag of magic spell dust to throw at his adversaries, but he can pick up extra weapons along the way. Also en route secret treasure is to be found - useful for bribing information holders or buying weapons. Dravion can find this by inspecting the ground with a hammer stolen from a dead wasp or fly. Yes, it is weird, but that's magic for you! ■

GRAPHICS	7
SOUND	6
INTELLECT	4
ADDITION	7
OVERALL	79%

LASTING INTEREST

Even though the platform-based arcade adventure isn't a new idea, there are few enough on the Amiga to make them interesting. *Grandslam's* release manages to keep the style alive by presenting us with a good looking and playable game in a long-trusted format. It would have been very easy to ruin the idea by producing a simple run-to-the-right time after time banal game, but as US Gold proved with *Ghouls'n'Ghosts*, as long as it's done properly, platform games can be fun.

GRAPHICS AND SOUND

For such a young company, Thalion have done themselves proud by programming a slick and well polished game with small but well-defined sprites,



Your last chance to get hold of a power jump at last year's price.

haunting soundtracks and impressive presentation screens. The game's atmosphere veers wildly, due to the contrasting tunes and graphic styles - from the cute "Wizard of Oz" town scenes, through wondrous gold treasure caverns to murky underground passages filled with horrible monsters. Some of the dungeon creatures offering bargains are a little quirky, but fit into the general appearance of the game nicely nonetheless. A good start for these young designers!

KENNY DALGLISH SOCCER MATCH

IMPRESSIONS £19.99 ■ Joystick

Here's the second in the planned trilogy of Kenny games - the first was a management game and the third is based on the struggles a young man faces as he works his way up in his soccer career.

It's a pure arcade game for one or two players, though four people can also play making up a league, that follows the standard format: the player controls one footballer at a time, the current player highlighted with an arrow.

Passes and shots are made by holding the fire button down while moving the joystick to one of nine positions once you've got possession. The pre-match options are limited and allow you to do little more than decide the length of each half and name the teams.

What really lets the game down, though, is the appalling gameplay. Knowing when you've got possession is difficult enough but trying to execute a pass or a

shot is frustratingly awkward. The game has two speeds: normal and fast, and only at the fast speed does it come anywhere near the acceptable speed for this type of game. In normal mode the players all move as if they're wading through three feet of water.

The graphics are basic, the sound effects are awful and the gameplay is sorely lacking - so yet another win for Anco's *Kick Off* in the best football game league.

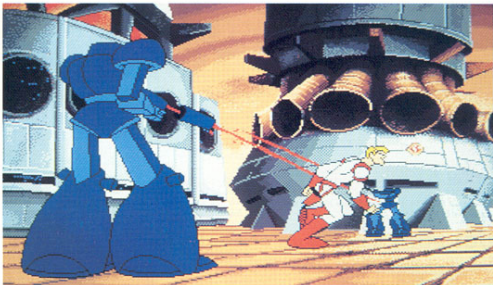
GRAPHICS	4
SOUND	3
INTELLECT	2
ADDITION	4
OVERALL	31%

There's still everything to play for... let's see if this young striker can put the ball in the... err... back of the net.



GRAPHICS AND SOUND

Space Ace's audio-visual delights are without doubt some of the best to be seen on the Amiga. The pictures look to have been taken directly from the original artwork, giving an appearance more akin to a Disney cartoon than a computer game. Every screen has been exceptionally well drawn and smoothly animated with cinema quality music and spot effects to back the frantic action. Occasionally, you forget to carry out a move just because you get carried away watching the cartoon! The only way an Amiga game can improve on Space Ace's graphics is to use full colour digitised photographs to portray the action throughout and we all know how that gobbles up the memory - we're talking ten disk games here!



Caught between two laser welding robots, ulp!

SPACE ACE

READYSOFT £44.95 ■ Joystick

A few years ago a strange coin-op machine hit the arcades. Instead of the usual blocky aliens and ping-beep sound effects it featured state-of-the-art, Disney-style animation and hi-fi sound effects. Hordes of people came forth with their 50p pieces to be totally confused and die on the first screen. Soon enough, the game was written off as a gimmick and only crops up when players say "Do you remember Dragon's Lair?"

More recently, Don Bluth - the man responsible for *Dragon's Lair* - came up with *Space Ace*. Although in a similar vein to the medieval original, the futuristic romp had a good deal more playability than its predecessor. Now thanks to Readysoft, even those without the requisite number of coins, but with plenty of notes, can play in their homes.

The plot is a little on the strange side, but isn't that the point of cartoons? Borf, a nasty alien tyrant, has concocted an ingenious plan to take over the Earth - he's going to zap every human being with his Infanto Ray, which turns adults into children.

Only two people can save the Earth, Space Ace and his beautiful friend Kimberly. Unfortunately, just as they approach Borf's ship, they get hit by the Infanto Ray, turning them into children before they can

LASTING INTEREST

Even though *Dragon's Lair* had superb animation and sound, the gameplay was so disjointed that players soon lost interest. Pressing a button every third screen or so wasn't exactly entertaining. Most screens only have one or two moves to be carried out, so they aren't too difficult to learn. The inclusion of a Save Game feature means that reaching the end of the game is a little on the easy side.

overpower the foul oppressor. As if that wasn't enough, he's also kidnapped Kimberly! Now Ace is back to his youth as Dexter, he must summon up all his mettle to go and rescue Kimberly and defeat the evil Borf.

For anyone not familiar with

Don Bluth's 'interactive cartoons' the gameplay consists of making decisions on the main character's actions by moving the joystick at the appropriate time. Play begins on the cliff overlooking Borf's ship, where Dexter must dodge Borf's laser blasts, and continues



Yet another disaster avoided - a second later and you'd have plummeted to your death.

through the rocky sections of the planet, past stomping robots and tentacled pit creatures into Borf's ship itself. The ship contains all manner of alien hazards, such as guard dogs, guard robots and automatic defence systems.

