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AMAZING!



World's first colour handheld computer

FIRST REVIEW

page 2

HIS MASTER SOUND'S VOICE

The Express guide to the newest and best sound samplers



page 16

KICK OFF!



Best soccer game yet

SHOPPERS' BONANZA!

How you can buy cheapest in Express

page 43

ALSO INSIDE EXPRESS

- Disk dossier
- Les French games
- Neural networks
- Tech Tips

THE NEW GENERATION

Last week *Express* broke the details of Atari's exciting new handheld games machine. This video tape sized gadget completely wowed visitors to the Chicago Consumer Electronics Show.

This week Marshal Rosenthal gives you the first hands-on review of what is being touted as the first of a new generation of gaming machines...

Put the designers of the Amiga and all their technical expertise together with Atari's price competitiveness and track record. Shake it all about and watch the world's first hand held, high tech, colour LCD games machine emerge.

The history of this saga is fascinating. Enough at least to have the press chasing any and every detail for the past few months. Consider: Epyx decides to get into the hardware business and make a splash. It enlists the aid of two mega minds, RJ Mical and Dave Needle. These two designed the Amiga, a computer which stands very tall indeed when it comes to graphics and sound.

Interestingly, the Amiga was to be an Atari machine until Commodore jumped in. These two companies do not like each other one bit.



• Play it, Sam: Atari boss Sam Tramiel gets to grips with his new machine



Atari's machine has clearly stolen the little machine limelight but Nintendo was not to be outdone. It was showing off its smaller (but black and white) Gameboy (*Express* *passim*) to lots of interested punters.

As always that firm was "intimidating" in the space it took up. Apart from the \$89 handheld Gameboy people could also treat themselves to a range of Nintendo merchandise such as, wait for it, Mario Brothers wallpaper and Nintendo denim jackets.

Meanwhile, Nintendo finally looks as though it's going to make a proper go of it here in the UK, having signed over the selling rights to a big

company called Serif. Its track record includes board game *Trivial Pursuit*. Expect to see lots of TV ads in the run up to Christmas.

Nintendo was sold here by toy company Mattel. That firm's poor performance prompted the Japanese to set up a subsidiary in the UK called NESI. Nintendo is saying NESI is only ever short term and it's always been on the lookout for a good UK agent.

Elsewhere on the console front NEC has unveiled an upgraded version of the PC Engine. The innards aren't substantially different but its Turbo Graphic 16 has been remodelled for the American market.

Mical represents the software engineering - taking numbers placed inside chips and turning them into excitement you can see. Needle looks after the hardware - actually forcing bits of metal and silica to do things. And now they've done it. They've produced the next step up from the Amiga, the world of liquid crystals.

Atari knows a good idea when it sees one and promptly stepped in adding more than just its name to the device with no name. It flexed a few marketing muscles, waved a few wads of cash around and now it has smashed the price barrier with what is provisionally being dubbed the Atari Portable Colour Entertainment System.

Let's run down some of the tech specs. A 3.5 inch colour screen makes for easy viewing and no eye strain. Getting sharp detailed graphics using 16 colours from a palette of 4,096 is quite an achievement for such a small machine. And 64K RAM coupled with 16Mhz speed means one fast baby.

The one pound unit slightly resembles a dumb bell that got flattened at the edges. It's got four channel sound with volume control for those of us getting a bit old, plus a headphone plug. Another plug has been fitted for mains use which will take the strain off the six AA batteries. As is becoming increasingly fashionable you can also plug it into the car cigar lighter. With this machine on your person there's no time for smoking.

Software comes in the form of 16 Mb cards which slot in. You can also link up eight different machines with each player getting first person perspective.

Controls consists of an eight direction joystick and five function buttons, plus dual A-B switches which come in handy since left handed players can flip the screen upside down. The screen resolution of 160 x 102

pixels are usefully intelligent - any more would have made a muddle.

Amazingly this little lot is going to be sold here for \$149. But the most amazing thing is it's all American technology and all produced in the States (except the LCD screen).

When I gave it a try *California Games* was up and running. Whipping the character around the radical Half Pipe I found it moving very fast. Too fast for me since he was sent sprawling. The joystick works just like any other and there isn't really any feel of newness here.

But the feel of the entire unit is solid and it's easy to drift away and start wandering around in little circles trying to get the character to stay on the blasted skateboard. Animation is quite remarkable. The development guys did OK.

The big difference is that this doesn't really feel like a handheld at all. It's more like a full size gaming machine that's been hooked up to a small monitor.

Not having many games to try out is disappointing especially as *California Games* doesn't have too many characters on screen at once. But it's pretty obvious just what 16MHz is capable of when you watch the on-screen action. Games for this machine are going to be killers.

There's really no comparison between this and any other handheld. Colour aside (though I'd say that's pretty important) this has faster animation, quicker game play and more software possibilities waiting to be exploited by the games.

RJ and Dave are always damned good at what they do. This time they have excelled themselves.

Atari's unnamed babe is a winner all the way down the line. This machine, as we say in the States, is a whole new ball game. ■



• Chicago CES: Atari launched among the masses

Euro D-day for fast

Hot on the heels of last week's tough-talking new strategy plans, piracy-busting outfit FAST has decided to attack the European problem.

At a special meeting at the Houses of Parliament last week, Federation Against Software Piracy chairman Roger Tuckett said the body would be taking a Europe-wide perspective.

"We're regarded throughout Europe as a body with the most effect. I realise that there are a lot of cultural differences that will need to be bridged but we are committed to fighting piracy here and on the continent," he said.

Tuckett acknowledged that any efforts would have to be undertaken "as a team" and that attempts would have to be "co-ordinated to be successful".

British piracy has been curbed somewhat by FAST's activities both in investigating individual cases and lobbying Parliament for effective laws. The legal situation is extremely loose in some



• Moving FAST: Tuckett's Euro crusade

European countries where piracy is so bad that software houses have no hope of making a decent living.

Software users often complain of lack of support and commitment here by publishers. In some European countries genuine users enjoy even less attention. ■

Cheap ST console delayed until '91

Atari's promised ST console isn't likely to see the light of day until very late next year, or, more probably, 1991.

Senior bosses at Atari in the US are saying that the project has been put on hold for the moment.

Although reasons are being kept close to Atari chests it would appear to be as a result of the new-found commitment to its little hand-held machine. Atari UK boss Bob Gleadow had stated that

the £99 console would arrive by this September.

It is understood that Atari is so pleased with the hand-held that it wants to direct all energies into making a commercial success of it. Developing the machine isn't a problem since the technology is already there. One Atari insider told *Express*: "It's just a case of waiting for the right time to launch it. Every product needs to be launched at just the right time." ■

KGB Hacker in suicide tragedy

A West German computer hacker who was caught supplying secret data to the Soviets has committed suicide.

