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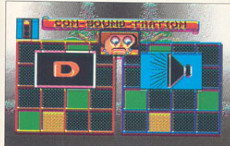
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FOR THEIR HELP IN THE MAKING OF THE MUSIC FEATURE, OUR THANKS GO TO: DUCK SON AND PINKER, BATH (MUSICAL INSTRUMENTS), MIKE AT MOLES STUDIO, BATH (DAT RECORDER), YAMAHA UK (INSTRUMENTS AND PICTURES).

MUSIC

A day in the life of a tune.
Follow the construction of
a piece of music, listen to
the tape as you go, and
learn how easy it can be...

Disk Extra

DAN DARE III

PLAYABLE DEMO OF SPACE SUPERHEROICS FROM VIRGIN

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FULL USEABLE DEMO OF MICRODEAL'S NEW MUSIC-MAKER

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119



Captain John Stark
Peace Officer
Age 33 years
Current Location:
Glen Darrow



The actions screen where you decide what your character should do - ski in this case



MIDWINTER

RAINBIRD £24.95 ■ Mouse, Joystick or Keyboard

The year is 2099 AD. The world was devastated some 60 years previously when a strike from a massive meteorite affected the global climate and sent the world into a new Ice Age. Continents collapsed, millions died and it was clear things would never be the same again.

Some thirty years ago a bunch of people discovered an ice-covered island and started settling the place. Life was far from easy, but by sinking heat mines it became bearable and the inhabitants of what became known as Midwinter Isle struggled on.

It soon became apparent that Midwinter was, the last habitable place on Earth and the leaders of the isle got together and formed the Free Villages Peace Force (FVFF), to ensure things stayed free and safe. New settlers who through luck or careful planning managed to find their way to Midwinter were welcomed and integrated into the island's system.

In the last few years, though, some of the newer members have become disgruntled with their lot. The leader of the FVFF, Captain John Stark, decided to let things ride... and disaster struck.

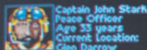
A rebel army, led by General Masters, is now on the march and intent on taking over the whole island. You, as John Stark, must rally your forces and prepare to defend the island...

Midwinter is a one-player strategy game featuring light-sourced 3D graphics and a game area of 160,000 scale square miles. There is a total of 32 characters in the game who can be rallied to your cause. To find out where these people are and where General Masters' armies are, a map can be called up at any time. Then the only problem to deal with is getting to them.

There are four methods of transport on the island: travelling from two fixed points in the cable car, hang-gilding from the top of high ground or - the two most common methods - in snowmobiles or on skis. Snowmobiles can only be picked up from settlements with a garage but you can ski anywhere. There are dangers to all methods of transport and it's highly likely you'll take a tumble, but this is less serious when you're skiing than when you're hang-gilding or driving a snowmobile.

After a hard journey, taking breaks to restore energy when necessary, you make it to your destination and put your case to anyone who'll listen. If you're lucky you'll gain a recruit. This is by no means guaranteed because, like any community, there are some people who will do favours for others and some who won't.

All those you do manage to recruit need to be controlled by you, though, and as the game is time based there are two watches to keep your eye. There's a team watch and a personal watch. You don't want to see 10 people sitting around doing nothing while you concentrate on one person, so every character has two hours of game time in which to act before watches need to be synchronised with the team watch and every-one's two-hour period starts again.

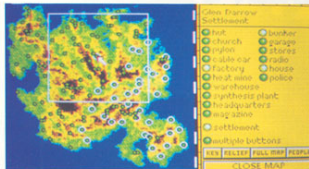


In recent years, John Stark has made the FVFF into a disciplined and effective force. He is a fair man but equally a man convinced that his way is best. He has never had much time for romance and many were surprised when he fell for Sarah Madlooke. Stark's nearest friends are Howard Courtenay and Harl Rudzinski.

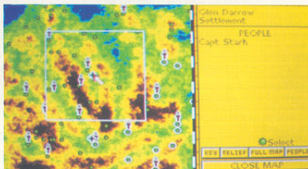
QUALITIES AND SKILLS

Morale	Excellent
Energy	Excellent
Alertness	Excellent
Endurance	Excellent
Sturdiness	Good
Oxylation	Good
Strength	Good
Stamina	Excellent
Sharpness	Excellent
Shining	Good
Gilding	Good
Driving	Excellent
Sniping	Good
Sabotage	Poor

Every character gets his or her own personal details screen, which it's important to look at when deciding what they should be doing.

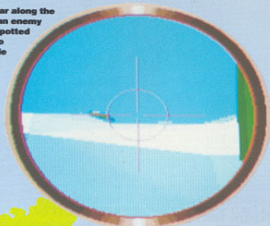


Midwinter Isle. You're somewhere around the middle-ish of the map. At the moment 'settlements' is the option you have selected, but if you're looking for the nearest comrade...



...hit the 'people' button and the display changes to show you where they are. Prof Kristiansen could be a big help in recruiting others if you can get him to a radio station, so let's go find him.

Not very far along the road and an enemy patrol is spotted - switch to snipe mode and blow them away.



And here's Kristiansen's hut. Let's hope the Prof's in.



RESISTANCE



Captain Stark explains about the location of the Free Villages and asks for help in resisting General Masters' army.



"That's your problem, not mine," snarls Professor Kristiansen.



Kristiansen



Well, Professor Kristiansen is indeed at home, but he's not coming round to your way of thinking. That's a bit of a blow.

For example, you send person A to a particular village to meet person B. Person C, meanwhile, goes to meet person D. You control A on his mission for two hours, then switch control to C for two hours. In effect you have controlled both, simultaneously, for the same two-hour period. After these two hours, A and C will be back on the same time, so watches can be synchronised and you can start again.

When the enemy are discovered they should be engaged. If you're travelling somewhere you can enter snipe mode when sking or chuck some missiles at them from your snowmobile. At any rate, try to destroy as many of

them as you can, but always remember that the enemy forces will be shooting back!

Rally your troops, destroy the enemy and when you're ready launch a counter-attack on the enemy HQ. Succeed and Midwinter Isle will once more be safer: take too long, though, or let the heat mines fall into enemy hands, and it's curtains for you and your people. **Andy Smith**

GRAPHICS	8
SOUND	6
INTELLECT	7
ADDICTION	9
OVERALL	92%



Back to the skiing and you've been spotted by another patrol, who very ungenerously decide to fire homing missiles at you.

GRAPHICS AND SOUND

The sound effects are good, as are the graphics. Everything is well drawn and the 3D moves swiftly, although it can be difficult on occasion to judge the landscape when you're skiing or driving. Generally, the audio and visual effects are of a satisfyingly high standard.

LASTING INTEREST

This will take you absolutely ages to play: fortunately there's a game save option. Just trying to get started is tough, so you'll really need to concentrate and use your resources to their best advantage to gain a victory. It's compulsive stuff, so once you start you'll enjoy every minute.

SITUATION REPORT

FVFF

HEATMINES	16
DESTROYED	
FACTORIES	0
SYNTH PLANTS	0
WAREHOUSES	0
RADIO STATIONS	0
ENEMY UNITS	0
ENEMY VEHICLES	2

DAY 1



ENEMY

PRISONERS	6
HELD	
FACTORIES	10
SYNTH PLANTS	8
WAREHOUSES	5
RADIO STATIONS	4
MOBILE UNITS	32
MOBILE VEHICLES	4065

Watches synchronised! Your team has two hours before the next situation report is due.

Two hours have passed so it's time to synchronize watches and get a report on how well the war's going.

JUDGEMENT

Well, it's finally made it. *Lords Of Midnight*, the greatest ever game by Mike Singleton, author of *Midwinter*, has arrived on the Amiga, albeit under a different name and with a whole host of improvements and updates. *Midwinter* is the '90s LOM, a sugar-coated wargame with the pace set at just the right level for the player not to realise he's playing such a complex strategy game. *Midwinter* is a superb game to play and a must for anyone who wants to immerse themselves in a thoroughly believable game world. Playing properly, ie allowing the enemy to have mortars and bombers, you'll find this an excellent game: but note, there is one way to complete the game extremely quickly. The quick route is a lot like cheating, so bear that in mind, but if you're prepared to play the game properly and win convincingly you'll enjoy it immensely.

Catching a cable car across mountain ridges reduces the risk of injury and provides Cap'n Stark with a chance to catch his breath.





Performing a stunt to earn extra dosh. That banknote fluttering along in the air might turn out to be useful too.

SKIDZ

GREMLIN £19.99 ■ Controls

No-one likes to live in a town strewn with litter, but just try rounding people up to do something about it. This is the situation in Gremlin's *Skidz*.

Your local townfolk are an extremely messy lot, dropping cans, bottles and pieces of paper all over the place. Despite concerted efforts nobody will get down and clear it up, so you must take to the streets and clear them up for yourself.

You can ride either your skateboard or BMX bike through the town to carry out the task you

have set yourself, which is to pick up at least 75% of the litter in each of the town's messiest sections. Ten pieces of rubbish can be picked up before your arms are full, at which point you must deposit the bits in a trashcan before any more can be collected.

Throughout the town, evidence of neglect can be seen, such as potholes, broken walls and discarded boxes. All these obstacles must be avoided, since falling off your mount depletes your energy supply. Extra energy can be gained by picking up useful items around the town, or by spending money in the Ride 'n' Skate shop (which doesn't seem to sell any trendy clothes, unfortunately for you hip skaters).

Money is gained by performing stunts off the ramps or by picking up dosh dropped by particularly negligent townfolk. Don't hang about though, as there is a clock counting down, which heralds the appearance of the

LASTING INTEREST

The first level is easy enough to complete, getting you nicely into the feel of the game, but from the park onwards things tend to get a lot tougher. You can choose to pick up the game from the start of the last level if you wish, which is a handy little facility and is bound to be well used. The superb graphics of each level will keep you playing "just to see what the next level is like!" The choice of control methods is another nice touch, allowing you to find out which manner of play suits you best so you can choose to play in that mode.



Pick up and deliver those chopsticks for an extra bonus.