Eventually, Dexter returns to his powerful adult form and confronts Borf in a deadly hand-to-hand battle with laser staffs. Ace must defeat Borf before escaping with Kimberly. ■

Reviewer: Matt Evans



The start of the game and timing the jump behind that rock on the right is crucial...



...well, you survived that, so onwards you may go.

JUDGEMENT

Don Bluth has improved the format since the first game, making the game run much more smoothly and giving the player much more to do. Despite the fact that *Space Ace* is superbly presented and the gameplay has been improved, the amount of interaction between the cartoon and the player is minimal. The fact that the game can be completed too easily means that all you're left with after three or four days is an expensive four disk animation demo.

GRAPHICS	9
SOUND	8
INTELECT	3
ADDITION	2
OVERALL	62%

BATTLE WITH BORF



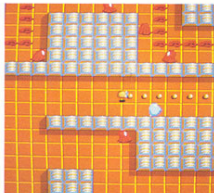
Battling with Borf. That stick he's got is not as innocent as it seems...



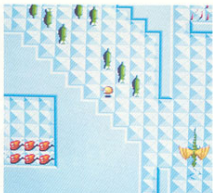
...as you can see!



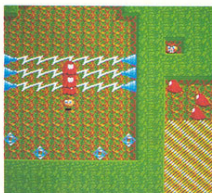
A well timed jump at the vine gets you clear of him.



Collect all the pills and you will be able to go to the next level.



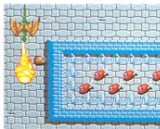
Just how are you going to get to those hams in the bottom left?



Bouncing across those power lines sure sends your health points plummeting!

UBI SOFT £24.99 ■ Joystick

SUPER PUFFY'S SAGA



Keep out of the dragon's breath and collect that key at the bottom of the screen to get into all those health giving hams!



Eek! More fire to avoid, and this time ghosts complicate the situation.

JUDGEMENT

Perhaps the programmers have tried to detract from the lack of game content by going overboard on the peripheral presentation. Well I'm sorry guys, but it doesn't really work! There's a lot of levels to play and they won't be easily beaten but this sort of game looks decidedly dated now.

GRAPHICS	7
SOUND	5
INTELLECT	4
ADDICTION	4
OVERALL	57%

Right, let's get the bad jokes out of the way..."This game is about a load of old balls! Haw haw!" Well that's where you're wrong, because Puffy and Puffyn are young balls.

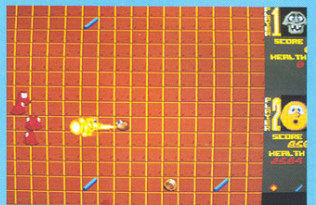
One day, while on an excursion, an evil wizard lured them to his castle, turning them from careless young lovers into small bouncing balls. As if that wasn't enough, he's also trapped them at the bottom of these labyrinthian dungeons. Ooh, the rotter. You must guide the young hero or heroine (depending on your choice) through these dungeons so they can crack the spell and return to their natural shape.

This isn't as easy as it sounds, since there are many hazards to watch out for, including spiked floors, electric guns and sticky floors. There are also all manner of strange creatures wandering around the dungeons who have been warped by the wizard's evil mind and are on the hunt for any strangers in their world. Creatures such as snakes just crawl up and down the corridors and are easy to avoid, but other beasts like fire-breathing dragons and ghosts that follow your every move, cause many more problems.

You are not totally defenceless on your quest though, as the spell has also given you the ability to fire a puff of deadly gas from your lungs. This can be made more powerful by picking up power

GRAPHICS AND SOUND

The overall feel of Super Puffy is very similar to the classic maze game Time Bandit. Many of Bandit's elements have been included, such as weird landscapes and comical creatures, with a liberal dash of the old Gauntlet backgrounds. In fact the whole thing looks somewhat dated, being similar in looks and sound to arcade adventures seen on the Amiga two or three years ago. In that case, why does it work for this kind of game? Mostly because the smaller sprites give the player a feeling of space in the dungeon, leaving the larger and more impressively animated creatures to give a greater impact later in the game. Unfortunately, the sound doesn't match up to the standard set by the graphics, consisting of the odd sampled effect in the midst of a whole batch of weak "plip-plip" effects and annoying phrases, particularly the unhelpful "Puffy, you will die!" I KNOW.



Revenge! Now it's your turn to get the ghosts.

tokens or spells to give you fiery dragon-breath (time for a squirt of mouth freshener).

To finish a dungeon and travel to the next level, Puffy and Puffyn must collect enough 'Goms' to

open a portal. These can either be found lying around on the floor or in chests opened by gold keys. Chests can give spells such as invisibility, speed, immunity or viewing the dungeon using ESP. ■

LASTING INTEREST

Wandering around the mazes is great fun to start with and the fact that the first couple of levels are easy to solve instils a certain confidence, but the gameplay gets too hard too quickly. After the "obvious route" solutions of the first three levels, the game becomes incredibly hard, throwing things at you from all directions so that you can't even make it around the next corner, never mind the end of the level. Soon enough, the feeling of frustration takes over the compulsion to see higher levels, especially when you have to sit through the ever-so-slow outro and intro sections - all seven sections of it!

GRAPHICS AND SOUND

Everything is smoothly animated and fast, but the sprites are not particularly well drawn: they look a lot better when they explode. The backgrounds and the floor are fine, but a little dull. Sound is OK as far as it goes: you get a couple of jaunty tunes and some nice spot effects.

LASTING INTEREST

Pure blasting fun – best in two player mode. It doesn't have the impulsiveness of *Operation Thunderbolt* and it lacks variety too. It's quite tough, though, so it will certainly take you quite a while to complete.



Top: Running along blasting away at the insectoid nasties. Switch weapons by hitting the space bar. Above: You've taken a hit and your energy has suffered as a result.



BAD COMPANY

LOGOTRON £24.99 ■

Joystick

The *Bad Company* in question are a bunch of eight soldiers born and bred just to blast baddies. The baddies that need destroying this time are a load of insectoids who are inhabiting four worlds – four worlds that we want to inhabit, so they have to go, and the *Bad Company* have been called in to 'persuade' them.