Tragic 24 year old Karl Koch was found last weekend burnt to death at his home in Wolfsburg. Police say he doused himself with petrol and set himself alight. They are ruling out any foul play.

Koch was one of eight hackers rounded up earlier this year in connection with espionage activities

(*Express* 19). He and his pals had been supplying data to the KGB for up to four years.

In return all had been given money and drugs. But they claimed they had been blackmailed by the KGB.

Koch had not been charged as yet pending an extensive investigation by West German authorities. However, it is thought he would have been charged with a minor espionage offense in due course. ■

AMSTRAD'S CONSOLE INVESTIGATION

A new games machine is being investigated by Amstrad, *Express* can reveal.

Ideally, the firm wants to show off a new console at the PC Show this September, but time constraints make that unlikely. Amstrad is hoping to tie up a badging deal rather than dive into any exhausting research and development program.

In effect this means that it will take over another company's machine and slap an Amstrad logo on the front. The Brentwood boys have been in tentative negotiations with at least one console manufacturer with this in mind. In the past all its machines have been self originated (except, of course, for the Spectrum).

Boss Alan Sugar declared last February that no new machine would appear from the firm during 1989 and, indeed, that was the intention.



• Tower of babble: Secret plans under discussion at Brentwood?

However, Amstrad is well known for its willingness to change quickly according to market trends and any opportunities which might arise.

The firm can hardly have ignored the frantic activity over the past few months on the console front with manufacturer after manufacturer launching new machines, or else upgrading

versions of their old successes.

For the past four years Amstrad has always been the centre attraction at the PC Show, launching new machines every year. The firm regards it as an important focal point for its plans.

This year has had its problems with the PC200 showing moderate success at best, and the high end Amstrad PCs being dogged by delays and problems.

An uncertain year in its computer and satellite disk campaigns have prompted drastic dips on its share

price. Last Friday shares dipped by 9.5 pence resting at a three year low of 83.5p. Four months ago its shares were trading at 181p.

The only clues about Amstrad's plans for the PC Show are centred around the PC Show. Contrary to curious reports elsewhere Amstrad is not planning to scrap the machine. Indeed, some sort of relaunch is expected in September. "We'll be giving the PC200 a lot of backing in the autumn," came the Amstrad line. As always, the firm is not talking about any new projects. ■

Miami Twice

Miami Vice is once again to be the subject of a computer game.

Softek has decided to convert Crockett and Tubbs to computer format with the game likely to arrive later this year. A Miami Vice game appeared in 1985 courtesy of Ocean. Unfortunately it was panned by the press and didn't make much impact.

But Softek is confident it can turn the TV Show into a "good" computer game. ■

CONTENTS

FEATURES

ARMCHAIR EXPERT 8
Expert Systems and Artificial Intelligence on your micro

FAST TRAIN 20
Report on the Training Show in London

SAMPLEY GREAT 24
The Express guide to s-s-s-samplers: best buys, best gear

DISCOVERY 18
All you ever wanted to know about disks

A to Z PART 9 21
L is for Laptop, LocoScript, Laser printer...

APRIL IN PARIS 24
Er, June, actually

REGULARS

COMMENT 4

LETTERS 11
You have your say

EXPRESS SALES 34
Great bargains here for the taking

JOBS 39
The best computer situations vacant

TECH TIPS 36, 37

READERS' CLASSIFIED 38

GAMES 48, 50
Kick Off, Silkworm, Super Scramble Simulator, Timescanner, Classic Invaders

VOUCHERS 43, 44
Buy *Express* for 58p and save £10!

BACK PAGE 46

YOUR MACHINE

ST 26

Amiga 27

PC 28

CPC 29

Spectrum 30

Commodore 64 31

PCW, QL 32

BBC, MSX 33

Atari 8-bit 35

COM COMMENT

Amstrad to console itself?

Rather like McDonalds, it's fashionable to be disparaging about Amstrad and its box-it-up-and-flog-it mentality (though McDonalds staff show infinitely more warmth and sincerity than Amstrad's). Amstrad's shares are dipping again and few people are shedding tears.

But for all its unpleasantness, Amstrad is a British company which had, up to this year, been beating the rest of the world with the relentless brute force of a West Indian bowling attack. But problems with its unspectacular PCs in the more 'legitimate' computer market have seen a downturn in its still vast fortunes.

The boys at Brentwood need to reaffirm their grip on the low end market - and that means games. Atari and Commodore are running amok with the ST and Amiga, and games consoles (such as the new generation of hand-helds) threaten to hit Amstrad's CPC and Spectrum all round the park.

What Amstrad needs is a console. It will blast the company back into the game by being cheap and superbly well marketed; all Amstrad needs is to find an innovative console to market. In the present console-heavy climate that should be perfectly possible for Alan Sugar and his side.

Savings on paper

Express has moved on to new paper in a small bid to go ecological; the new stuff is non-chlorine bleached to cause less damage to the environment. (No chance of using recycled paper yet - that's still much more expensive than fresh paper - though all the paper we use in our offices is recycled). It's simplistic, but nevertheless true, to say that if we don't make the future Green, it will be black.

EDITOR.....Rob Ainsley
NEWS EDITOR.....Colin Campbell
FEATURES EDITOR.....Andy Storer
REVIEWS EDITOR.....Rik Haynes
TECHNICAL EDITOR.....Jerry Glenwright
ART EDITOR.....Angela Neal
ART ASSISTANT.....Harriet Athay
PRODUCTION EDITOR.....Rod Lawton
ADVERTISEMENT MANAGER.....Mark Salmon
AD EXECUTIVES.....Sarah King, David Lilley
AD TYPESETTING.....Terry Turner
PUBLISHER.....Greg Ingham

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BUNDLE BOOST FOR COMMODORE 64



• Pack attack: New bundle for C64

A brand new games bundle has been unveiled by Commodore for its ageing 8-bit micro the C64.

The 64 has long been backed up with freebies in order to attract new buyers. Purchasers are often first time buyers - Commodore clearly has this in mind with lots of popular names in the new pack.

Dubbed *The Sporting Brainbox Pack* it offers ten games of varying quality. On the sports side buyers will get

Peter Beardsley's International Football, Frank Bruno's Boxing, Ian Botham's Test Match, Daley Thompson's Olympic Challenge and a "mystery game".

The other side contains Domark's massive seller *Trivial Pursuit, Split Personalities, Jeffrey Archer's Not a Penny More, Not a Penny Less, Bob's Full House* and an unnamed title.

The bundle will come with a joystick and datacorder and

will cost £149.

Whilst lacking the quality rating of freebies on the Amiga and ST this pack is almost certain to attract new game players. The C64 confounded everyone last Christmas as punters flocked into high street stores and stocks ran out.