GRAPHICS AND SOUND

Skidz's graphics perfectly capture the mood of riding and skating around the streets, even down to the skateboarder's way-out clothes. The sprites have a marvellous cartoon-like appearance, especially on some of the characters around town – the mad workman with the pneumatic drill is well worth looking out for! The background graphics have an individual atmosphere on each level, from the cobbled streets and canvas huts of Chinatown to the muddy wastes and heaps of bricks found in a building site – everything is loaded with atmosphere. The sound is rather jolly too, consisting of an up-beat hip-hop tune backed up with lively vocal samples and solid effects, but I can't help thinking that a mad guitar thrash track would have fitted better!

scrap spirit, who whizzes around you draining all your energy in an attempt to keep the mess he likes gathered around him.

Bonus points are awarded for completing set tasks on each level. For example, finding and delivering a parcel, feeding the fish in the park or delivering the paper to the workmen on the building site. This is the only time that the town's inhabitants are co-operative, as for the rest of the time they just hang around getting in the way. Awkward bast... er... awkward people! **Maff Evans**

GRAPHICS	9
SOUND	7
INTELLECT	3
ADDICTION	8
OVERALL	86%

JUDGEMENT

It's been a while since such a straightforward 'fun' game has appeared on the Amiga; especially one that looks and sounds as good as *Skidz*. The appeal of the game is bound to spread beyond the die-hard skateboard and BMX fans, since the game has obviously been written with a sense of humour, especially when from a gate reading 'Beware - Beast' wanders a little brown mongrel! If this is in tune with your sense of humour and po-faced shoot-em-ups seem a little dull these days, then get your most colourful shorts on and have a bash at *Skidz*.



Are you really ready for a race? Well, go for it anyway!



It's a straightforward race! Go! Go! Go! Go for the tape!

IN THE SHOP



Replace any damaged wheels with a new set on your BMX

Cost - \$50



New bike brakes for quicker deceleration

Cost - \$30



Repair kit for patching up damaged bike wheels

Cost - \$10



Helmet to reduce the amount of energy lost in collisions

Cost - \$90



Water bottle for an extra few units of energy

Cost - \$20



Buy a medical kit to completely refresh your energy supply

Cost - \$50



Replace damaged runners with new skateboard wheels

Cost - \$50



Fit brakes to your board with a stopper pad

Cost - \$30



Knee pads help to cut down on energy loss

Cost - \$40

Theme Parks are generally seen to be happy places. Places to which families can go together and spend a day having fun, forgetting all their worries. Your grandfather can tell quite a different story.



This game may look innocent, but fail to win and your progress could be severely impaired!

Magic Canyon was one of the most successful Parks in the country, until something happened there to send your grandfather completely mad. You must find out what happened so that the memories of your family can be put to rest and the park can be reopened. Otherwise the park and the land will have to be sold off, losing everything that your grandfather worked for.

As soon as you arrive at the park, it becomes clear that something is not quite right. A strange presence can be felt as you enter the first of the Park's three sections, Yesterdayland. For one, what happened to your clothes? The old-fashioned costume isn't what you were wearing when you arrived - things are going to be weird!

This is where your adventure begins. To begin with you must work out how to use the fortune telling machine, the home of Zoltan. He will tell you what you have to do to return the park to normality - namely return eight runaway demons to him.

The demons are well hidden within the four areas of the park - Yesterdayland, Dragonland, Futureland and Dreamland - each of which has its own specific task that needs to be completed before the game can be finished. To enter the different areas an item must be picked up and used, but finding them isn't as easy as it sounds. All possible clues must be taken note of, as well as applying a substantial amount of brain power to solve the puzzles and win the challenges placed in your way by the mischievous demons. *Maff Evans*

CH-CH-CHANGES



Zoltan's magic gives you a new form as you travel to each section of the game.

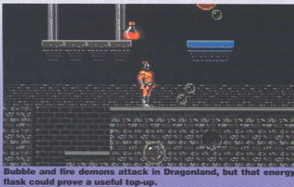


Zoltan, the guardian of the fortune machine, magically appears to tell you of the task that lies ahead.

THEME PARK MYSTERY

**IMAGWORKS/
MIRRORSOFT £24.99**

■ **Mouse and Joystick**



Bubble and fire demons attack in Dragonland, but that energy flask could prove a useful top-up.



Look out for the bird and pick up the keys he drops. Those pretty little boxes are just dying to be opened!

GRAPHICS AND SOUND

Theme Park Mystery's strength most definitely lies in its polished appearance. A lot of care has been taken to ensure that the feel leans well towards the ethereal adventure side of things (even though many of the sections are definitely arcade based) with lots of objects to use and graphic puzzles to overcome. Each park has its own distinct atmosphere, from the rustic colours of Yesterdayland, via the medieval catacombs of Dragonland to the surreal surroundings of Dreamland. Sound is sparse, consisting of a few sampled effects and tunes, but it is still effective where it is used - particularly the jolly bandstand music from the grabbing game and the mysterious theme tune (if only it was a bit longer).

LASTING INTEREST

As you'd expect from adventure game, it's extremely unlikely that you'll complete Theme Park Mystery in any great hurry. The arcade sections fit into the game well, but rather than returning for another 'bash' their challenge will only last until you've managed to carry out the task required to complete them. Still there's enough to get through before the game has been won, so adventure fans will probably sit glued to their screens until the challenge has been overcome.

JUDGEMENT

Adventures that are entirely graphics based are quite often simply arcade games with a few obligatory puzzles thrown in. Theme Park Mystery manages to avoid this trap, mainly due to the fact that the game was designed by a well-established adventure writer. With a great deal of thought, all the puzzles can be worked out logically but, even when you know what to do, there is still a lot of playing to be done before the final goal can be reached. Theme Park Mystery may be just the game to bridge the gap between pure adventure games and the adrenaline-fired world of shoot-em-ups or platform games, creating the perfect opportunity for fans of either to cross over and discover the delights of the other.

GRAPHICS	8
SOUND	6
INTELLECT	7
ADDICTION	7
OVERALL	82%



After a quick prayer the game's afoot!

NINJA SPIRIT

ACTIVISION £24.99 ■

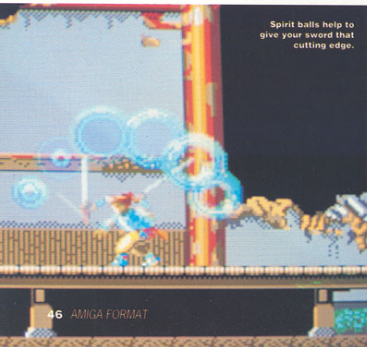
Joystick

What's all this *Ninja Spirit*? Well, it allows the summoning of long-dead ancestors to see off present-day foes. Dealing with ancient magic, though, requires balls! Childish innuendo aside, the spheres in question are 'spirit balls' that give the living warrior power-ups on his sword, shuriken, rice scythes and 'lasson ropes' - a bit of string with a blender on.

All very handy, as from the word go Ninjutsu's most unpopular man is set upon by horde after

horde of blood-crazed nutters. The guy's task is to fight his way through seven levels of death, destruction and other distractions for no good reason whatsoever.

The arenas vary, but the song remains the same, a horizontally-scrolling cut-em-up, with the small 'ninja' leaping around the place waving various death-dealing devices. Bad guys appear in trees, hop on screen, charge headlong at him and even burrow under the floorboards, trying for a bot shot.



Spirit balls help to give your sword that cutting edge.

GRAPHICS AND SOUND

The days when ninjas followed the Henry Ford dress code (any colour as long as it's black) are long gone. These boys wear every colour under the sun and when mixed with Buddhas and bonsais they create a stylised Japan that never was, but should have been. The end-of-level guardians, too, are big, bad and beautiful. Lend an ear to the soundtrack while slaying and the picture is complete.



Two ninjas mean much more murder.

LASTING INTEREST

NS is a straight arcade charge into single-handed genocide. No subtle gameplay, no vast array of controls - just swords and spears, blood and guts. The first couple of levels are easy enough for any shogun assassin to carve up real quick. The major difficulty comes from finger fatigue as foes fling themselves forward incessantly. There's an instant magic but no real development in the style of opponent, so life soon gets a little bit dull. Enough is missing to bore the 'intelligent' gamer to tears in ten seconds flat, while any accomplished coin-op killer will rip through all seven levels in no time.

VERDICT

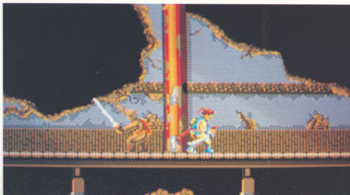
Ninja Spirit was a great arcade machine game, the double-action blades of the ninja and his spirit shadow putting Gillette's corporate output to shame. But what was fun for a ten-minute massacre drags as a home conversion. The extra power weaponry helps in the beginning, as does the double ninja bonus, but after that, all that's left are the end-of-level guardians - and they're good, but not that good.

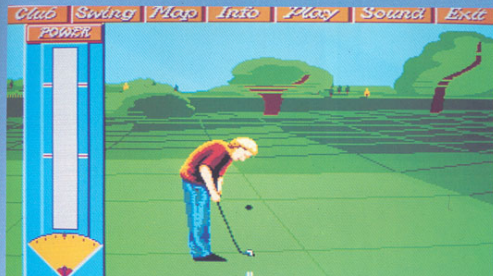
GRAPHICS	8
SOUND	7
INTELLECT	4
ADDICTION	4
OVERALL	63%

On the plus side *Ninja* can collect spirit balls, select the flashing weapon (the best one for that section) and then something magical happens. It's called mega-death! Swords throw out huge rings of destructive energy killing anything they touch, death stars triple in volume and various other deadly side-effects ensue.

The true *Ninja Spirit* shows when you collect a spirit ball and find that you've grown a solid shadow. This is one of your ancient friends back from the grave. They mirror every move, striking with the same power-ups as you. Your companion is invulnerable and hangs around until you croak, which can be a mighty long time with the spirit doubling your kill power. Sickening violence on a grand scale is the result, but now it's in your favour! **Trenton Webb**

Watch out for that guy burrowing up below.





Don't undershoot on the putting green. Because there are no pointing arrows (the ball will automatically drift toward the hole) it seems simple. But putting distance offers the greatest challenge.

ULTIMATE GOLF

GREMLIN £24.95 ■ Joystick, Mouse and Keyboard



Choose your club with care. The caddy will help, but it's worth bearing in mind that he is only the caddy. You decide.