It's a one or two player shoot-em-up with it's roots firmly based in *Space Harrier* (that is, your character is at the front of the display and all the baddies run from the back of the screen towards him). Before starting out, you first have to decide which of the eight you'd like to be, as each character has abilities that are peculiar to

him: so some can carry heavy weapons but are none too agile whereas others can move around swiftly, but aren't strong enough to lug the big weapons about.

Once you've decided on the character, you can then choose which of the four planets you want to start on and you're beamed down. From here on in it's just a case of running along, blasting absolutely anything that comes towards you and trying not to take

too many hits because each one leaves a chunk missing from your health meter. Once the meter reaches bottom you lose one of your four lives. Fortunately, your health will repair itself gradually, but the way things go you're often unable to sit around waiting for it to recover before you're thrown into the fray again.

You guessed it, there are tougher-than-average baddies to be encountered along the way and the best way to deal with these is to pick up the extra weapons that are dropped down from the orbit-



Simply shoot the spheres!

ing mother ship – you start the game with two weapons, which can be switched between at the touch of a button. Clear the planet of aliens and you can then move onto a tougher one, with a bigger points bonus should you manage to survive it. ■

GRAPHICS	7
SOUND	6
INTELLECT	1
ADDITION	7
OVERALL	71%

JUDGEMENT

Simple blasting fare that's fun for a while but soon becomes tedious. It is addictive at first, however, and although it's not as much fun as something like *Operation Thunderbolt* or *Space Harrier*, it will nonetheless keep you entertained and playing for a reasonable while.

More car-driving antics, this time in a viewed-from-above job from Hewson. You're taking part in a series of illegal races during which you have to race up the screen, avoiding the boulders and ditches that crop up as you drive along, in order to reach a sign that says 'Turn Here'. Then you have to turn

around and drive back along the course – all within a time limit.

There are also enemy cars to avoid or destroy with your front firing gun. For every kill and race completed you earn yourself money which you can spend in the shops found along the way, on such goodies as missiles, turbo

boosts and even helium tyres that will allow you to jump further.

Graphics are basic, sound is awful and gameplay is not much better. It's not difficult to play but control is frustrating and the task is dull, so you'll have to be dedicated to play to the end. *5TH Gear*? It just gets out of neutral...

GRAPHICS	5
SOUND	3
INTELLECT	1
ADDITION	4
OVERALL	42%

5TH GEAR

HEWSON
£19.99 ■
Joystick

On the first race, pull into the station to get some more fuel, but remember the clock!





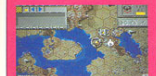
The strategic map which shows the whole planet and which can be called up at any time.

GRAPHICS AND SOUND

The planet is viewed from above and the graphics are fine: they could not be called outstanding, but they are functional for this sort of game. Forget about the sound: there simply isn't any.



The Hen has now collected a lump of precious ore...



...and instantly makes the metal into a handy tank.

JUDGEMENT

A jolly nice, simple, tactical game that can be great fun to play – especially if you are lucky enough to persuade two or three chums to join in the fun. It's easy to get into in the first place, but the only thing letting it down is the rigidity of the set-up (the fixed number of turns, having only one planet and so on).

LASTING INTEREST

With four players (any combination of human and computer), this game can get to be very enjoyable. Even in solo mode it's fun, but after a few games the seasoned strategist will find it too limited to hold the attention. The single-planet scenario does tend to limit the lasting interest too: it's simply not big enough to provide variety.

INFOGRAMES £24.99 ■
Mouse and Keyboard

FULL METAL PLANET



Deploying your forces. That's the Hen about to be dropped.

Below: The set-up screen. Here, there is one human player to take on three computer ones.

Apparently the board game of which this is the computer version, was in existence long before Stanley Kubrick made the film with the 'Full Metal' prefix.

It's a one to four player strategy game set in the future, where up to four spaceships have landed on a planet containing a plentiful supply of a precious metal ore. Every player wants the ore, so it's time to fight. The overall objective in the game is to blast off at the end of 25 turns with as much ore on board as possible.

The game is played in turns, and the first couple of turns are dedicated to deciding first where to land your spaceship and then where to deploy your forces, which include five tanks, two ships and two curious pieces of hardware. The first of these curios is called The Crab and this is the machine that collects the lumps of ore that are found on the surface of the planet and returns them to the mother ship. The second piece is known as The Hen and this can

not only collect and transport ore, but it can also build new pieces of equipment, so it can wander about picking up ore and turning it into pieces of hardware.

Movement of pieces during the game is restricted by two factors, the first and most important being the number of action points available at the start of the turn. Initially, each player only has five points so little can be done. From turn five until turn 21 (at which point the player can opt to blast off if he wishes) the points increase up to 25, so a lot more things can be accomplished – like blasting your adversaries or capturing their pieces of hardware – especially if you save some of your points and have a bumper lot for the next turn. Attacking your enemies is a curious matter: for starters, you must get at least two of your pieces in range – two hexes – and each piece can only fire twice per turn.

The second major movement factor is the tide. Each turn por-



tions of the planet become either submerged or exposed as the tide rises and falls which can leave your pieces stranded and unable to move for at least a turn.

The winner of the game is the person (or computer player, of which there are six with varying levels of aggressiveness) who manages to survive to the end and also has the most ore collected and pieces remaining. ■

GRAPHICS	6
SOUND	N/A
INTELLECT	8
ADDICTION	6
OVERALL	75%

CRAB PASTED



Two pieces move in for the kill on a Crab – and it most certainly looks like the end of the line for him.

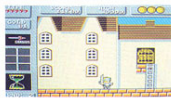


Yup, he's gone.

GRAPHICS AND SOUND

As is usual in games of this type, the graphics have attempted to be cute and cuddly rather than realistic. To be honest, the designers have succeeded in doing this, but it would have been nice to have "cute and cuddly" on a larger playing field. Most of the screen is taken up by the display panels, not leaving much space for the game screen.