Talk of the impending demise of 8-bit machines still appears to be a fallacy as the 64 (as well as the Spectrum and CPC) is still the focus for parents looking for a good,

cheap, value added first time computer. The offer is likely to run until Christmas and probably beyond. ■

● Snippets

• PC owning pilots will be able to feel the freedom of the skies next month when US software company SubLogic launches *Flight Simulator: Trainer*. Soaring at an expected price of \$195 it's designed for current or prospective pilots wanting a little extra practice and is fully compatible with SubLogic's huge line up of scenery and supplement disks.

• British companies spent an average of £2.8 million on computer technology last year and should spend about £3 million in 1989. Analyst Price Waterhouse reckons it's a healthy change from the days when management was spending too much money on improving technology which didn't improve business performance.

• Haydock dealer Saddler Communications is to hold an open day on Thursday 29th June. On show will be loads of Amstrad kit as well as Commodore, Philips and Atari stuff. Technical and sales people from the various companies will be on hand to help you with enquiries. More on 0942 719122.

• A new comms software pack is being sold here which, it is claimed, doubles modem throughput. MagicSoft's MTE costs £69 and is being sold by Digital Matrix. "With this users do not need an expensive high speed modem to take advantage of reduced on-line charges and lower telephone bills," says Matrix. Contact 021 704 1399.

• Logotron's sideways scrolling shoot 'em up *StarRay* is to be sold Stateside as *Revenge of Defender* capitalising on the success of the brilliant old coin-op it resembles.

UK tech grads whisked away

Britain's top notch computer graduates are being wooed away by European and Far Eastern companies promising big money salaries.

Universities throughout the country are the target for employers hoping to pick up the best of Britain's technical boffins. The reasons for this are:

- English is the dominant language in technological fields.
- Britain's graduates are highly regarded throughout the world especially in computing.

• European firms are prepared to pay graduates more money than British rivals. Even tax cuts here for top bracket workers is not enough to keep them back.

• Foreign firms are more likely to promote technical experts to senior positions such as the board. Those positions are more likely to be held by marketing people in the UK.

- Recruiting in the UK is easier then elsewhere due to an efficient system throughout the university network.
- A demographic downturn on

the continent is spurring employers into looking elsewhere for graduates. West Germany's graduates have dropped by 45 per cent in the last decade compared with 36 per cent here. Skilled young people are even scarcer in Europe than in the UK.

Whilst big salaries in European countries is good news for clever graduates it's hardly what the doctor ordered for British companies. For the moment they are losing out in the battle for good staff. ■

Calling all coders



• Receiving you: Edgar lines up new games

A new games software company is on the lookout for good ideas for publication.

Cumbria based Videocoders has just set up with the aim of launching a series of £2.99 games on the Spectrum, C64 and Amstrad CPC.

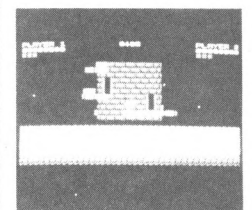
Top of the shopping list are football management games, beat 'em ups and simple shoot 'em ups.

"We'll be happy to evaluate software from anyone out there with a view to publication," said director Jonathan Edgar. "Our programmers will be paid well and their games will also be going to other countries. I'm sure it will take off. Eventually we could be setting up a full price label."

Budding budgeteering programmers should call 0228 35208. ■

Action combo

Veteran software company Hewson will give gamers the chance to relive six of its most popular titles next month when it releases *Heat Wave*, a games compilation package for the Spectrum, C64 and CPC. For £13 you get *Nebulus, Firelord, Rana Rama, Zynaps, Netherworld* and *Impossaball* (Spectrum/CPC) or *Alley Kat* (C64) on cassette, with C64 and CPC disk versions currently under consideration. ■



• Nebulus: Back in the pack

Oxfam games plea prompts action

Oxfam's plea for donations of second hand software in order to help save the starving has prompted hundreds of companies and individuals to make an effort.

Already thousands of pounds of software has been brought forward. The international charity organisation asked for any donations - particularly of games software - last month. Already software houses, magazines, retailers and distributors have sent in games. Offers from individuals are not so substantial but still "coming in thick and fast".

Oxfam preferred not to reveal which companies had been the

most generous simply saying: "The response has been really good and we'll be selling software through selected London shops during the summer." Plans are afoot to sell games through outlets in cities around the country.

Oxfam has ventured into home computing on a smaller scale in the past with a healthy response from gamers. But the organisation is urging anyone with old and unwanted software to visit to an Oxfam shop to make a donation.

Monies raised will "help people suffering from hunger, disease, homelessness and extreme poverty around the world".

Hotel guide for PC



• Open Door policy: Now your PC can find you a hotel

PC owners who often hit the road are being offered a package which details 1,354 hotels, each within a radius of any one of 23,000 British place names.

Open Door's size apparently caused some development headaches for software publisher Lucidus with maps and the like having to be tightly squeezed into the memory using specially created utilities.

Hotels featured can be checked against any combination of up to 40 requirements - such as facilities available. Hotel information such as car hire details can also be called up at will.

The complete system costs £250 which includes two updates in the first year. Lucidus is now attempting the mammoth task of a world-wide version. More on 0993 882660.

Virus blackmail

Two computer technicians are currently standing trial in Madrid for allegedly infecting municipal computers with a virus.

The duo infected machines all over Spain with a specially devised rogue program and then offered to sell a vaccine to various local authorities. The blackmailers are being charged with unauthorised reproduction of computer programs and plagiarism. This is the first computer crime case in the country.

TOP FIRMS TO HIRE HACKERS

Frightened firms in the financial hub of Britain are employing hackers to go through their computer networks and reveal all the loopholes.

Known as Tiger Teams, the gangs of hackers are employed by security consultants. Top brass in big money companies then employ them to break into their own systems. Only one or two board members within the company will know about the mission.

Tiger Teams are called after American counter espionage agents.

City chiefs are so worried about the threat of hackers that they have actually been buying the silence of some who break into their computers.

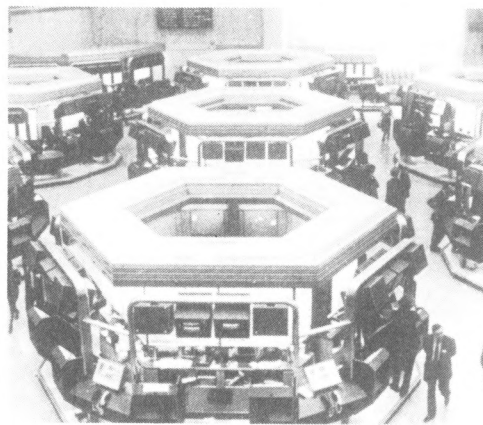
According to the Computer Industry Research Unit at least six big money companies have signed agreements with hackers. The hackers are offered amnesties if they agreed to return part of the money. It is understood that some of the losses exceeded

£1 million with only a tenth of that returned.