Detractors of the game claim that golf isn't so much a sport as an insult to lawns. So if you're the kind of person who, adding injury to insult, can turn the local pocket of greenery into something resembling The Somme, playing from home could well be the perfect solution.

Gremlin have come suddenly to the fore with what is claimed to be "The most accurate Golf simulation" to date. With the help of the (still) World Number One-ranked Greg Norman and a posse of Sheffield programmers the firm have conjured up what is set to be undoubtedly the most intriguing golf simulation since the wholly magnificent *Leaderboard*.

For the first time you are required not simply to make a few mathematical calculations, aim and fire but to master and utilise the variety of tricks which make the likes of Norman such a marvel. Gremlin have provided the player with a myriad of useful options

designed to aid the wee ball's progress from tee to hole. Fortunately for those of us who like a challenge this can have the opposite effect. For one you can change the angle of spin to a finite degree. This can result in a shot which will turn your pitching pals green with envy or can make you look like a complete berk.

There's the chance to give your ball detailed top and spin which can make the dimpled object of frustration stop dead as soon as it hits the ground. This brand of jiggery-pokery could take you months to perfect.

Ensuring accuracy of stroke is no breeze either. The Gremlins have designed an extremely fast swingometer which will surely test your nerve. If you don't hit your button at the crucial moment the result will be somewhere between the lacklustre and the diabolical.

There are rakes of playing options. You can take a stroll around one of two courses on

GRAPHICS AND SOUND

The landscape has been drawn in a squarial style which, while not always appropriate, manages to give you a good picture of terrain. On the whole the affair is pretty and bright although sometimes a tad fuzzy. The worst aspect of this game is the sound which you would do well to dispense with. Clearly golf is not a noisy affair, but audio simulations of balls dropping into holes or magnificent one wood swings are, on this occasion, awful.

LASTING INTEREST

For one player or four there is plenty to do and the more you get the swing of it the more you'll enjoy this game. It's excellent fun. Gremlin have provided only two courses but are promised extra fairways, lawns and greens in the near future.

JUDGEMENT

Despite the number of options available this isn't an excessively fancy game. It's accurate, intelligent and challenging and will prove to be one of the most popular sports sims of the year.

your own or with some opposition and you can play Fourball, Foursome, Greenball or Skins. At every turn there pretty windows offer extra options to give you a clear picture of variables such as weather, wind speed and turf.

Each individual club head is pictured in one window so you make the best choice. The usual map is also to hand, but you have the option to view the hole from any part of the course. And there are many fiendish obstacles as well as putting greens which will make your blood boil.

Gremlin have taken a small eternity to get this game out, but it's turned out to be an absolute corker. **Colin Campbell**

GRAPHICS	8
SOUND	2
INTELLECT	6
ADDICTION	9
OVERALL	88%



Subtle changes to swing, angle and top will make all the difference.



Ignore the map and suffer the consequences. There are some fierce obstacles.



Italy move in to score. INSET: A change of view for the goal-kick.

ITALY 1990

US GOLD £24.99 ■ Joystick

If things carry on as they have been with everyone and his cat releasing World Cup games, then no one will be able to get away from their machines long enough to watch the actual event! The latest game to arrive is from US Gold (don't mention World Cup Carnival!) and comes in the usual 'view from almost above' mode of play.

You can choose to play any of the teams taking part in the competition, with all teams adhering to a seeding system. The difficulty of the game depends on how strong your selected team is. For example, selecting a team such as Italy or Brazil will make your job of reaching the final and claiming the cup pretty easy, whereas picking someone like Egypt makes things a little tougher! Once you have

chosen a team to represent, the playing formation and team list is set up, then it's off to the game!

The form of the competition closely follows the World Cup itself. That is, three qualifying matches have to be played, with the top two teams from each group going through to the second round. From then on the game is played as a straight knockout.

Maff Evans



Select players from the squad and put them in formation.



Typical Latin enthusiasm takes over as a goal is scored.

GRAPHICS AND SOUND

Italy 1990 is very well presented. The intro screens are colourful and nicely drawn, and there are some nifty touches such as the TV presenter outlining the forthcoming action. The graphics in the game itself are of a similarly high standard. The sprites move effectively around the smooth-scrolling pitch, and extras such as the animated scoreboard and touchline-view goal-kicks add to the atmosphere. The music is jolly enough, but the in-game effects don't consist of much more than a few thuds and whistles. Where's the joyous Italian crowd? Gone home, it seems.

LASTING INTEREST

Romping through the competition to take the cup is rather easy if you play as one of the top seed teams, but just try taking the United Arab Emirates into the final and you'll find that it's a totally different ball game! The other teams will not hesitate to stomp all over you. This kind of challenge will have you plugging away until at least after the World Cup final's been televised.

GRAPHICS	8
SOUND	5
INTELLECT	4
ADDICTION	7
OVERALL	80%

JUDGEMENT

Anyone who remembers US Gold's last 'official' World Cup release may be a little dubious about Italy 1990. However this hesitation is unfounded, since US Gold have put their footy troubles behind them and have come up trumps with an amusing, well-presented and superbly playable footy game. The wealth of teams and players gives the game a healthy amount of variety to keep players interested, and even if you do get bored, you can always keep yourself occupied with the World Cup Trivia book included in the package until the next game's on telly!

"...and it's over to our man in the



TREASURE TRAP

ELECTRONIC ZOO
£24.99 ■ Keyboard

Isometric 3D, popular in the mid-Eighties, is now making a comeback. The advantage of this technique is that each location in a game can contain a great deal of graphic detail. The setting here is a sunken ship containing gold which you are trying to recover.

The ship is composed of 100 rooms, most containing gold bars, aquatic lifeforms

intent on destruction and man-made hazards. As in all games of this type you can jump and pick things up - the two essential abilities for solving the problems in each room.

The gold bars are sometimes in easy reach but more often are hidden away or perched in awkward places. Getting them involves pushing objects around, using lifts,

making smaller creatures go where you can't and generally outwitting the beasts. Many things can whisk away one of your lives - and your air supply must constantly be replenished by collecting oxygen tanks.

Helpful objects include keys and 'smart' fish which act like a smart bomb, swimming round and killing off all the dangers in a room.

There's plenty of ship to explore and it looks good too. Excellent title music rounds off the feel nicely. However, the puzzles in each room are fairly simple and that means the lasting interest dips once you've explored the ship, which should only take a few days. It's fun, but although the map is complicated enough, the rooms are not. Bob Wade

The opening screen in the centre of the ship. The sphere and pyramid are keys (the sphere is needed to open all four doors here) and on top of the crate is your first gold bar.



GRAPHICS 7 / SOUND 6 / INTELLECT 5 / ADDICTION 7 / OVERALL 68%



The mission briefing. Each of the missions can be practised as often as you like, but can only be done for real once.



Into the mission. The brown box indicates the target zone, and there are no enemy about yet.

The Drastic Response Assault Group Operations Network are in town and they mean business. These boys are a crack group of commandos 14 strong working for all the good nations of the world in a bid to stamp out terrorism. Guess what – you're in charge of the whole bunch.

This is a single-player tactical skirmish wargame featuring some dozen missions that can be played in any order. For any mission only seven of the bunch can be selected, so the first thing to do is get the mission briefing. Pick carefully to get the best men, because they are all specialists in different areas including demolition work, handling nasty great machine guns and close combat.

Once you know what must be done and you've picked the people to do it, the next task is to select weaponry for each soldier. Each one of the squad has several characteristic ratings such as awareness, intensity and strength, the strength rating determining how much of a load the soldier can take into battle.

Then it's time to do the job. Your group is airlifted to the game area and you then have a fixed time to complete the task before reassembling your men at the extraction site where a helicopter



In the process of issuing orders. In this case, getting a medic across to one of your wounded soldiers is the target you want achieved.



Here are the enemy. Things are not looking good.

D.R.A.G.O.N. FORCE

INTERSTEL £29.99 ■ Mouse



After you've picked the team, kit them out with some weaponry.

will come in and get you out – the helicopter can be called in before the specified time if you finish the job early or get into a tight spot.

The game is played in rounds. Up to five orders can be given to each man who will endeavour to carry them out. Once you've issued orders (they're small and

quite specific orders, none of this 'go over there and shoot anyone who moves' stuff) you can then advance the game. You have two options: 'go until event', which means the game continues until something happens (ie forces exchange fire) or 'go until interrupt', which means things carry on unaided until you break in and dish out some more orders.

At the end of each mission you're given a de-brief which tells you if any of your squad have had their attributes upgraded, whether you lost any of the team (which you'll know anyway) and whether you gained any medals.

Missions can be practised any number of times but can only be done 'for real' once. When a mission is completed you won't get the chance to do the thing again – although it's worth noting that there are ways to cheat so that you can. **Andy Smith**

GRAPHICS AND SOUND

Everything is viewed from above with the characters drawn as little stick men. The background graphics are much better, though, and the sound effects are good as well. You'll know by now that great graphics don't necessarily make a great game and the same applies in reverse: naff graphics don't have to mean a naff game.

LASTING INTEREST

More would have been nice. There are only the dozen missions and there are no skill levels. Although you can cheat and redo missions to improve your performance there's little point. Novices will find it tricky to start with, but others will find the missions slightly too easy.

JUDGMENT

DF has been nicely done: it has a Laser Squad feel to it and, though it's not as good, it will keep you playing for some while. More missions and various skill levels would have beefed it up and improved the game but, that apart, it still works very well and is fun to play.

GRAPHICS	6
SOUND	6
INTELLECT	6
ADDICTION	8
OVERALL	83%

It seems that tanks are the 'in thing' as far as games are concerned. After a series of *Battlezone* look-alikes being released, US Gold have come up with a game that simulates not one, not two, but three armoured transport systems.

Heavy Metal places you as a cadet in the US Officer Training School, where you will learn how to control an M1A1 Abrams Main Battle Tank (MBT), an Air Defence Anti-Tank (ADAT) and a Fast Attack Vehicle (FAV) as well as tactical forces in a battle scenario.

Only Second Lieutenants and above can enter the tactical stage, so your first step on the ladder is to qualify for promotion by proving your worth in combat simulations using all three vehicles.