The sound also lets the side down, as it consists of extremely weak beeping soundtracks that fail to add any atmosphere whatsoever. It looks as though the game hasn't been programmed to make use of any of the Amiga's features, which for a £25 game is rather annoying.



In the shop and on the receiving end of some sound words of advice.

Occasionally, arcade games veer away from the space shoot-em-up or racing simulation, and appear with some of the silliest plots imaginable. One of these games popped up several years ago, placing the player in control of a nappy-clad, adventuring toddler carrying out tasks that would make a muscled docker flinch.

The game was, of course, *Wonder Boy*, and proved such a success that Sega came up with a

sequel: *Super Wonder Boy*. This time the hero no longer seems like a frightened toddler struggling to stay alive. Oh no, this time the courageous adolescent is kitted out with sword and armour. He has a quest to undertake and, moreover, despite his diminutive stature he can bally well do the job too!

Tom-Tom (our junior hero) must enter the realm of Monster Land, home of the vicious Meka dragon. For too long the scaly

SUPER WONDER BOY

ACTIVISION £24.99 ■
Joystick and Keyboard

tyrant has dominated the poor frightened folk of Wonderland and it's about time something was done. Enter one fully-armed sprig, who you control on the start of his journey into Monster Land.

First stop is a local wizard's hut, where you are kitted out in the latest line in adventurers' 'tin fashions. Then it's time to tackle the terrible tyrant's terrifying tools of termination (that means mon-

sters), such as snakes, giant squid and the evil Red Knight (gasp!)

Not all the inhabitants of Monster Land follow the Dragon ruler's lead, however, and additional help can be had from various store owners and in-keepers, who are only too happy to let you have some additional gear or information provided that the price is right. You can pay them for their services with gold, gained by finding secret locations or by killing the Monster Guards.

To get to the Dragon himself you have to kill off his guardians in a one-to-one battle and steal the keys to the gates that divide Monster Land. ■

LASTING INTEREST

The game starts off quite easy, then gets very hard very quickly, causing you to die somewhat abruptly. As in the arcade version there is a continue play option, but the Amiga version only allows you a maximum of three credits. It also includes the annoying feature of not giving you the chance to finish after one credit, so that your score resets to zero, which means that there is no way to keep your high score. That may seem petty, but once you've completed the adventure (which, incidentally, shouldn't take THAT long), what is there to keep you playing if you can't obtain a high score?



Aargh! A nasty ghost to quite battle with (still, you are a wonder boy so he really shouldn't prove to be of too much trouble to you).



Meanwhile, on another level... This time you are lucky enough to find another shop, located at the top of the stairs.

JUDGEMENT

It seems that *Super Wonder Boy* is another in the sadly increasing number of games that has simply been ported over from the first conversion, so that none of the features that make Amiga games stand out are included. Activision have supplied us with some top-rate games recently, including arcade conversions, but unfortunately *Super Wonder Boy* misses the mark by a considerable distance.

GRAPHICS	6
SOUND	2
INTELLECT	2
ADDITION	3
OVERALL	51%

Reviewer: Mark Evans

Remember that ancient arcade game *Gyruss*, in which you travelled from planet to planet destroying aliens by whizzing around the edge of the screen? Well, Exocet have released a 'new' game similar to this ageing coin-op.

The plot remains the same, in that you have to travel around the solar system destroying the invading alien forces, your eventual destination being good 'ol Mother Earth, although the planet Platbat

doesn't appear to be in the AF textbook of the Solar System! The graphics are more akin to 'classic' shoot-em-up *Arcadia* than a new 16-bit release, being flat and blandly coloured with a noticeable lack of animation. The sound is of an equally poor standard, consisting of a few badly-sampled spot effects and an incredible use of the old 'silent theme tune' trick!

The gameplay is annoying in the extreme. Your ship slows down

when a lot of aliens appear on screen, meaning that it's easier for them to kill you, and the 30-second delay between lives urges your finger towards the OFF button. Take my advice - don't stop the finger! It knows what it's doing!



GRAPHICS	1
SOUND	1
INTELLECT	1
ADDITION	0
OVERALL	19%

Collect that blue pod as it flies toward you and you'll gain a power-up.

Reviewer: Mark Evans

EXOCET £19.95 Joystick

PURSUIT TO EARTH



Another game and a dragon to fight. Time to run away?

DRAKKHEN

INFOGRADES £29.99 ■ Mouse and Keyboard

In another world and another time a strange island once appeared. This island is home to eight (or is it nine?) dragons that have returned after a long slumber to rid themselves of a very annoying thorn in their sides: mankind.

Eventually the only course of action became clear: four adventurers would have to travel to the island and defeat the dragons in order to steal the magical stones set in their foreheads and thus ensure mankind will be free from the threat for once and for all.

JUDGEMENT

This game takes work to get the most out of. The blend between adventure and action works but it's not brilliant. Shoot-em-up fans and anyone not wishing to work at a game should steer clear, and even fans of the genre may find it's not the best of its type. Dungeon Master is still the best action/adventure to have appeared.

You're going to be leading the party, so the first thing to do is decide just who should go and what their attributes should be. A fighter would be a good idea, so would a magician, but how about a priest (or priestess)?

Once you think you've got the right mix you can worry about their strength levels and so on, which are generated randomly and range from one to twenty. This is just a simple process of deciding which number you're happy with for the particular attribute, then moving

on to the next. The easy option, though, is to use the default team, which is made up of a person of each profession, but this does mean you won't be able to save the game as you're playing.

Moving during the game is divided into two major modes. The first is individual mode, where your characters are all on screen and by pointing and clicking with the mouse pointer one character can be directed about the screen (the character currently under control is highlighted to the left of the playing window). This is the main movement mode whenever you're inside a building - handy for picking up objects that are found lying around - and for when you have to engage in combat.

The other movement mode is for travelling about the island and simply involves hitting the return key, at which point all the characters walk towards the front of the screen and fast movement around the lands can be achieved by using the cursor keys. ■

GRAPHICS AND SOUND

The sound effects are terrific and very atmospheric. The graphics are also very good and it's nice to see such a high level of attention to detail: for example, get a member of your party to take some armour out of his or her backpack and put it on and the picture at the side of the screen will show him or her wearing it, as will the sprite when in individual mode. Inside buildings all the rooms are highly detailed and outside everything moves very swiftly when you're travelling around.