The firms are scared that any prosecutions will result in a loss of business as customers learn of the insecurity of their computers. "Companies who feel vulnerable are running scared by agreeing to these immoral deals. Their selfishness is storing up serious problems for everyone else," said senior computing consultant Peter Nancarrow.

But these companies could be prosecuted themselves for perverting the course of justice.

"Employers could find them-



• Put a Tiger in your bank: City firms are recruiting hacker teams

selves in very deep water by such strenuous efforts to protect the credibility of their image. We doubt very much of these agreements are watertight for they have never

been tested in the court. We believe they offer no protection" said leading computer cop Detective Inspector John Austin.

One assistant programmer at a merchant bank diverted £8 million to a Swiss bank account and then returned £7 million in return for amnesty.

These activities have prompted City firms to employ mercenary hackers to sweep through systems. This can take up to four months and costs in the region of £50,000

When the Tiger teams are done some computer managers don't even know they've been in.

Youth banged up

An 18 year old hacker on the US has been jailed for nine months and fined \$10,000 for illegally penetrating US Defence and AT&T computers.

Herbert Zinn Jr was only 16 when

he began committing the crimes. He copied \$1.2 million worth of programs and destroyed files valued at \$174,000. He also published secret passwords and hacking tips.

He'll spend his

sentence in a special youth facility in South Dakota. If he had been an adult when the offences were committed Zinn would be facing 13 years in the slammer with fines of up to \$800,000.

TOP 20 Full Price GAMES

- 1 Robocop** OCEAN
Spectrum, C64, CPC, ST, Amiga, Others
- 2 Microprose Soccer** MICROPROSE
Spectrum, C64, CPC, ST, Amiga
- 3 Run the Gauntlet** OCEAN
Spectrum, C64, CPC, ST, Amiga
- 4 Emlyn Hughes** AUDIOGENIC
Spectrum, C64, CPC
- 5 Dragon Ninja** OCEAN
Spectrum, C64, CPC, ST
- 6 Out Run** SEGA-US GOLD
Spectrum, C64, CPC, ST, Amiga, Others
- 7 Operation Wolf** OCEAN
Spectrum, C64, CPC, ST, Amiga
- 8 Football Manager 2** ADDICTIVE
Spectrum, CPC, ST, Amiga, Others
- 9 Populous** ELECTRONIC ARTS
ST, Amiga
- 10 Forgotten Worlds** US GOLD
Spectrum, C64, CPC, ST, Amiga
- 11 Kenny Dalglish** COGNITO
Spectrum, ST, Amiga
- 12 Crazy Cars II** TITUS
Spectrum, CPC, ST, Amiga
- 13 Running Man** GRAND SLAM
Spectrum, C64, CPC, ST, Amiga
- 14 Renegade 3** IMAGINE
Spectrum, C64, CPC
- 15 Silkworm** VIRGIN
Spec, C64, CPC, ST, Amiga
- 16 Gunship** MICROPROSE
Spectrum, C64, CPC, ST, Amiga, Others
- 17 Double Dragon** MELBOURNE HOUSE
Spectrum, C64, ST, Amiga, Others
- 18 3D Pool** FIREBIRD
Spec, C64, CPC, ST
- 19 Middle Earth** MELBOURNE HOUSE
Spec, C64, CPC, ST, Amiga, Others
- 20 The National** D & H GAMES
Spectrum, CPC

TOP TEN Budget GAMES

- 1 Enduro Racer** HIT SQUAD
Spec, C64, CPC, ST, Others
- 2 Shanghai Warriors** PLAYERS
Spec, C64, CPC
- 3 Daley Thompson** HIT SQUAD
Spec, C64, CPC, Others
- 4 Treasure Island** CODE MASTERS
Spec, C64, CPC
- 5 Rambo** HIT SQUAD
Spectrum, C64, CPC
- 6 1942** ENCORE
Spectrum, C64, CPC, Others
- 7 Road Runner** KIXX
Spectrum, C64, CPC, ST
- 8 Turbo Esprit** ENCORE
Spec, C64, CPC
- 9 Spy Hunter** KIXX
Spectrum, C64, CPC, Others
- 10 Fast Food** CODE MASTERS
Spectrum, CPC

RE re-entry • NE new entry • Last week's positions
Compiled by Gallup
The charts shown are based on the Open Market, that is retailers who stock a broad range of products. All charts shown are copyright of Gallup.

Life saving computer

Doctors can now plant radioactive capsules inside a person's head which eat away fatal brain tumours - thanks to computer technology.

Previously, doctors dared not insert large doses of radioactive materials inside a patient's head. However, a computer which provides three dimensional pictures of the brain and tumour allows surgeons to place the seed in exactly the correct position.

Now only cancerous parts of the brain will be affected by the lead capsule whilst healthy areas go undamaged. The £125,000 computer would normally be used for high

tech aircraft design but thanks to a generous donation one London hospital can use it to save lives.

The Ardent Titan computer was donated to St Thomas's Hospital in Lambeth in memory of Mick Shields - former managing director of Associated Newspapers - who died of cancer on Christmas Day in 1987.

Any attempt to work out the necessary calculations manually would be utterly impossible. The computer itself is a staggering 100 times faster than previous equipment. St Thomas's hopes to operate on 25 tumour cases a year giving every one an extra lease of life. ■

Poll tax tracker

People unable to pay the dreadfully unpopular Poll Tax are to be tracked down using a special 'debt collection' software package.

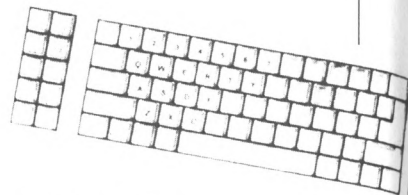
DC4 is already being installed in various local authority centres and it can handle "any number of

debtors". DC4 from Sherwood can also hold all history and documents relating to each individual debt. Authorities will have to spend between £10,000 and £20,000 on the package which can run on micros utilising UNIX, CDOS and MS-DOS. ■

MSXtremely MSXciting

Games starved MSX owners will soon have the chance to play four top games thanks to the kind people at Virgin/Mastertronic - Xenon, Double Dragon, Road Wars, and Terrorpods are all due on the Melbourne House label, priced at £9.99 on cassette. ■

DON'T FORGET TO TELL SAM



How would you like to have a financial stake in a computer manufacturer? If you've a few hundred pounds to spare here's your chance.

A 66 per cent flotation sale has just been announced by Miles Gordon Technology to any budding investors. The firm hopes to raise £500,000 which will help finance the launch of its SAM Coupe computer.