Once you have been promoted you can select the tactical section, where you have the three units under your control as well as a fourth support unit, which can be any of the vehicles.

You must deploy your forces and engage enemy troops in an attempt to stop them reaching your HQ. Once all your forces have been defeated or immobilised you are taken to the debriefing room, where the General gives an appraisal of your performance.

New recruits usually find themselves receiving the hard edge of his tongue, but eventually you may be promoted to Five-Star General and outrank him, which should soften the General's approach. **Maff Evans**



Use the tank's laser targeting to home in on that gun emplacement.

HEAVY METAL

US GOLD £24.99 ■

Mouse and Joystick



The ADAT cannons blaze and - WHAM! - another enemy tank bites the dust.

GRAPHICS AND SOUND

The presentation of *Heavy Metal* is very good, with an effective animated introduction and some extremely tough-looking intermission screens. However, the actual in-game graphics vary from good to all right. The ADAT screen is the most impressive, with a well-drawn display and smooth scrolling and animation, but the MBT section has a rather simplistic look, with simple wire frame graphics used to portray the surrounding proceedings. There is a solid option, but this only works for the scenery, not for enemy vehicles. The sound doesn't really make much use of the Amiga's capabilities, sounding more like that old 8-bit warhorse the Commodore 64.

LASTING INTEREST

The three simulators are in essence three different games, requiring a completely individual approach and use of tactics. Even if you manage to beat the three individual sections, there is the tactical game which takes more thought and planning before you can overcome the odds and beat the enemy forces, no matter how skillful your driving and shooting may be.

JUDGEMENT

Despite some rough edges in the audio-visual department and some annoying delays while playing the game, *Heavy Metal* isn't a bad combat simulation. The three sections are tough to master and present a fair challenge when combined in the strategic element of the game, especially when you're outnumbered almost two to one! The feel is more 'arcade' like than straight wargaming, making the game easier to get into than some of the more complex simulations available - a fact that may repel strategists but will be welcomed by blast fans. But both these groups may find *Heavy Metal* a bit of light relief from their usual games.

GRAPHICS	6
SOUND	4
INTELLECT	5
ADDICTION	7
OVERALL	77%



Steering carefully through the enemy munitions dump in your speedy Fast Attack Vehicle.

THE VEHICLES

Air Defence Anti-Tank

This high-tech monster is armed with automatic laser-tracking missiles to take out planes and a 30mm cannon for blasting jets and tanks. The missiles are about 90% effective, but the enemy attacks in waves and the missile can only pick out one target at a time. Also, the missiles are only capable of Ground-to-Air flight, so be ready with your cannon!

Main Battle Tank

In this section you control the tank from both the Gunner's and the Driver's positions. The automatic Laser Targeting System picks out enemy positions and gives you the information you need to home in and blast them. Be ready to use a smokescreen, as the enemy has a similar targeting system.

Fast Attack Vehicle

Looking rather like a beach buggy with guns, this vehicle is designed to penetrate enemy defence areas very quickly to inflict as much damage as possible on their vehicles and equipment in a short space of time. Watch out for tanks and Gunships, as the FAV isn't very heavily armoured.



End-of-level Bosses comes in all shapes and sizes - there are killer caterpillars and trees among others. The one thing they have in common is their irritating habit of mole-murdering.

IMPOSSAMOLE

GREMLIN £19.99 ■ Joystick

The animal with the vision problems is back and this time he's brought an extra eight bits with him. Monty Mole has finally found his way over to the big boys. Although the game itself has not been out on the Amiga, the feel certainly has. You have to horizontally scroll your way through four scenes - the Klondike, the Orient, the Amazon and Ice World - before qualifying for the final level. The main obstacles in your path are beasts you may be forced to duff up.

With a lot of the beasts - the grey birds in the Klondike (they might be bats) or the puffins in Iceworld (!) - there's little point in attempting to ruck them unless you've picked up some additional weaponry along the way. Your best bet is to spread your cape (they've given Monty a cape) and attempt to jump, fall or fly over attackers.

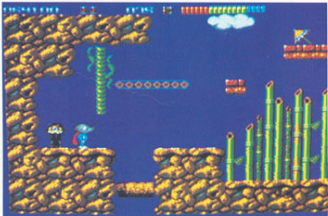
Jumping and falling, you ask? There's a glut of it. Most of your time is spent off ground, mainly because many of the surfaces 'pon which you might land are treacherous in the extreme: moving rocks, sinking rocks, nasty oozy chemical-looking gunge and spears which do to a mole that which was done to Perkin Warbeck (he was lowered onto a red hot poker so that... you get the idea).

Once you've sorted out the jumping then you've got plenty of bits'n'bobs to pick up along the way. Because you play the game with one life, but are capable of taking several hits, you should

keep your eyes out for some life-sustaining food. This comes in the form of worms, ice creams and other nosh (now normally opening a can of worms is the last thing you'd want to do but there you have it... a funny old game). Also be on the look-out for jewels, lumps of gold, coins and anything else dosh-like which might come in



The five stations of the mole. Get through the first four in any order and you're ready for the Bermuda Triangle.



Beware of small oriental-looking characters bearing cameras. The guy standing next to money might only appear to be here for frustration value but, when the proverbial hits the fan, who knows...?

GRAPHICS AND SOUND

Graphically, *Impossamole* does its duty with no real quibbles to be had. It is certainly not up to the "Crivens look at that for some mind bending imagery" standard, but who needs their minds bent when you've got small bear-chested chappies with attitudes bearing down on you? The backgrounds themselves are fine: nothing to complain about or to get overly excited about, for that matter. There are the occasional perspective changes in the form of trees and spears going behind then in front of you - jolly stuff but nothing to get agitated over. Monty himself is drawn with what an art critic might say was a "sympathetically cartoonesque style" - in other words he's cute as a box of two-week-old kittens in soft focus.

The soundtrack changes from an introductory drum machine, scratch and stiff blast to a weirdly lilting game tune. Of course, if it's not your bag there's always the Walkman. Monty's death throes, it must be said, sound less like the passing of a hero and more like the final moans of a prima-ballerina.

LASTING INTEREST

How do I put this? Not very much, really. Although the game-play is standard stuff it lacks the thought required by something like *Rick Dangerous*. After a while you will find yourself blasting through creatures purely to get to the end of the screen and not really caring whether or not you make it just as long as you can say that you've seen the end. This stream of impatience is added to by the fact that the death of the mole finds you twiddling your thumbs or making three cups of coffee while the game gets itself together once again. This does nothing whatever for the concentration and peps up the irritancy factor eleveny-five per cent. The loading screens are blank, grey areas with nothing to keep you amused.

JUDGEMENT

All in all, a game for the young at heart and patient of nature. There's lots to do and little thought required to do it. It doesn't take too long to suss out who can and who cannot be beaten to a pulp with ease. The additional weaponry which you chance upon every so often seems to have a life-span close to that of a mayfly at a frogs' convention. One of those games which you might play from time to time just to see, but not one which you would rummage through your collection for. A nice effort, a cute character and some passable gameplay.

GRAPHICS	5
SOUND	4
INTELLECT	4
ADDICTION	4
OVERALL	60%



A lightning flash crackles to herald the arrival of a couple of the baron's henchmen. Looks like it's time to get the guns out!

Set a thief to catch a thief: that's the current rule in crime-busting. Resolution 101 was passed in January 2038 and it instantly allowed criminals held in state prisons the chance to gain themselves amnesty and freedom by helping the state. In effect, that means sending them out on a mission to terminate an even more dastardly criminal than they are themselves.

You are one such criminal in search of a pardon, so with your licence to kill in one hand and the keys to your Theta 4000 ground skimmer in the other you head off to prove you are worthy to rejoin society. Your mission, then, is to

track down and terminate four drug barons operating in the small southern city of Los Envegas. Each baron controls a certain sector of the city and dealing with them involves destroying their henchmen and drug runners and collecting the red capsules of drugs they drop. Once you've collected a set number of the capsules you can go after the baron - destroy his ship and you can move on to the next sector.

The baron won't be defeated, though, because he's got his vehicle covered by insurance which means he can be destroyed on three separate occasions before he finally lies down and dies. This

effectively makes the game a twelve-level affair, with each baron being 'killed' three times.

Your vehicle is also insured, but you can be destroyed four times. You can up your insurance rating (gain another life) by collecting the yellow capsules which are dropped occasionally by the baddies (four for a life).

The game is viewed from the cockpit of your skimmer, which is divided into a large window through which you watch all the action that's happening around you, and below that an instrument panel containing your radar (which can be set on enemy or shop mode, more about the shops later)



The shop, where all you need to battle the drug runners can be bought for mucho moolah.



A homing missile is just about to destroy an enemy saucer. Get ready to pick up the contraband he's about to drop.



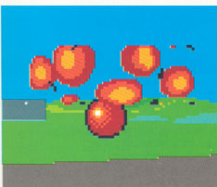
Two saucers swoop in on your hovercar. It's time to put up or shut up so blast them away! A homing missile would be nice...



Collect the baron's money cases to spend in the shops, but don't hang about or that drone will make off with the wonga before you get there.



Whop a few homing missiles out to battle these crawling pests, before they creep under your defences.



Another baddie bites the dust. Pick up enough of these red pods and then locate the white dot on your radar which represents the baron - then you can blast him.

THE FOUR EVIL DRUG BARONS



JAKE JUKOWSKI



TOBY KOMAZUKI



LORD CAMAMILE



JOHNNY PSYCLOPS



The baron makes a fleeting appearance. Got all the dropped drug canisters? Then keep on his tail and let him have it!

and several other bits and pieces designed to make your vigilante life a bit easier.

Initially you're armed with a front-firing machine gun, which is OK to start with, but once a baron has gone down he'll start rebuilding his forces and equipping them with more destructive firepower. To compete you'll have to start thinking about visiting the shops and buying yourself some upgrades: missiles, cannons and speed booster pods. These all cost money, of course, so it's fortunate that enemy skimmers carry wads of dosh - if they're not carrying pods - which you can collect and spend.

As well as returning your fire, the enemy skimmers drop bad pods which can cause severe damage to your skimmer if you're

foolish enough to pick them up. Then there's the time limit - enough drug pods have to be collected before the baron completes his current drugs run, because if he makes it you lose one of your lives.