In individual mode. Move the pointer around the action window and the highlighted character moves to the selected spot.



With two party members dead things look bleak.

LASTING INTEREST

Should you decide not to bother creating a game save disk, you'll spend hours trying to get through the game. Even when you do create a disk and 'cheat' by saving the game before entering a potentially difficult situation you'll find the game takes a long time to play. Get involved with the game and it'll keep you busy for a long time.



Before setting off properly, though, it's a good idea to equip your party.

GRAPHICS	8
SOUND	7
INTELLECT	5
ADDICTION	6
OVERALL	73%

DUNGEONS AND DRAKKHENS



In group mode. Use the arrow keys to move about the countryside.



A castle to explore, if you can get past the shark in the moat!



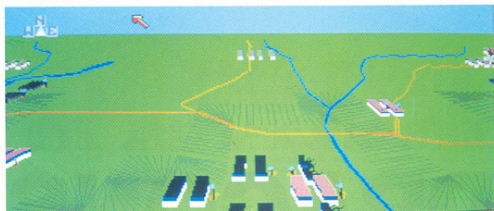
You did, but how are you going to turn off the force fields shielding the doors?



After a scrap, the spoils of war.

PSS £24.95 ■ Mouse and Keyboard

AUSTERLITZ



Mail: Murat, a report has arrived from Walther, at 8 15 am, 1 1/2 mile southeast of the Zuran, I have 1500 men.

Looking north from Napoleon's position. Getting battle reports from your subordinates is the best way to keep track of how things are developing.

December 2nd 1805 and Napoleon's Grand Armee have called off the planned invasion of Britain due to the threat imposed by Austria, Russia, Sweden and Britain who comprise the Third Coalition. The French march their way into Austria and after winning a series of decisive victories are preparing for yet another confrontation with the Austro-Russian forces.

That's the state of play at the start of this one or two player wargame, one that allows the player to rewrite history as either Napoleon commanding the French or Czar Alexander I commanding the allied Austro-Russian forces.

This is the second of the PSS games designed by Dr Peter Turcan. They differ from most wargames in their attempt to be

as realistic as possible - only allowing the player to see the battlefield from the eyes of the Commander-in-Chief.

Once you've decided whether to play as Napoleon or Alexander, take command: the orders you issue are sent by dispatch rider to your corps commanders, who in turn order the divisional generals to move their infantry, cavalry and artillery units. All of your subordinates have their own intelligence and the player is rarely concerned with the decisions made by regimental commanders at the lowest level of command.

The orders you're able to issue vary in complexity from vague commands like 'Soul, attack the Pratzeberg' to things like 'Lannes, at 12 45pm order 3 infantry divisions to defend Santon

Hill'. Once you've decided which orders to issue (eight per turn, each turn lasting 15 minutes) the orders are sent by messenger to their destination. Obviously, the further away this is, the longer it's going to take the orders to get through (if they do at all, because riders are just as prone to getting themselves killed as anyone else). And that's the crux of the game, keeping tabs on what your subordinates are doing and reacting to situations, very often before they can actually occur. ■

GRAPHICS	7
SOUND	N/A
INTELLECT	8
ADDITION	8
OVERALL	91%

GRAPHICS AND SOUND

The last thing you want in a serious wargame is sound, so there isn't any. The 3D graphics, however, are great. It takes a short while for the screen to update each time, but the delay is not too bad. There's an option to see the cannons firing, which is a nice touch, but most of the time you're looking at the blocks that represent the various units.

LASTING INTEREST

To familiarise yourself with the game system and, indeed, to get used to the tactics used in Napoleonic warfare, you can select to view the action through the eyes of corps commanders and major landmarks - very handy. Though there's only one scenario, it's a tough one to win - especially if you play as the Czar against the computer.



Looking south from Alexander's position. The yellow text message just tells you what the computer's doing.

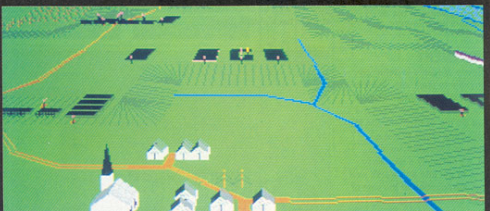


Looking east from Lannes' position on Santon Hill (the option to look through other commanders' eyes is on).

JUDGEMENT

This wargame provides a real challenge. Novices may be better off looking elsewhere, but anyone who wants to play a serious game and is prepared to put in the effort needed to play the game well will find it very rewarding. If you liked *Waterloo*, you'll find this a worthy follow-up.

Looking east from the town of Pratz at the allied forces who are currently dominating the high ground.



GRAPHICS AND SOUND

The character portraits are all good and while the overhead and side views are basic, they're quite reasonable—at least the sprites respond quickly to key presses. Sound is limited to a few spot effects and these are not worth to write home about.

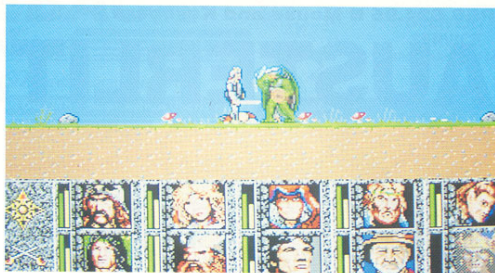
Right: In combat, with the Draconian forces proving to be tough cookies.

SSI continue their series of AD&D releases with *Dragons of Flame*, an action game (like *Heroes of the Lance*, the first release) set in a mythical world.

It's 300 years since the gods abandoned the people of Krynn and as a result, Takhisis, the Queen of Darkness has awakened some dragons and created an army of Draconians. Once her armies are victorious, she'll be able to rule the land. All that can stop her is a bunch of companions — led by your very own self.