MGT won't become an ordinary company with which to buy and sell shares though. The sell off is part of the Government's Business Expansion Scheme designed to give small companies a chance to get their products on to the market.

Investors will be asked to buy a minimum stake of £500 worth of shares (although £1,000 stakes will be given preferential treatment). Then, after five years, they will be able to rake in whatever those shares are worth.

The advantage for shareholders is that they can gain tax relief and they aren't obliged to pay capital gains on any earnings the shares make.

The disadvantages are that BES purchases are, by their very nature, a bit touch and go. They are designed to help small companies make an impression with new products.

Any new product is always a risky venture especially when it happens to be a low cost computer. The City is still nervous about computers (Amstrad's dodgy share price will testify to that).

But if the SAM Coupe takes off it could mean mega bucks for canny money makers.

MGT's three directors will retain the other 33.3 per cent of the company. Not surprisingly the firm is "extremely confident" that its baby will take off around

• Coupe: Money spinner?

the world. But it needs money to market the Coupe and pay for the costs involved in manufacturing.

"The technology's been ready for a year now but finances have kept us back," said director Alan Miles. "But we've made the personal sacrifices needed. Demand for the machine might even exceed our own expectations." MGT will become Miles Gordon Technology plc.

The sale is being arranged by reputable firm Johnson Fry Corporate Finance Ltd. If you want a prospectus write to Dorland house, 20 Regent Street, London, SW1Y 4PZ.

The Coupe should arrive in September with a price tag of £150. ■



YOU GET MORE FOR YOUR MONEY THAN JUST OUR NAME

MICRO MEDIA SEAL!

Micromedia are the **ONLY** Company committed to customer support for the fabulous PC Engine games console.

- For a start we are an established company who will be around to look after you in a year's time, and not "gone with the wind" (and your money) - Micromedia are suppliers to the Computer Shops. Chances are, you'll find us the only Company supplying them with software for our customers too.
- Micromedia's own company "Engine-eering" repairs only our machines - in fact right up to full replacement internals - and is presently the only professional repair source in the country.

- The PC Engine user club is only available to Micromedia owners (who are automatically logged onto our computer) and is FREE. You will get the monthly magazine and access to our telephone hotline, now and into the future.
- Picture quality and hardware reliability are far superior. Don't take our word for it, your local computer shop will soon be stocking it (and if not why not), so see for yourself. Alternatively, write for details of special mail order offers.

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WINTER'S TAIL



JIM DAVIS

THE
EDGE

The ski animal's coming your way soon

THE AIS HAVE IT

Artificial intelligence – or AI – is coming into our lives more and more, from the High Street shop to your home PC. Neil Booth went to the Expert Systems Conference at Novotel last week to get a glimpse of what's to come...

The idea of computers being 'intelligent' is one that most of us treat as a joke. When you get threatening letters because you haven't paid your gas bill of £0.00, or mailmerged competition offers which begin 'Dear 23 High St, Great news!', you might think artificial stupidity is a more accurate term.

But making computers that can think – or at least, be active seekers of information and givers of advice based on what you tell them instead of passive tools – is big business. The Expert Systems Conference was full of smart people in suits and American accents talking about inference mechanisms, backward chaining, cyclical execution and dynamic slot creation.

Expert Systems are not really artificial intelligence. They are knowledge bases – a sort of smart store of knowledge entered by humans which can advise users on decisions based on that knowledge. You ask questions of the computer, or type in answers to the questions it asks you, and it advises on what you should do.

Expert Systems are coming in everywhere. One advises transport agencies how to move radioactive loads and details the regulations they must observe. Another in use in the US trains

judges by advising them on how to reach decisions over test cases. Doctors can use expert systems to give quick diagnoses. Other applications include agriculture (advising on crop and livestock management), broking, engineering (diagnosing faults in structures), finance, pharmaceuticals, foodstuffs, teaching and so on.

The computer can store a vast quantity of information and access it all; a doctor may miss one of the possible diseases linked with the symptoms a patient has, whereas the computer will unfailingly check all the possibilities.

Everyone is keen to point out that Expert Systems aren't there to replace anyone – they're merely a tool that human experts can use to help them make a decision. They can also preserve 'rare skills' – the knowledge and expertise of someone who retires or dies.

Most of the programs are written in languages like Lisp and Prolog and run on mainframes, but there are quite a few PC AT based systems around. They're strictly for businesses, unless you happen to have a few grand to spare!

Neural impulse

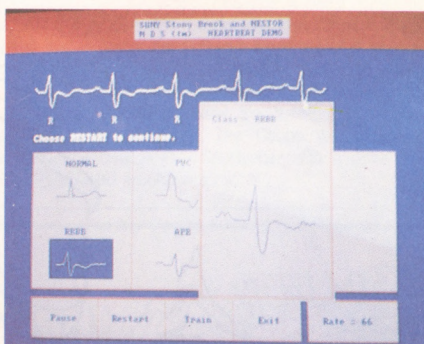
Neurocomputing claims to be Britain's leading supplier of neural networks. These systems learn in the same way as humans – by making connections from experience.

Consider the way you learn to read numbers; you learn that all shapes of a certain type are called '3', others '9' and so on, and make your own inferences as to what defines a 3 or a 9. A program on display – running on a PC AT – did just that; you input five versions of each number from one to ten – hand drawn on screen with a mouse – and the neural system 'learns' from that what the numbers looked like generally and can recognise them from then on.

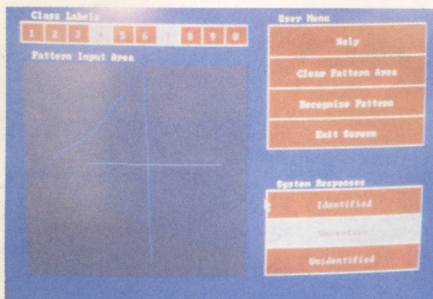
The numeral recognition system is a mere £500; the system on display which advises on whether or not to give mortgages "better than any human



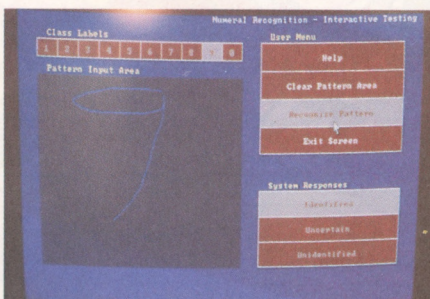
● Suppose you're buying a hi-fi. The assistant can run up an Expert System on a PC which asks you questions about your requirements – what sort of room you want it for, how big it is, how much money you want to spend and so on. The program advises you of the best choices.



● This neural system looks a patient's heartbeat patterns on-screen and can instantly detect heart conditions from the shape of the trace.