Shoot around the place taking on anything that moves, collect the pods and money and go for the baron. Make it to the end of Level 12 and you'll have earned your freedom. **Andy Smith**

Your boss - a man who doesn't like to be disappointed.

GRAPHICS AND SOUND

We must point out the version we reviewed had no music or effects, but Millennium assure us both will up to the standard of the graphics - which are very good indeed. The filled 3D moves around extremely quickly and though the enemy ships are a little basic they are well animated. A very fast, very good-looking game.

LASTING INTEREST

Lose a life on a level and the whole thing has to be started again, which makes life difficult.



GRAPHICS	9
SOUND	N/A
INTELLECT	6
ADDICTION	8
OVERALL	87%

There is the option to save the game at the end of every level, though, to balance things out. Considering the vast numbers of enemy ships that must be destroyed and the length of time it takes to earn enough money to buy upgrades, this is going to keep you skimming around and blasting for some time.

JUDGEMENT

Very good graphics, the game plays very well and it's a fun blast-em-up. Things start to get a bit repetitive, though, and it's not until you start exploring the

world of when to go for money rather than drugs that things pick up again. It hasn't got the legs to make it into the Format Gold league, simply because it needs more variety. But it has a damn good try.

ARMOUR STATUS - Displays the strength of your outer defences

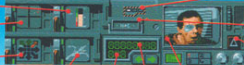
LOCAL RADAR - Shows all objects in the vicinity

DIRECTION FINDER - Points towards the nearest drug runner or shop

CITY MAP - Shows activity of all characters throughout the city

CONTRABAND COUNTER - Shows the number of packages to be collected

THE DASHBOARD



WEAPON INDICATOR - Informs you of the currently selected weapon

COMPASS - Displays your current heading

RUN COMPLETE WARNING LIGHT - Flashes as the drug runner is about to complete his run

CBTV LINK - Shows the reaction of the drug runner when hits are scored

RESOURCES - Gives a readout of your cash reserves (in American dollars)



RESOLUTION 101

MILLENNIUM £24.95 ■ Mouse or Joystick



The first of many timing problems. Wait for the green platform to swing towards you...



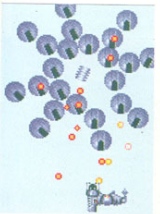
...move onto it, wait in the middle until it swings over the other platform, then make a run for it.

In the 22nd Century our alien enemies are becoming pretty sophisticated, so we're having to alter our thinking to keep up with them. That's why the Cyborg Research Facility was set up – and this time they've got something special up their sleeve.

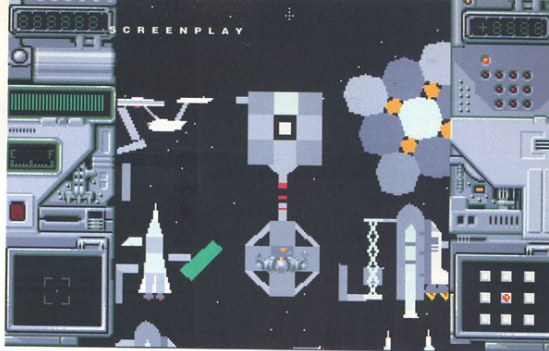
Lieutenant Kowalski, a trooper in the elite marines, has been badly injured in a battle on Titan. Rather than just patch him up and send him back out, the boys at the research facility have decided to re-build him as a computer-assisted fighting machine.

Extensive tests need to be made on Kowalski, renamed RemoTe: Offworld Xenoprobe (ROTOX), before he goes back into service: so he's been shipped off to Neptune to the new testing complex. Which, naturally, is where you come in.

Rotox is a single-player puzzle shoot-em-up and is, as they say, viewed from above. You have direct control over Rotox, who is centred in the screen, and you must battle through ten levels each made up of nine sectors.



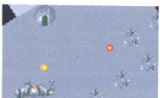
There's a bonus weapon in the middle of all those guns, so close your eyes and get in there.



The start of the first nine sectors.

ROTOX

US GOLD £24.99 ■ Joystick



Greeted by a wave of aliens and a gun emplacement, it's already time to test your weapons.



An extra weapon's been picked up so taking out the gun emplacements is easier.

Complete a set of nine sectors and you then move onto another level and another nine sectors. On each sector there is a specific number of enemies to destroy, including flying aliens in waves and gun emplacements. Destroy them all and the screen flashes to let you know the job's done. Then you can move on to the next.

This is where things tend to get much trickier because moving between the sectors is far from easy. There are thin walkways to negotiate (if you're lucky) as well as revolving, sliding and disappearing platforms to cross.

Destroying the aliens and moving from sector to sector can be made easier if you manage to pick up extras such as missile

launchers and jet-packs. These aren't always enough, though, because the aliens come thick and fast at times and contact with them reduces your energy, as does falling off the platforms. You have three lives per credit and five credits so getting some way into the game shouldn't be too much trouble. Once you start hitting the higher levels you'll wish you had a lot more! **Andy Smith**

GRAPHICS	7
SOUND	3
INTELLECT	5
ADDICTION	7
OVERALL	84%

GRAPHICS AND SOUND

The game graphics are a mix between the sprites (of the aliens and Rotox, which are OK, but could be better) and the filled 3D of the platforms (much better) which works very well together. Turn the sound off, though – the effects are dire and only annoy after a while, rather than enhancing the gameplay.

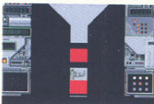
LASTING INTEREST

Getting through the early levels is easy once you've got the hang of staying on the platforms – fortunately, your energy level is not penalised too much for falling off, but the game gives you no favours and puts you back at the start of the section. The higher levels are very tough. This will keep you going for some little while.

JUDGEMENT

The puzzle/shooting mix works very well, the graphics work well and the whole game hangs together excellently. More and slightly different puzzles would have made things better, but even so it's a good game that requires a good bit of hand-to-eye coordination. One you'll enjoy working through.

BELOW: More timing problems, here all the platforms move!





Pick up that disk and... woah! Watch out for those cymbals!

JUMPING JACK SON

INFOGRAMS £19.99 ■ Joystick

Hands up who likes rock music! That many, huh? Well imagine a place where there is no more rock and only classical music remains. Sounds pretty dull, doesn't it? This is the situation in Infogrames' latest 'jolly' offering - remember Bubble Ghost? Creaky old conductors rule the world of music with their dusty horns and creaky oboes, keeping lovers of rock music in a state of despair. But there is a solution...

One solitary copy of the King's (Elvis Presley's, dim-wit) first recording still exists, guarded by the classical tyrants. If it could be liberated and brought to the masses, then the world would be a happier, if not noisier, place. Who is the man for the job? Who else but a descendent of Jumping Jack Flash - the one that made it all right (in fact he made it a gas) in the Rolling Stones' classic hit.

Jumping Jack Son must travel through the strange dimension where the recording is kept, revealing and playing any other rock recordings he can find before the classical instruments destroy them. This isn't as easy as it sounds, since the records are all hidden in zones built up of square platforms. Certain sections of the

zones have to be turned to the same colour, by leaping on them, which makes a record appear. Jack can then pick it up and take it to the correspondingly-coloured record deck in order to set it playing, building up the tune with drums, bassline and harmony.

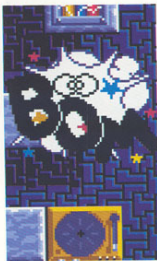
Once all the records have been placed on the decks, Jack can go on to the next level. Spirits sent out by the classical tyrants wander around the zones trying to stop him from completing his quest, giving Jack a good biffing if they can catch him.

Jack can drop a limited supply of cassettes in front of his enemies to hold them at bay for a while, as well as picking up items along the way to help him. These include sleeping pills to put the instruments to bed, hard-man rock shades to scare them off or coloured Walkmen for magic powers such as invisibility.

At various stages throughout the game 'challenge' stages appear. On these Jack must find a route through the level to enlarge glass orbs, but each square can only be crossed once. If this task is completed, then a password to higher levels is given. If Jack fails then he gets now! **Maff Evans**

LASTING INTEREST

The gameplay starts easily enough, to get you into the feel of things, but soon gets hard enough to challenge the most dedicated puzzle fans. Passwords save the tedium for impatient players, allowing you to concentrate on the more difficult screens - but they have to be earned! The 16 levels get progressively more difficult, making you learn new tactics. Even when all 16 levels have been completed, there is a totally new set to keep you busy for another couple of weeks.



These classical instruments don't half put up a fight!

JUDGEMENT

It's always fun to play jolly puzzle games and when they're as well put-together as this it is a real treat. The format is basically a reworking of an old theme, dating to the days of Q-Bert, but with enough twists to turn it into an original product. It's not the best puzzle game ever, but the fun presentation and compulsive gameplay make it one well worth checking out. Now, I wonder if anyone can do the same sort of thing for indie music...

GRAPHICS AND SOUND

Bouncy platform games really need to have bright, colourful graphics and bop-along sound to work. Fortunately *Jumping Jack Son* has both in abundance. The levels are colourful and sprites have a jolly and humorous look. Jack himself is a fine figure of a bubble, with cool shades and a multi-coloured floppy haircut. The overhead platform view is reminiscent of the superb puzzle game *Bombuzal*, but with its own definite character. The 'raunchy' rock music pushes the gameplay along nicely, being more Rolling Stones than Guns 'n' Roses, with a boppy, 'fun' feel to it.

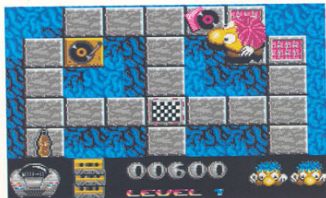
GRAPHICS	7
SOUND	7
INTELLECT	6
ADDICTION	8
OVERALL	81%



Jack seems to have gone a bit wrong on the challenge stage.



Conveyor belts make the going tricky on the higher levels.



One record in place and another one ready to be picked up.



It's time to see who's the bravest.

Order game players may remember the game *Tron*, based on the film, in which two players rode along on light cycles that left a trail, the idea of the game being to force your opponent into one of the trails. Well, that's the basic idea behind *Wipe Out*. Of course, there's a lot more to it than that.