The battle against Takhisis has already begun, the Disks of Mishakal have been taken and one of your party (Goldmoon) has become a true Cleric. Unfortunately, your party have also managed to get themselves caught up in a Draconian army and have to reach the caves of Sla-Mori, sneak into the fortress of Pax Tharkas in order to free the slaves and recover the sword 'Wyrmslayer' so as to bind the forces of the resistance together.

Up to 10 companions comprise your band (you start with eight, the other two can be recruited as you travel) and the idea is to move through the coun-



DRAGONS OF FLAME

SSI/US GOLD £24.99 ■ Joystick or Keyboard

tryside, find the caves, enter the fortress and do the business. There are two main movement modes: the first shows your party represented by a single, viewed from above, character that is controlled directly by joystick. The

second is viewed from the side and shows only the party leader (you can switch party leaders whenever you feel like it) and any characters encountered — friendly or not. Encountering baddies usually means you have to fight them and this involves either pressing the firebutton and moving the joystick to one of eight positions, or calling up a spell menu and casting a spell (if the current character has the ability). Encountering goodies, though, usually results in a text message either giving you some helpful advice, such as "There is an arms cache to the north" or informing you that someone would like to join your party.

There are several helpful items lying around that can be picked up and used by members of your party, and these are indicated by blue squares on the overhead view. Once a character dies, his/her portrait at the base of the screen becomes blurred and once you've lost all the party, well, it's time to either start again or load back in that saved game. ■

LASTING INTEREST

It's simple stuff so it's easy to get into. It's also easy to play and with a bit of application shouldn't take too long to complete. That said, it's not too easy and the difficulty tuning has been set about right. It's definitely an action game and the role-playing elements that creep in give it a nice bit of variation on a straight hack'n/slash game.



The spell casting screen: handy, and essential for defeating some of the monsters encountered.

GRAPHICS	6
SOUND	4
INTELLECT	3
ADDITION	6
OVERALL	62%

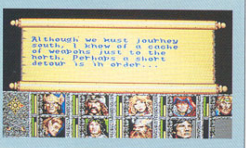
JUDGEMENT

Dragons of Flame is definitely enjoyable to start with, but the sheer number of enemies that have to be dealt with takes the edge off the excitement and the whole thing starts to get a shade on the repetitive side. Still, it's certainly a nice easy game to get into and works well as an introduction to the sort of things that happen in 'real' role-playing games.

The start of the game and a non-player character is encountered.



What you now have to decide is whether it is worth the risk.



DAVE JONES, programmer of Psygnosis' hits *Menace* and *Blood Money*, presents part two of his series in which he divulges the tricks

THE WHOLE TRUTH ABOUT GAMES PROGRAMMING: 2

of the trade used by top games programmers.

This month:

SCROLLING

This month's example with source is the dual playfield *Menace* scroll. The framework source form last month has been used to allow the scroll to be executed, with return to the CLI upon pressing the left mouse button. Try executing the assembled file on the disk, what you see should hopefully be recognisable as *Menace*, minus any aliens or your ship on the screen.

When designing your scroll routine there is one major decision to make: namely, should it be a hardware or software scroll? First I'll explain the differences.

Hardware Scroll

The Amiga has the ability to hardware scroll the display screen. This means the entire display can be shifted pixelly, left or right, with virtually no overhead or processor usage. It actually does better than this in that it can change the scroll value every line if required: take a look at *Shadow Of The Beast* for some impressive use of the hardware scroll.

Software Scroll

A software scroll entails using the

processor, or preferably the blitter, to physically shift the display memory the required number of pixels. Take for example a typical 32-colour screen that requires 40000 bytes: to scroll the entire display memory, even using the blitter, would take the best part of a frame (1/50th of a second).

Pros and Cons

It seems fairly obvious at first glance that the hardware scroll is the one to go for: however, thoughts must now turn to what exactly will be drawn into the display memory. To move an alien

about the screen for either method requires a simple procedure as follows...

1. Save the memory where the alien is to be drawn.
2. Draw the alien (masked) into this memory.
3. When moving the alien, restore the memory and go back to (1).

If we did not do the saving and restoring of the display memory, then as we moved that alien, a 'trail' of itself would be left when it moved. The above procedure is exactly what happens in *Menace*, where the saving and restoring does take up a major part of the execution time of the game. This is where using the software scroll can have an advantage. With the software scroll the usual method is to use the blitter to copy the display memory, shifting it as it goes, to another part of memory, which will obliterate the contents of what was previously there. This means that only step 2 of above need be executed when moving aliens about, as the whole of the display memory is restored

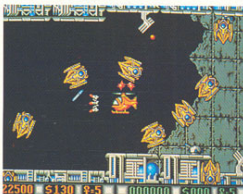
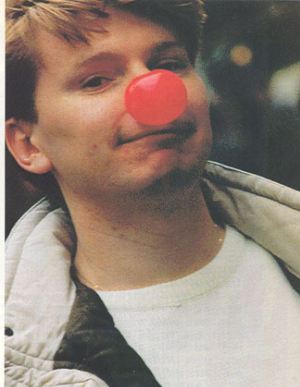
while it is being scrolled.

If you envisage having a LOT of objects flying about on a scrolling screen, then there comes a point where the software scroll will save you more execution time than the hardware one. The software one is also simpler to write, not having to bother with steps 1 and 3 above. Incidentally in *Blood Money* I switched to a software scroll for the very reason of the number and size of the aliens kicking about compared to those flying around in *Menace*. There are, of course, many variations on scrolling techniques which are dreamed up by programmers: it is simply a case of sitting down with pen and paper and working out which one is best suited to your own game.

Scenery Blocks

With the scrolling method decided upon I had to come up with a technique for scrolling through approximately 30 screens for one *Menace* level. The simplest way would be to have 30 screens laid end to end in memory and simply hardware scroll through memory. However, at approximately 24 Kbytes per screen this would require some 720 Kbytes, not exactly easy with only 512 Kbytes! Game playing areas therefore tend to be made up from maps.