● The numeral recognition system can recognise all the numbers in anyone's handwriting, even say when it is uncertain (for a scrawled figure halfway in between a 4 and a 1, for example) and also say when it can't recognise anything (for a squiggle). A genuine neural network – on a PC!



Such a system has great potential in signature recognition, in banks and shops taking your credit cards.

A similar system also being displayed at the conference could check people's passport photographs against the real thing – instantly.

expert can" was a snip at £250,000 per licence. (If you're interested in finding out more on neural networking, phone the company on 0962 842048).

It's all a vision of the 90s. But, as David Robertson explained, neural networks have been around a while. "It started in the 50s. There was a peak of interest in the late sixties, then a decline. But now that technology has caught up, there's a surge again." He numbers all the top 100 UK companies among his customers – "including all the clearing banks and building societies" – and neural networks are reckoned to be a billion-dollar business by 1992.

As he was keen to point out, neural network systems won't replace anyone. "They're just another tool, but a very powerful one." A great advantage of the neural networks is that they don't have to be programmed, they just learn from large quantities of input information. So they can be used in 'instinctive' situations such as insurance underwriting, where humans themselves, however good, may not be able to define any 'rules' for their job and so couldn't program a computer to do it.

AI is going to be a part of our lives in the nineties. It may not be the dishwashing robot type, but it'll be there advising, and helping experts to advise us, on which pensions to go for, which hi-fi to buy, and what diseases we've got. It'll be validating our signatures in the banks and shops, checking our passport pictures at the border. And the good news seems to be that, with ever more powerful home micros, AI is going to be more and more available for the home or small business user. ●

Want to know more? Say AI

If you're interested in finding out more about AI, there are some nice introductory books by Forsyth and Naylor called 'The Hitchhiker's Guide to Artificial Intelligence', published by Chapman and

Hall for £10.95. They are full of programming examples in BASIC (yes, BASIC, you don't need Prolog or Lisp or anything!) and are available in Amstrad BASIC, BBC BASIC, IBM BASIC and

Apple BASIC editions. ISBN numbers:

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
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

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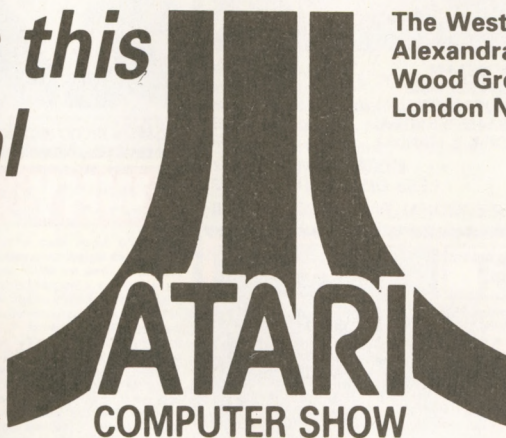
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- Stump the Atari experts with a question and win a prize for charity.
- If you enjoy your Atari computer, you'll love the Atari Computer Show.

LEAVE ME A LOAN

John Hunter (letters, Express 29) mentions in passing a scheme for students to buy computers (I assume it means cut price). Please could you tell me where to write to for details, as I am intending to buy an ST in the next few months.

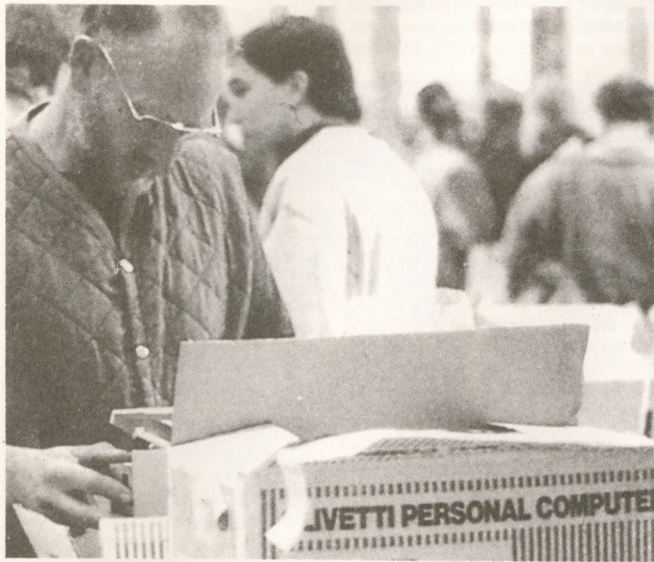
SJ Phillips, Wirral, Merseyside

● What you can get is student discount and an easy terms loan. Details from the NUS on 0457 468003.

What I would like to do is to hack into the DHSS and implant viruses to mess up this bloody poll tax. By the way, I really do live in Cambridgeshire, but I'm not giving you my address. You might send John Boy round. I hope I can count on the support from other hackers on this subject.

The Mad Man, Cambs

● I don't suppose you could hack in to the AA's computers and remove my name from their Prize Draw mailing list, could you?



● The world ends at Birmingham, according to computer auctions

LET'S HAVE SOME AUCTION

On reading your article about computer auctions by Jerry Glenwright (by the way, an excellent article) I discovered to my horror that there were no addresses for computer auctions in the north of England. The northernmost address was in Birmingham, which is classed as the Midlands. (Ho - no, not the great north/south divide again!)

Could you please tell me and other readers from the north of England of any northern computer auctions. (By the way, your magazine does reach the north).

Anthony Bailey, Leigh, Lancs

● As far as we know there are only the three companies we mentioned in the article doing regular auctions, all based in the south. If anyone knows of auctions in the north we'd be delighted to hear.

HACKED OFF

I am sorry but I can not contain my anger any longer.

I am a hacker and have been for the past three years. Emma (can't you tell I'm a Tory?) Nicholson with, "We must succeed - hacking is a real threat, blah, blah, blah" (Express 25). Doesn't it make you throw up? It gets worse, what do we get in issue 30? Detective Inspector John Austin of New Scotland Yard wanting to capture hackers like me.

I can see nothing wrong with hacking (if I did I would not do it). As to his reckoning that 90% of hacking will stop, it won't. It will just bring in an element of danger, and more and more people will start hacking. I'll carry on hacking. No wonder we can't see John Boy's face in the photo. He'd have hackers following him home.

QUICK POINTS

- 1 Don't let the lefties force Ken Mosley out. He's great.
- 2 Bet you the 16-bit PC Engine is launched at the CES show.
- 3 I've got a great way of stopping piracy. Less protection should be put on the disk - but if the program is not accessed in a certain way, the drive should start saving and wipe the disk! If protection tabs were on, the program could just crash. That'd stop 'em.