For a start, the one or two player game is played on Hoverboards, which are like skateboards that float on air. Bouts are contested in an arena, each bout consisting of three sets, each set of three legs. The first player to win two legs wins the set and two sets win the match.

Every match you play alters your position in the league (the number of players in the league depends which planet you happen to be on) and you gain or lose points depending on the outcome. As well as points, money can also be won and lost on the outcome of matches and it's the acquisition of money that eventually allows you buy better boards and travel to other solar systems.

New, improved boards generally have better top speeds, can turn tighter corners and some can even jump trails, which is especially handy when you're in a tight spot. When you start coming up against the better opponents you'll want to give yourself every advantage and have a decent board. You'll also want to pick up extras

from the arena if there are any available - they appear at random. These extras allow you to go through trails and even remove a player's trail, but activating them can be a bit tricky, especially if done using only the joystick.

Each season lasts 15 matches and at the end you are awarded a medal if you win the league. To challenge for a higher star rating (star ratings run from 0 to 8) you'll have to jump to a higher-rated solar system in the galaxy and take on their bottom league player.

The game will only allow you to travel to another system if you have more game points than that planet's lowest-rated player, so progress takes some time. To keep things exciting in the meantime you can always jump to another planet in your own solar system, and battle it out on two new arenas. **Andy Smith**



The Amoeboid had no chance as Mahoon forced him into the wall.

WIPE OUT

GONZO GAMES £19.99

■ Joystick or Keyboard

GRAPHICS AND SOUND

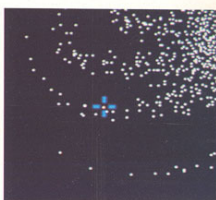
There are only a few sound effects which can best be described as all right, but there's also music which plays throughout which is much better. The graphics are not brilliant and they don't move too smoothly giving the game a primitive look. This doesn't spoil your enjoyment of the game, however.



Tricky one, this: you are both playing inside that vertical strip with nowhere else to go.

01	79	+0002056	A	Y	T	P
02	65	+0001748	W			
03	55	+0001719	0001	0022		
04	62	+0001701	Mahoon	MECHANOID		
05	48	+0001686	00074220	SKLIMBER		

Mahoon's doing very well at the top of the league with 91 matches played (not all in one season!) and only 19 lost.



Jump to another part of the galaxy and you can challenge a player for a higher star rating.

GONZO WHO?

Gonzo Games may be a new fully-independent publisher, but the people behind it have been in the industry a long time as developers and programmers under the Viz Design label.

Viz never really came up with an *Elite* or *Tetris* classic, but they gained some notoriety with their games *Werewolves of London* and *Frankenstein Jr.* Their conversion work, which included such greats as *Airwolf*, *Hypersports* and *Roller Coaster*, however, was much better.

Wipe Out proves Gonzo have also got what it takes to make it, so we're waiting to see if they can keep up the good work with their next releases, *Street Hockey* and *Brides of Dracula* due later in the year.



LASTING INTEREST

Absolutely loads of it. Working your way up through the ratings will take weeks of play, and just when you think you're getting to grips with an arena and can take on all comers, along comes a better computer player and you have to rethink your tactics all over again. And if you're playing with another human in your league things can really hot up.

GRAPHICS	6
SOUND	5
INTELLECT	6
ADDICTION	8
OVERALL	85%

JUDGEMENT

It's a very tactical game. Not only will you have to have a quick joystick hand for those tight turns, but you'll need your wits about you constantly if you're to win because this is not a game for cowards. Chances have to be taken and you have to go out there and force your opponent into making mistakes, rather than just waiting and hoping he messes up. A good game and a great start for Gonzo - let's hope they keep it up.

Big bad company Centro Holographix has taken two human subjects, turned them into holograms (fairly solid holograms, but we'll put that down to artistic licence) and for the sake of economy put them both into one body.

This has obviously irritated Hammerfist, the tall, dark, violent male, as well as Metalis, the tall, blond, violent female who, by the way, has a kick like a Thai boxer on steroids. They decide to steam into Centro, do the business and leave the place looking like Bournemouth beach after a friendly footy match.

Unhappily the company feels it has a right to stop secondary fighting. They decide to lob in a few guards, the occasional zipping robot, a few traps, the odd giant ant and some militant vegetables in order to protect their property.

Both Hammy and Metty play their own roles in the game. The former is skilled in firing laser bolts from his... er, hammer-like fist - you will need to keep picking up the red power-ups with the Ls in the middle in order for this weapon to function. Failing this, he can use a hammer-action fist. This latter weapon is handier than you might think - some of the stooping, white-overalled guards will duck laser fire.

Metalis is no slouch herself. While Ham-the-man is beefy, he is no good at all at leaping onto higher levels or moving at any speed. Metalis is highly reminiscent of Daryl Hanna's high-kicking, flick-flacking android from *Blade Runner*. She also comes armed with side kicks and a pretty neat line in ducking and jumping.

Moving between characters is simple enough, you just push the joystick up and shazam! Each of the characters then has their own moves and weapon manipulation - a handy little ID card fills you in on this lot. Once you've got the moves sorted out it's time to get into the fray. Each screen you meet comprises a number of enemies, maybe a puzzle or two and some computer screens to head butt. Once certain of the screens



The room of the pumping screws. Not just jiffing the living daylight out of droids. You have think a bit too.

HAMMERFIST

ACTIVISION £24.99 ■

Joystick



These two little droidettes provide Metalis and Hammerfist with hours of fun and also some more power-ups.



Feeling tired, run-down and low? Use new, simple re-energiser ports. Be careful not to blow your own brains out, though.

have been busted and a few droids wasted, the security on the room will have been breached and it's time to move on to the next.

Each guard, droid, terminal or vegetable destroyed provides power-ups, energy or weapons but beware, the Master is also watching you. Occasionally, when his (or it might be a her) energy is built up, each of the power-ups becomes a deadly skull-faced antimatter blob. Avoid these at all costs. You should also be aware of the re-charging stations along the way. Plugging into these follows the same routine as terminal bashing. Again watch out, you may well send too much charge up your central circuits and end up by frazzing yourself - game over!

With all this going on you might think that death would come quickly, but far from it. Hammerfist has the luxurious edge in that it allows you to play and play for hours on end. Every time you look like dying, you head back to the recharging point, find yourself a strategic spot and stand there blasting the foe. Relax for a while in a secluded storeroom and catch your breath. Once you've rested up, it's back to the fray with a vengeance. Playing with a little thought and some skill you could keep going for days. **Tim Smith**

GRAPHICS AND SOUND

Nice bit of scrolling here. All very smooth with no jagged edges which suddenly make you realise that you're not in fact there but are in a small bedsit in East Molesey. The flick-flacks of Metalis are particularly joyful to watch as are the exploding backgrounds. Nothing appears static for too long which gives a pleasantly manic feel to the whole thing. The soundtrack is fairly work-a-day, nothing to write to *Smash Hits* about. The effects are also passable with the odd explosion and rather emasculated laser burst.

LASTING INTEREST

Tons and tonnes of it. Because you can keep playing for hours, you can really explore those rooms and work out those tactics. This latter point, tactics, raises *Hammerfist* from a basic horizontal scrolling hack'n'slash to a different level of gameplay. When the Master becomes active, there is no point in blasting for power-ups, you have to think a little. Each screen provides its own difficulties, each puzzle it own solutions. Great stuff.

JUDGEMENT

At first sight you could be fooled into thinking that *Hammerfist* was merely another bish, bash, bosher. It is possible to play it like that. But don't be fooled. Reflexes are taxed to the limit and brain cells are not left to atrophy. Reaching the end of this outing is certainly not the easiest task in the world and for once you really do want to reach it. One problem did crop up in the 'Room of the pumping screws' - if you fall off one of the platforms there's there's no way of getting back - you don't die, but you're not on screen either. Aside from this, *Hammerfist* is definitely a game to keep you busy for a very long time.



Watch those power-ups fall from the sky. Beating things up can be profitable - just ask Ron and Reg Kemp.

GRAPHICS	8
SOUND	5
INTELLECT	8
ADDICTION	9
OVERALL	89%



The car mechanics with the winky baseball caps mean mean business. Do it to them before they do it to you.

STORM ACROSS EUROPE

SSI/US GOLD £24.99 ■ Mouse

The strategic map showing the whole game area after the first round.

Latest in a long line of SSI games to reach these shores from the States is this one, two or three-player wargame simulating the war in Europe from 1939-45. Wargamers will instantly realise the scale of such a simulation and be wondering if it is not, perhaps, a little too ambitious.

Players take on the responsibilities of commanding either the German, Allied or Russian armies, navies and airforces and also must concern themselves to a lesser extent with managing their home country's economy and production. In one-player mode, the player must automatically take control of Germany.

The game is played in turns, with several phases making up each turn. The issuing of orders is usually on a very grand scale, very often involving selecting and issuing orders to whole divisions at once. The game world is divided into 37 countries and sub-divided into 224 strategic areas.

Each turn lasts 3 months of game time and the amount of orders you're allowed to issue

during any one turn depends on the season - less orders during the winter in some parts of the world. Orders include attacking a neighbouring sector or country, transferring divisions to different areas, sending subs and battle-ships (among others) out on patrols or raids, organising air strikes against enemy installations or enemy armies and creating or removing armies.

Generally everything you wish to do for that turn has to be done and then 'Combat' selected, which moves the game onto the combat phase and hopefully your armies go goose-stepping all over the place. Then it's the next player's turn, so he attempts to do the same and stomp all over you.

Players can be knocked out of the game if they allow certain sectors to be captured by the enemy, at which point the conquering army takes control of all the vanquished player's land. The game continues until only one player is left or summer 1945 comes round and Germany's position is judged. **Andy Smith**

GRAPHICS AND SOUND

There's a definite C64, Apple II and PC look to most of SSI's games and this is no different. It's very simplistic and unimaginative-looking, but the graphics do their job and the sound effects are not too bad.

LASTING INTEREST

As you might expect, it takes a while to get to grips with and once you have found your feet it takes a while to play each game. There is a multitude of options that can be altered before play to make things easier or harder for yourself, so if you're into this sort of thing you'll have plenty to busy yourself with.