The scenery graphics were broken up into 16x16 blocks, each of these given a number from 0-255 (to store as a byte). To make best use of the blocks many blocks were designed to fit together in certain ways giving as much variety as possible. Some games that use this technique are easily spotted when graphic



In one of David's other games, *Blood Money*, he used a software scroll to enable him to put more objects on the screen - as you can see from this screenshot of some furious action.

► blocks that do not quite match up are placed together – *Battle Squadron* exhibits this quirk. As *Menace* is a dual playfield game the maximum number of colours per block is 8, made up from 3 planes. Each block required 96 bytes of memory (2 bytes wide x 16 high x 3 planes) with a complete level taking 24576 bytes (256 blocks x 96 each).

The scrolling technique devised allowed us to scroll through an infinite number of screens, but required memory for only twice that of a normal screen. The *Menace* screen was larger than the normal 320 wide to make the playing area that bit larger. 16 pixels were added either side, expanding it to 352 pixels in length and providing a nice over-cast effect. Another extra 16 pixels were also required at the left side due to the way the Amiga accomplishes the hardware scroll (these are the extra pixels that are normally hidden but are hardware scrolled on) – this is fully explained in the Amiga hardware manual. The actual size is therefore 368 pixels wide of which 352 are displayed. As mentioned, the scroll routine requires memory for two screens laid side by side (see figure 1), we can calculate the memory required as...

46 bytes wide

- x 2 screens
- x 192 high
- x 3 planes
- = 52992 bytes

The 192 line height of the playing area was chosen as it is the closest multiple of 16 to 200, the game panel adds another 32 pixels to the overall height bringing the full screen size to 224 pixels. The background playfield is constructed in a similar way (see figure 2) but requires an extra 32 pixels at the end of each screen for clipping purposes (more about this at a later stage). The memory required for the background is...

50 bytes wide

- x 2 screens
- x 192 high
- x 3 planes
- = 57600 bytes

Given that that one screen is 368 x 192 pixels, this corresponds to 23 x 12 blocks (each block being 16x16). As each block is stored as a byte in the map, then map data for one screen would be 23 x 12 = 276 bytes. For approximately 30 screens per level the map data would therefore



Battle Squadron from Electronic Zoo exhibits a programming quirk where graphic blocks that do not quite match up have been used. Can't see it? Then look closely at the ridge running across from the left of the screen.

be some 8280 bytes. Looking at the size of the file MAP on the disk, which is the map data for level 1 of *Menace*, shows a file size of 5282 bytes – so level 1 consists of roughly 19 screens. The map data in this file is simply organised as 'strips of bytes'. This means that every 12 bytes (the number of blocks high the screen is) represent the 12 graphic blocks that sit one on top of another to form a 16 x 192 high strip which is scrolled on from the right.

That actual graphic data for each block is stored in the file FOREGROUNDS. As discussed, each block is 96 bytes in length, given that the foregrounds file on

the disk is 24480 bytes in length, we know this will contain 255 graphic blocks (1 less than the 256 maximum allowed). The first 96 bytes are always 0, as block 0 is a special case being a blank block (there has to be some blank areas on the screen to fly through).

You could try experimenting with your own graphic data and map. If you altered the bytes in the map in any way, then you will see 16 x 16 blocks scrolling on that were obviously not designed to fit together. You can even try changing the map file to some other file, as it is simply a sequence of bytes that can be any value. The program will not crash doing this. You

can even do this with the foregrounds file to produce some pretty random graphics!

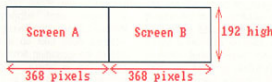
How the scroll works...

Now we know how the map and graphics are organised I will attempt to explain how the scroll works. If it sounds confusing, which it probably will at first, persevere, as when it clicks it should seem pretty straightforward.

Take a look at figure 3. This shows our two screens laid side by side in memory. At any one time we are displaying 352 pixels (22 words) of this data. The bit plane pointers on the Amiga can be positioned on any word (16 pixel) boundary. Incrementing the pointers therefore would scroll through memory 16 pixels at a time, which is a mega speed compared to the single pixel *Menace* requires. We therefore use the hardware scroll to shift the display pixelly from 0 to 15, then when we want to scroll to the 16th position we increment the bit plane pointers but reset the hardware scroll back to 0. We will carry on doing this until we have scrolled entirely through screen A and are displaying screen B. At this point we reposition the bit plane pointers back to display screen A and repeat the procedure again. OK, this will smooth scroll us from A to B.

Now, to keep new data coming onto the screen we draw graphic blocks as defined in the map, one strip at a time (16 x 192 pixels) just to the right of where we are displaying (as shown in figure 3). Therefore for every 16 pixels we scroll on we draw a new strip from the map, scroll another 16 pixels, draw a new strip etc, etc. Remember that the strip is being drawn just to the right of where the display is, so we cannot see it being drawn, but only see it scrolling smoothly on.

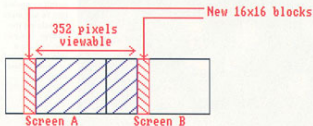
Right, if you understand so far you may notice a quirk in that when we have fully reached screen B, we reposition the plane pointers back to screen A and start again. This sudden jump to screen A though will cause a complete new screen to appear showing what was previously in screen A. This is where we apply the twist in the tail. As we are drawing the strips into screen B and scrolling them on, at exactly the same time we draw the same strip into screen A, just to the left of where we are displaying (see figure 3 again). This means that as we are forming and scrolling through screen B, the exact same data is being formed in screen A, so when we are completely displaying screen B, screen A is also



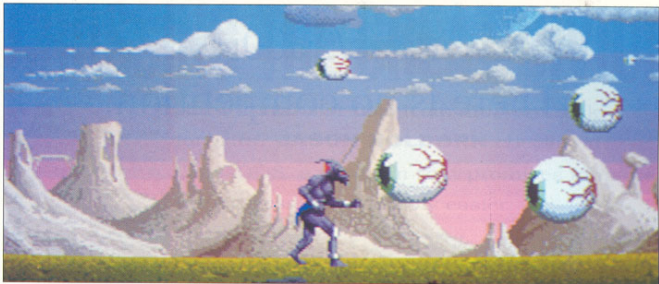
Scenery (foreground) screen
Figure 1



Background screen
Figure 2



Scenery (foreground) screen
Figure 3



Shadow of the Beast, another game from Psygnosis, demonstrates impressive use of hardware scrolling - which is the technique used in Menace.

exactly the same. NOW when we display screen A again, nothing will seem to happen as the same data is being displayed, but we have moved the plane pointers back to screen A, allowing us to repeat this process, and to scroll through large numbers of screens with only two screens in memory!