Barry Newton, Wigan, Lancs

● Ken says he has no interest in politics and just 'speaks plain common sense'. I think he has his own ideas on stopping piracy - see the back page this week.

There was a version of the 16-bit PC Engine at the CES show, but I would not like to encourage gambling in Express.

TWO ROMS DON'T MAKE A RIGHT

I just thought I would let you know the latest info on Atari's TOS 1.4. After my abortive letter attempt the other week, I decided to ring Atari customer services department at Slough.

This is what I was told about TOS 1.4: "Time release date for the new ROMs for upgrades is 3 or 4 months away at present, as priority is being given to installation in new machines until the supply of ROMs improves. The price of the ROMs has not been fixed as yet."

The chap I was speaking to took my name and address and said I would be informed as soon as the ROMs were available. So it looks as though there may be some hope on the horizon for my upgrade.

Clive Parker, Bristol, Avon



Dear Reader

More pages packed with another selection from our postbag and Rob Ainsley's replies. Have you got something to say? Make your voice heard in computing's liveliest letters page! Send your contributions to: Express Mail, 4 Queen Street, Bath, Avon BA1 1EJ

PS. Sorry, we just don't have the time to give personal replies, whether you include an SAE or not. We're too busy putting Express together!

Bognor off

I read the article on Users Groups with interest. Mr Glenwright obviously has never attended the Bognor Computer Club. If he did it would be a different story. Upon arrival I was subjected to rudeness and down right abuse.

With respect, the secretary and a few others were very friendly, but the general atmosphere was 'this our 'clique', so **** off'. Just because someone wears a leather jacket and doesn't listen to acid-house music, is this a reason to be anti-social to them?

Come on folks, we've got to stick together. Most people's image of a computer user is either a hacker, 'mindless' games player or a



furtive 'self-manipulating kid'. These kinds of actions only reinforce these stereotypes. We all know that computing is fun so why not spread the word, instead of being so self-centred.

I'd love to know what other people think about these points. Alan Reed, Bognor Regis, West Sussex

● The Bognor boys are not coming out of this well. Get your act together, you lot, or we'll send 'Hitman' Haynes round.

Anyway, Alan, drop us a line, tell us what your machine is and to make up for it we'll send you a piece of software as the sender of this week's prize letter.



● Are user groups nice and friendly, like this one, or full of ignorant yobs who listen to House music? Go to Bognor and find out...

ATTACK OF NORTHIA

I still get a laugh from re-reading the Eric Lombard piece (Express 14) occasionally. Just goes to prove I suppose that at the end of the day if you want a real figure of fun you can't beat a northerner.

Not all northerners are figures of fun of course, especially those who see sense and move south.

Some of the letters you publish worry me.

M J Adams, Ealing, London

So far in the back pages we've used as figures of fun Japanese, Americans, Northerners, Southerners, Lawyers, Doctors, Art critics, the BBC, Estate Agents, and Yuppies among others, so I wouldn't say we were particularly biased. Maybe it's time the Welsh, Irish, Scottish and a few racial minorities got the treatment as well.

Express has a strong northerner contingent. Andy Storer is from Sheffield, Rob Ainsley from Hull and Jerry Glenwright from Sunderland.

ALAS, POOR ORIC

Could you please tell me where I can obtain software for my humble Oric? Your brilliant mag is my last hope.

S Briglin, Paisley

Well, you could try the Oric User Group, IOUG. The address is 1 Kingsway Crescent, Burnage, Manchester M19 1GA.

BACK ISSUES

I am doing a GCSE Business Studies course at secondary school. After writing to Romantic Robot for help on my project on the computer industry, they replied but



• Where can you find software for the Oric?

could be of no help other than to mention a recent issue of your magazine in which there was a 'detailed financial analysis of a software company' (their words, not mine.)

I do not normally get your magazine, and after searching around for several days in the local shops I could not find the issue mentioned. I would be most grateful if you could tell me how I could acquire the issue, (which I believe to be number 28) or the article itself, as this would be of great use in my project. Matthew Whitton, Peacehaven, East Sussex

Back issues are available from The Old Barn, Somerton, Somerset, TA11 7PY, for 75p each inc. p&p. (Only recent issues may be available). And yes, issue 28 is the one you want.

If anyone else has trouble getting Express, the first thing to do is to pester your newsagent to take it, and the second to tell us. We want to get our magazine out on the shelves too!

TREADING THE BOARDS

1. In reply to Michael Brown of Cheshunt, Herts' request for bulletin board numbers, I have a collection of over 400 of these, and would be pleased to send him a copy (and anyone else interested) if he could send me an SAE. (Onslow House, Weston Road, Bath).

2. Software piracy - I wish people who do would shut up and get on with it. I really don't care if some people want to play

games without paying for them, but if they go around boasting about it, they deserve to get done by FAST.

3. A friend of mine recently had the bright idea of selotaping two floppy disks together to copy from one to the other in a single drive. I wonder why his drive didn't work too well afterwards?

4. Two raised fingers to you, Joel Grounds of North Wales. Archie Basic is not faster than 8-bit machine code. You are right, however, in saying the Arc is superior to the Amiga or ST, and I will set my battle-hardened Beeb B on anyone contesting the matter.

5. I see you are based in Bath. It's a lovely city, isn't it?

Rafael Jay, Bath, Avon

Thanks for the offer about the BB numbers. Bath is OK, though I'm not over fussed with the new local bye-law which makes it an offence to drink in public (i.e. you

ARCH RIVALS

It's great news to hear about the coming Archie/Atari 8 bit column. I am an ardent Archie fan, but never thought you would give us our own column. I would also like to congratulate you on listening to your readers, and giving us what we want, not what you want to write. Thanks.

There is only one small problem. I don't suppose there is any chance of the Archie column totally supplanting the Atari one is there? After all, no one is really interested in them, are they? Robert Smith, Marlow, Bucks

If I were you I'd get yourself a secret identity and move away from Marlow. These Atari 8-biters are not to be trifled with.

THE ARCHIE IS TOO EXPENSIVE!

Though not a regular reader of your magazine I've bought a few copies and find it to be rather biased towards the Amiga and ST.

You seem to spend a great deal of time putting Acorn down - the Archimedes being too expensive, Blue Peter giving away A3000s as prizes, Archies are no good as games machines etc.

Maybe the A3000 is too expensive for the average home user. I'd certainly like one but can't afford it (mind you, at the moment I can't afford an ST!), but why on earth shouldn't the Beeb give away superb computers? I just wish I was young enough to enter (and get to meet Caron Keating). Had they given away an inferior foreign machine would you have been happier? I think yes, despite the fact that the lucky winners could well be using Archies at school shortly.