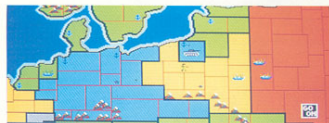
Select an army first, but only issue orders after considering the statistics you are given.

The army confirms receipt of the orders which you directed at it. Warsaw, here we come!

JUDGEMENT

The scale of the game is too large, which doesn't mean it's bad: in fact it's very good and very enjoyable once you get into it. But don't expect it to be as deep as some earlier releases.

GRAPHICS	5
SOUND	4
INTELLECT	6
ADDICTION	7
OVERALL	80%



Strategic land combat
 ((Battle Report)) (Initial odds 8:1
 (Length: 1 Weeks) (Terrain: Clear
 1ST ARMY vs. enemy Garrison
 Our losses: 8% (Enemy losses: 65%
 We are victorious.

All the orders are issued and it's into the combat phase where battles are resolved instantly and a report is given to the commander.

		Report to the Führer			
		German Casualty Report		Fall 1939	
Land	current	8	5	8	13
	year	8	6	8	13
	total	8	11	16	26
Naval	current	8	8	8	8
	year	8	8	8	8
	total	8	16	16	16
Air/Ped	current	8	8	8	8
	year	8	8	8	8
	total	8	16	16	16

At the end of the combat phase each side's losses are displayed (which helps you keep track of costly mistakes).

OUR MASTER WILL
BE MOST PLEASED!



Yikes! Dan is grabbed by the Treens.

DAN DARE III

VIRGIN MASTERTRONIC £19.99 ■ Joystick

The 18th of April saw the Eagle comic celebrating its 40th Anniversary, featuring the most famous space adventure pilot in history, Dan Dare. To celebrate this event, Virgin has released a third Dan Dare game.

The first game was very much a 'search and find' adventure, featuring a comic-style windowing system using many of the characters from the original strip. Digby was there, along with Dan's pet dog and the Treens led by the evil Mekon. The second made a departure from this format and plumped for the more standard scrolling shoot-em-up, with Dan flying around a maze-like Treen complex.

Dan Dare III follows the style set by the second game, being a multi-directional scrolling blast with a fair amount of searching to be done. The game starts with Dan being held by the Treens and about to be tortured with all manner of dastardly implements. Dan manages to free his bonds and give the Treens a good biff in the face to make a dash for it. After finding a jet-pack and a plasma rifle, he heads off to the hangar to

find a ship to make good his escape. Unfortunately the only ship in the dock has no fuel, so Dan must search the Treen complex, find enough fuel to fill the tank and blast off.

This is where you come in. You take control of Dan as he starts his quest in the Treen stores. You must fly around collecting additional weapons to take on the mutant forces the Mekon has sent out, which include bouncing bombs, homing missiles, energy shields and even nuclear devices. The end of the stage has a large guardian, either a giant Treen or a gun emplacement, which when shot gives you a pod to gain access to higher levels via the large transporter in the main cavern of each level.

On the higher levels the guardians sit in front of fuel canisters, each of which contains 10 pounds of rocket fuel. If you manage to collect 50 pounds of fuel, then you can refuel the ship, return to the stores and start up the blast-off sequence. But hurry! Dan has an appointment and it wouldn't do to be late! **Maff Evans**



Dan dons a jet pack and takes on some big-eared warriors.



Dan uses the last of his strength to reach the transporter pod.



DAREMANIA

The 40th Anniversary of Dan Dare has sparked off a lot of interest among the Science Fiction community. The Eagle has relaunched the character in the new-look Eagle comic. Gone are the days of the peak-capped, pipe-smoking hero and in comes the new high-tech, weapon-loaded, green, non-smoking, vegetarian soldier. Fans can visit the Dan Dare Exhibition in Southampton, home of Dan's creator Frank Hampson, and take a look at how the character has developed. Even a radio series has been broadcast by the BBC. If you missed it, don't worry - the stories are available on cassette.

GRAPHICS AND SOUND

Dan Dare's loading sequence starts with a series of colourful and well-drawn comic frames detailing the capture and subsequent escape of our hero along with some well-sampled pieces of speech. The feel is very much that of the original comic, down to the style of the scenery. Unfortunately, this atmosphere isn't carried into the game.

The sound is pretty standard, with blasting effects and a bouncy background tune, and the graphics are nothing to shout about. The sprites are small and rather flat-looking and lack the animation quality needed to bring a comic strip to life. Dan skates around the blocky scenery rather than running in a macho manner as he should. The appearance is, in all, dull rather than as exciting and vivid as the original strip.

LASTING INTEREST

The game is tough from the outset, killing you off time after time in quick succession. This situation isn't helped by the fact that your weapons run out very

quickly and the Treen forces take a lot of shots before they die. Progress is rather slow and frustrating - many players will give up in exasperation before the final objective is reached.

JUDGEMENT

The intro sequence is full of character and gives the impression that you are about to embark on an involved interpretation of the comic strip. Unfortunately the game is just a standard hunt-and-kill episode, with very little to justify the Dan Dare link other than the Mekon sprites at the end of the levels. If shoot-em-up maze games are your 'thing' then you may find some enjoyment in Dan Dare III, but if you just enjoy the comic strip character then stick to buying the Eagle.

GRAPHICS	5
SOUND	4
INTELLECT	3
ADDITION	6
OVERALL	67%



An attack from both sides has done for you here. Time to start again.

The nefarious King John was a bit of a rogue in the Middle Ages when good King Richard was away crusading, spreading the good word and killing anyone who wouldn't listen. It was a time of legends and of legendary heroes – Robin Hood, the Three Musketeers and the star of this game, Ivanhoe.

As the knight in shining, it's your job to travel to Austria and rescue Richard the Lionheart from his imprisonment in a castle. That means travelling through five horizontally-scrolling areas taking on all sorts of nasty types who are in league with King John.

Armed with just a shield and a sword it's tough work making your way through the stages, fighting off the magicians who lob fireballs at you, the archers who hide in

trees and the thugs who come at you with anything they can get their hands on.

As in most hack 'n' slash games, you can use a series of aggressive moves and non-aggressive moves, depending on whether you have the fire button depressed or not. There are also extra weapons to collect by killing certain jobs (like the ones in trees) including a bigger shield and a triple shot which has the strange effect of turning you into three Ivanhoes so you can attack front, back and overhead all at once.

Unfortunately, all the extra weapons have a limited lifespan and you lose any extras once you lose one of your five lives.

Should you make it to the end of a level you are rewarded with the chance of a bonus fight against a large enemy, which gives you an extra life if you manage to slay him. **Andy Smith**

GRAPHICS AND SOUND

There's been a lot of noise made about the graphics of the game because some of the people who did the cartoon movie Asterix have worked on them. It shows, too, because the sprites and backgrounds are very impressive. Less impressive, however, is the animation, which is slightly jerky. The sound effects and music are somewhat less than awe inspiring.



Jump up in the air to grab that shield and give yourself some extra protection for a while.



All ready for action at the start of the quest and two lily-livered baddies cover away from your lethal weapon.

IVANHOE

OCEAN £24.99 ■ Joystick

LASTING INTEREST

This game is murderously tough, so it will take you a while to complete it. Unfortunately all but the most determined players will give up the attempt long before the final screen.

JUDGEMENT

Looks great, plays mediocre. The gameplay is lacking in variety despite the quantity of different areas, so boredom sets in quickly. Sadly, Ivanhoe is not up to the high standard we have come to expect from Ocean.



Triple hits in action!

GRAPHICS	8
SOUND	4
INTELLECT	2
ADDICTION	5
OVERALL	52%

The US Army fly boy heroes train at Fort Rucker, a school where good pilots get better and bad pilots get dead!

Training's a head-to-head duel against another pilot. The screen's horizontally split with one chopper on either section, each with an Airwolf-style base hidden in a volcano in which to re-arm and re-fuel.

The aim is to collect the constituent parts of a bomb scattered around the playing area, drop them one by one back at base, then use the bomb to blast the other guy's base back into the desert. With both helicopters competing for one set of bomb parts every-thing's bound to end in tears.



Player Two attempts to bomb the base – your base!

The small chopper sprites suit the split screen well but are tricky to control. The scenery is just desert and rocks, but all extremely solid, and is complemented by the mandatory 'phut, phut' sound effects occasionally interrupted by a wimpy cannon-fire effect.

PROTECTOR

16 BLITZ/MASTERTRONIC
£4.99 ■ Joystick

As a solo game Protector replaces interest and excitement with frustration. The computer's an annoyingly predictable but irritatingly good pilot. As a two-player game it has its moments, but there just aren't enough of these to make for an enjoyable game.

It can't be considered a bad deal – everything works and there's a small element of strategy involved. This, however, can't disguise the lack of real gameplay and regardless of the price that has to be the bottom line for leisure software. Trenton Webb

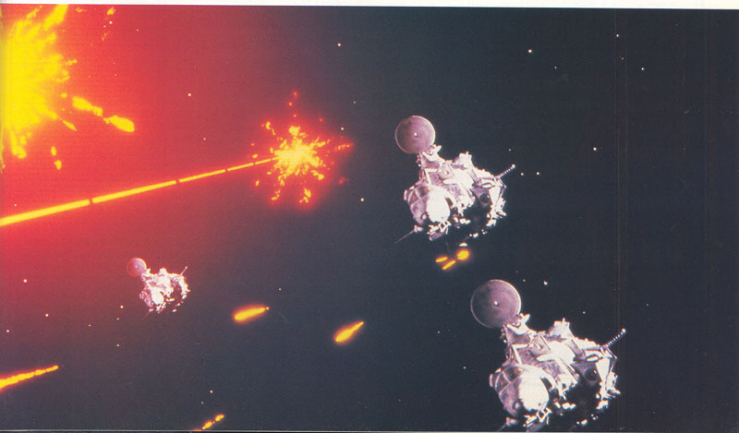
GRAPHICS 6 / SOUND 2 / INTELLECT 5 / ADDICTION 4 / OVERALL 52%

THE WHOLE TRUTH ABOUT
games programming

PART 5

Collision detection

The *Menace* code is nearly complete, becoming playable as **DAVE JONES** adds the bump-into-things routines.



This month sees all of the game coming together – and now being playable! – with the inclusion of the collision detection routines.