If your brain has now turned to jelly with that lot, do not worry, the light will dawn soon. Read it a couple of times, remembering the problem you are trying to overcome.

The background playfield in Menace is scrolled through in the same way, although no map building is done as the background is a simple wrap scroll where whatever gets scrolled off on the left reappears again on the right. At the start of a level, the background screens A and B are both built identically from a small map that allows only 16 blocks maximum. The Background is scrolled once every SECOND frame to allow it to scroll half the speed of the foreground. This gives the nice parallax effect. The graphic data for these blocks are included as source in the scroll source on the disk. The background graphic blocks are only 4 colours.

The copperlist

Finally for this month a run down of the copperlist for the main game (Listing 1). I tend to put everything that describes the display into the copperlist, although many can simply be written with the 68000. It allows the full display to be quickly changed or referred to rather than looking through your source to find where you changed modulo's etc, for certain copperlists.

The first instruction is a 'wait for line 10', which simply allows a

LISTING 1 - MENACE COPPERLIST

```

clist          DC.W $0A01,$FF00
copperlist    DC.W bplpt+0,$0000,bplpt+2,$0000
              DC.W bplpt+8,$0000,bplpt+10,$0000
              DC.W bplpt+16,$0000,bplpt+18,$0000
              DC.W bplpt+4,$0000,bplpt+6,$0000
              DC.W bplpt+12,$0000,bplpt+14,$0000
              DC.W bplpt+20,$0000,bplpt+22,$0000
              DC.W bplcon0,$6600
scroll.value  DC.W bplcon1,$00FF,bplmod,$0036
              DC.W bpl2mod,$002E,bplcon2,$0044
              DC.W dfststr,$0028,dfstop,$0008
              DC.W diwstr,$1F78,dwstop,$FFC6
colours       DC.W color+0,$0000,color+2,$0000
              DC.W color+4,$0000,color+6,$0000
              DC.W color+8,$0000,color+10,$0000
              DC.W color+12,$0000,color+14,$0000
              DC.W color+16,$0000,color+18,$0000
              DC.W color+20,$0000,color+22,$0000
              DC.W color+24,$0000,color+26,$0000
              DC.W color+28,$0000,color+30,$0000
              DC.W color+32,$0000,color+34,$0000
              DC.W color+36,$0000,color+38,$0000
              DC.W color+40,$0000,color+42,$0000
              DC.W color+44,$0000,color+46,$0000
              DC.W color+48,$0000,color+50,$0000
              DC.W color+52,$0000,color+54,$0000
              DC.W color+56,$0000,color+58,$0000
              DC.W color+60,$0000,color+62,$0000
sprite        DC.W sprpt+0,$0000,sprpt+2,$0000
              DC.W sprpt+4,$0000,sprpt+6,$0000
              DC.W sprpt+8,$0000,sprpt+10,$0000
              DC.W sprpt+12,$0000,sprpt+14,$0000
              DC.W sprpt+16,$0000,sprpt+18,$0000
              DC.W sprpt+20,$0000,sprpt+22,$0000
              DC.W sprpt+24,$0000,sprpt+26,$0000
              DC.W sprpt+28,$0000,sprpt+30,$0000
              DC.W $DF01,$FF00
              DC.W bplcon1,$0000,bplcon0,$4200,dfststr,$0030
rasteropl12  DC.W bplpt+0,$0000,bplpt+2,$0000
              DC.W bplpt+4,$0000,bplpt+6,$0000
              DC.W bplpt+8,$0000,bplpt+10,$0000
              DC.W bplpt+12,$0000,bplpt+14,$0000
colours2      DC.W color+20,$0000,color+30,$0000
              DC.W color+2,$0000,color+4,$0000
              DC.W color+6,$0000,color+8,$0000
              DC.W color+10,$0000,color+12,$0000
              DC.W color+14,$0000,color+16,$0000
              DC.W color+18,$0000,color+20,$0000
              DC.W color+24,$0000,color+26,$0000
              DC.W color+28,$0000,color+0,$0000
              DC.W bplmod,$0000,bpl2mod,$0000
              DC.W $DF01,$FF00,intreq,$8010
              DC.W $FFFF,$FFF0
  
```

bit of time after a vertical blank occurs in which to change some values in the list, before the copperlist is executed again.

Next we set the bitplane pointers. Six planes in all for dual playfield, three for the back playfield (as defined first) then come the three for the front playfield. Note these all point to 0 as they will be initialised once we have allocated some screen memory.

Next come the control registers. BPLCON0 is set to six planes with dual playfield activated.

BPLCON1 sets both playfield scroll values to 15. As we want to scroll left we have to actually decrement the hardware scroll value, incrementing it will scroll us right.

BPLMOD's are set to the difference in width of the screens laid side by side in memory, to the displayed areas.

DFSTRT and DDFSTOP are increased from the normal values by one word each, DDFSTRT is increased by a further word due to the hardware scroll. The hardware manual goes into this in greater depth.

DWSTRT and DWSTOP are set to reflect a screen size of 352 x 224 pixels. Note that the display is set higher up the screen than normal to allow 224 pixels to be viewed on an American system on which Menace appears as full screen with overscan.

COLOR and SPRITE registers are all set to 0 initially, these are set up by the initialisation routine of the game.

After 192 lines have been displayed a copper change occurs which switches the display to a 16 colour one in which the panel is displayed. The panel is 352 x 32 pixels, the graphic data is stored in the file PANEL on the disk. ■