There is normally some form of collision detection performed in all games – one object moving into another object is a very common occurrence that normally has to be detected. *Menace* required the following collisions to be identified:

- Player ship to aliens
- Player ship to foreground (expert mode and guardian)
- Weapons to aliens

These three are really all that is required in *Menace*. The first two of the above are very simple thanks to the Amiga hardware and the way *Menace* was designed.

Remember that the player's ship is a hardware sprite. The Amiga has the ability to detect collisions between any of the hardware sprites and any bit plane(s) we specify. In the dual playfield mode that *Menace* runs in, bit planes 1, 3, & 5 form the back playfield, with the even planes (2, 4 & 6) forming the front playfield. The aliens are drawn into the back playfield (planes 1, 3 & 5) so we want the hardware to detect when the hardware sprites that form the ship collide with pixels in these planes.

A problem springs up here, though, in that the actual background graphics would register a collision as these completely fill up planes 1 and 3 – being four-colour, they only require two planes. Plane 5 is, however, untouched by the background graphics and will ONLY contain data from the actual aliens. So rather than detect a hardware sprite collision between planes 1, 3 & 5 we will only detect a collision to plane 5.

You may notice a small quirk here in that only checking the third plane in the alien graphic data will not be very effective if the alien used very few colours that have bits in the third plane set. In reality all of the aliens in *Menace* used mainly the colours that are included in the third plane set (colours 4, 5, 6, & 7) as these were redefinable for each alien. The background colours (0, 1, 2 & 3) were very rarely used in the aliens themselves.

Hardware Registering

The hardware register that controls the sprite-to-playfield detection is called CLXCON. This lets you select which bit planes to detect, and the value to detect (normally 1 for a set pixel). All that happens is that a mask of the ship is ANDed with the bit plane data. This will only register a collision when two bits overlap, which is indicated in the CLXDAT register.

This is simply a hardware implementation of a commonly-used software routine where an object's mask

is ANDed with a screen mask to check for a collision. This type of detection is termed 'pixel perfect' detection as just one pixel of your ship hitting a single pixel of an alien will be detected. Many games use other methods of detection that are sometimes a little crude. How many times have you heard the shout 'No way I was dead, I was miles away from that bullet, stupid ♦♦♦♦♦ game!'

Ship to Foreground

The ship to foreground collision detection was handled similarly, with a collision between plane 6 and the ship being registered. Initially I registered collisions between planes 2, 4 & 6, all of the foreground planes. This then exhibited a quirk because the ship missiles are drawn into the foreground playfield. If the ship had quite a few speed-ups you could fly over some of your own slower-moving missiles – and then you lost energy!

Obviously not a desired effect, so the solution was to only draw the missiles into planes 2 and 4, and collision detect only to plane 6. This gave quite a lenient feel to the foreground collision detection as colours 0, 1, 2 & 3 in the foreground graphics would not register a hit. There was many a sprinkling of the other colours in the graphics, though, so the effect was not too noticeable.

As a hint, if you want to see the sort of effect that using only a single plane of some graphics would have in collision detection, load your graphics into *Pixmate* or *Butcher* (image processing programs) and switch off the bitplanes you will not be using. This gives you a visual indication of just what is going to register a hit. It also gives you the opportunity to swap a few of the colours around to get the best use from the single plane.

Being Generous

It is usually preferable to make collision detection 'generous'. This simply means that the player can stray into objects by a few pixels before a collision is detected. This is not possible to do if you are using the hardware collision detection, but is quite simple if you are implementing it in software.

Figure 1 shows the main sprite from Level One of *Blood Money*. Beside it is its collision mask. Rather than use the actual mask of the sprite, a new mask was stored that had a few pixels trimmed off around the edges. The blitter, rather than the hardware method, was used to AND this mask with a plane of the screen.

This allowed certain parts of your helicopter (note in the diagram the blades have been removed) to enter the side walls with safety. This allows a little more skill into the game and eggs players on to have a go at squeezing through tight spots.

This method of collision detection has one major downfall. Although we may detect we have hit an alien, we do not know which one. For *Menace* this does not matter as the game was kept nice and simple, with collisions with any alien simply reducing your energy – the only exception being the bonus icon that you shoot and pick up. The bonus icon, though, can only appear on its own on the screen, so if we hit an alien during the bonus routine, it must of course have been the bonus icon.

What hit What?

The last part of the collision detection, missiles to aliens, must be able to determine what particular missile hit what particular alien. This must be implemented using some

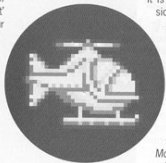
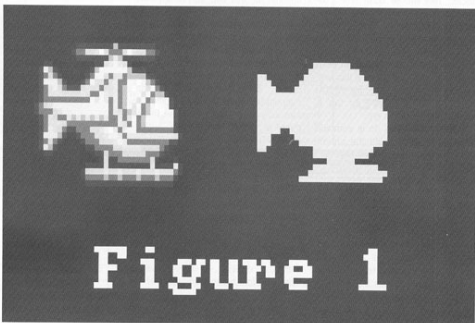


Figure 1: The main sprite from *Blood Money* with its mask for collision detection. The mask is smaller and has no rotor blades, to encourage the player to squeeze through small gaps.



form of coordinate checking. This is the second main way to perform collision detection.

Coordinate checking can never be pixel perfect unless we checked every pixel coordinate in the missile to every pixel in an alien, which would require HUGE amounts of time and cause a game to crawl along. What normally happens is that a "box" is defined within the two objects you are checking. A box only needs two coordinates, the top left and bottom right. If two boxes overlap then we flag a collision. You can see this is quite rough in that not many aliens appear as a box shape.

In *Menace* the missiles are quite small, so rather than define a box for each missile, only one coordinate at the tip of each missile was checked. If this coordinate entered the box of any alien then a hit was registered.

I made all the alien collision boxes 32 x 24 pixels in size, exactly the same as the alien size. This would appear to cause problems if the alien was quite small in size, not filling the entire box. Have a look at Figure 2. This shows a small alien with a missile entering its box, flagging a collision. But as you can see we would not want this particular case to flag any collision as the missile is quite far away for the actual alien itself.

One way around this would be to store a collision box size for each alien. The one in Figure 2 for example would suit a box of 24 x 18 better. This makes the calculation of whether a missile was in a box or not more lengthy, though, as we are not dealing with constant numbers. This may seem being picky but if we have 12 aliens flying around, and as you can have up to 18 different missiles active at once (missiles, laser, canons etc) this would mean checking every missile against every alien = 216 checks. This will be quite time consuming as there is a fair bit of calculation in each check.

Make it Simpler

What we need is a quick way to tell if a missile has hit ANY alien; if this happens we can then check for WHICH alien it has hit. Fear not, for this is quite simple to do.

What we need to do is combine the mask detection with the coordinate detection. We cannot use the Amiga's hardware detection for missiles to aliens as this only works with hardware sprites. The blitter can do a quick check for us, though.

The blitter has a bit called BZERO in the DMACONR register. This bit will be set true if the result of the previous blit operation is all zeroes. We therefore get the blitter to perform an AND operation between the mask of the missile, and plane 5, which only contains data from the aliens. If the BZERO bit comes back false, ie the

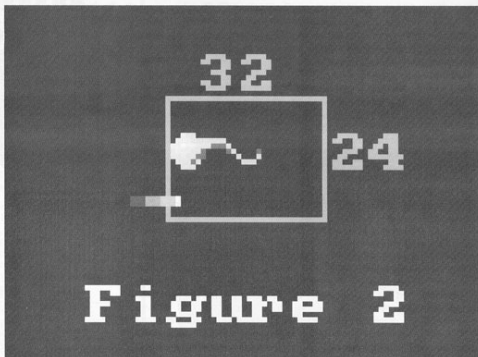


Figure 2

result of the blit was NOT zero, then the missile must have collided with some alien data.

NOW we can perform the coordinate detection to find out which alien we hit. This also solves the problem in Figure 2, which would not now flag a collision because the mask detection would not flag a hit, so therefore the coordinate detection would not be then be performed.

When we perform the blit to AND the mask with plane 5 we switch off the blitter Destination channel. We do not want the blitter to draw the result of the blit, so it is pointless to have an area of memory to point the D channel to.

It is quicker and therefore more efficient to switch off the Destination channel for this blit. This is a handy feature of the blitter allowing us to combine a few channels in some way, but only being interested in whether the result was zero or not.

This method of performing the missile-to-alien collision will be considerably faster, even taking into account the blitter operation. On average only three out of the eighteen missiles would actually be hitting aliens. This reduces the coordinate checking to a lower level: only 3 x 12 = 36 comparisons.

Love Missile F-111

That, then, is all the collision required in *Menace*: ship to aliens, ship to foregrounds, and missiles to aliens. The source code for this month (on next month's disk) covers all this, along with the drawing of the missiles. There are four types of missile:

- Normal missile
- Cannon

Figure 2: An alien from *Menace* is struck by a missile. If a standard-sized box is used to define the aliens' collision area, this rather small alien will be hit too easily. A smaller size of box is needed for smaller aliens.

- Laser
- Outrider

All have different ranges and speeds. They all simply subtract one from an alien's hit number, but lasers are not killed once they have hit an alien – they carry on till the end of the screen – and are therefore more powerful. All other weapons are killed as soon as they hit an alien.

Graphically they are quite small (typically 16 x 4 pixels) and are just four-colour. The blitter is used to draw them into plane 2 and 4. Weapons in shoot-em-ups nowadays are getting BIG. If you plan on trying to write one, I would say the bigger the weapons the better for MEGA effects. There should be no difference in the collision detection, only in the extra time taken to draw bigger, badder weapons.

Completing the Code...!

Sadly, there was no space for the code on this month's Coverdisk, but watch out for it next month – the *Menace* code is now pretty well complete and playable!

All the paths for Level One are there to be blasted, collisions to aliens will reduce your ship energy until zero, at which point you will be returned back to the CLI. When you reach the end of the level the game will also return to the CLI.

This leaves only the guardian to be added, which will be covered next month along with a discussion of the ancillary stuff such as music (where does it come from, how much memory should you reserve, how much does it cost! etc), text routines, disk routines and such like. ■