I have no complaints about Jerry Glenwright's review but Rik Haynes' ridiculous comments about A3000s as games machines needs explaining. The Amiga costs more than a Speccy - so what? The cost of the machine in this instance is irrelevant. You can't say, "It's got fantastic graphics and sound, a super fast processor, plenty of memory but it costs too much so it's no good at games", or "There are very few programmers so there'll be no software". It's ludicrous. Many Beeb programmers left to write games for the ST, they'd surely be more at home on an Archie. Zarch/Virus was written in half a megabyte, 1 meg is now standard.

David Braben and Orlando are obviously fluent ARM programmers others will follow their lead as the market grows. It may even be possible to write good games in dear old BBC BASIC which can give the Amiga/ST games a run for their money.

You won't be surprised that I've got a 32K BBC, still chugging along at a leisurely pace, fault free since I bought it 7 years ago, with a decent resale value, lots of great games (thanks in particular to Superior Software). Acorn have never let me down despite their lack of British support in their hour of need, all I can say is I hope the A3000 kicks the s*** out of Commodore and Atari, not forgetting Amstrad (fancy wasting all that money on Sinclair Alan - look what you missed out on).

Alex Card, Aldeburgh, Suffolk

I've nothing against the BBC giving Acorn machines away (it's doing it again this week) but they seem to be overly keen on promoting their own machines. Anyone who saw the BBC 'Software Show' would have thought the only computers in the world were the BBC and Archie.

Rik's comments on the Archie's unsuitability for games were, I think, quite justified. I doubt very much that it will supplant the Amiga or ST as games machines because I doubt there will be much software written for it. I hope time proves me wrong.

THE ARCHIE IS FAR TOO CHEAP!

We Archimedes users have failed in our conquest to try and get you to conform. We have tried to negotiate with you peacefully, but now I think it is our last chance to get it through your thick skulls. The Archimedes is not overpriced! Joel Grounds (Express 30) wrote a letter to you trying to explain that the Arch is better than the Amiga. All you can say is, "Nice machine, but I still think it is overpriced." Is that all you can say? Is that all you can say for your side of the argument? If that is so, then you are more incompetent than I first thought. I hope you recognise that the Arch is not overpriced and is better than the Amiga, for your sake. And tell the other Amiga freaks that too.

Daniel Brown, Cambridgeshire (where the Arch was designed).

can't sit outside pubs in Bath any more when the weather's nice).

OLD HACK

I was very disappointed to see (Express 27) that some dickhead agrees with Tory MP Emma Nicholson's plan to make hacking a criminal offence, punishable by ten years inside, and he is still not satisfied with that amount of time.

I am a hacker and a cracker and a myself I find it very challenging. I wonder whether these people who are against hacking tried hacking. If they had, I reckon they wouldn't disagree with me and many other people.

WC Fluch

SCOT FREE

Believe it or not, I live in Scotland. Come on, you know - that place above England. And whilst we are munching away on our Haggis, wearing our kilts, and playing our

You are fond of using unimaginative insults to back up weaknesses in your argument. Have you ever thought of being a politician?

THE ARCHIE IS REASONABLY PRICED!

I am writing in to defend the Acorn Archimedes since everyone seems to be on the attack when it's mentioned.

Every magazine like ACE, PCW, Computer Guardian, and even you seem to love the speed side, but badly criticise the price which is totally unfair, as Acorn have priced it as low as possible. You always have to pay more for the best, this is even true with software. How would Atari or CBM price a 32-bit machine? Has anyone considered this? They have a hold on the games market, so they can dictate the price as they desire.

My only wish is that reviewers would stop knocking its price and comparing it to 16-bit systems. I know the ST and Amiga are the closest neighbours but I think the differences in class and power must always be stressed. Think about PCs. They are 16-bit systems (like the Amstrad PC2286) yet they cost more than the A410 but seem to offer less than the 400 series.

Keep up the good work Express and more on the Arch please!
R Simon, Ealing, London

OK, good points. In fairness to Acorn it must be said that the Archie is possibly the only micro that has been developed, designed and even had its software designed by the same concern, so it has had to recoup a lot of development costs. However, still a lot of people in the know mutter that Acorn is used to educational pricing, not person-in-the-street pricing, and that it could feasibly be (say) £100 cheaper.

How Atari or Commodore would price a 32-bit machine is anyone's guess. I rather think they would have priced an Atari A3000 or Amiga A3000 at under £500 - but then they are world based and can indulge in such ambitious strategies. Acorn on the other hand is more parochial - almost entirely within the UK and its dwindling Empire. It evidently don't feel at the moment that it can legitimately go for an aggressively low price given its restricted market. In the end what it is being criticised for is a lack of ambition.

pipes up in the Highland hills, it might be of interest for all programmers to know that we do have computers up here, our population is over 5 million and that football is our national sport. Shock Horror!

So why, why, why do all these talented programmers only have English teams in their games? We don't want to be Arsenal, not even Tranmere. We want to be Hearts, Rangers, Celtic and even Queen of the South. But no. To be a Scottish team in *Football Manager 2* we have to dish out an extra £13 for an expansion pack.

Wise up. We are not a minority any more. Football interest has risen by 79%

since *Football Manager* came out. (The last one to contain an in team editor inclusive of price.)

Kenneth Jackson, Edinburgh, Scotland

● **A fair point. Come on, everyone, remember that there are other footy teams out there. Scottish teams are, after all, our only real hope for success in Europe for the moment.**

Perhaps a special Scottish version of Football Manager could come out in which the keepers are called Dracula (hates crosses) Cinderella (always late for the ball) or St Peter (spends his life fishing things out of the net).



● Kevin McInally, Scottish International, playing for Villa against Norwich. Perhaps he left Scotland because *Football Manager 2* doesn't let you play for Scottish teams without an expansion pack?

Snippets

DOES THIS MAKE YOU A BUGGIST?

Why are your bugs (Tech Tips) all beetles? As an entomologist, many are old friends but what's wrong with *Scoloposthetus Decoratus* or *Picromerus bidens*?

Alex Card, Aldeburgh, Suffolk

● **If I get 15 requests for a *Scoloposthetus* or *Picromerus* column in the next two weeks, I'll give them a column. After all, we've got one for the Atari 8-bit...**



● **Why are all bugs beetles, asks Alex Card? Our Endopterygota correspondent replies: There are over 370,000 species of beetle, found in every terrestrial ecosystem. They provide illustrations and test cases for almost every evolutionary principle (Crowson, 1981) and have a distinct pupal stage in which (that's enough about beetles -Ed.)**

WHAT A BINDER

I have every issue of the ace magazine you have (no, not ACE - Express!) and I think I would love to buy some binders.

Kenneth Jackson, Edinburgh, Scotland

● **Not many requests so far, I'm afraid, so it looks like there'll be no binders yet.**

POCKET ROCKET

...Uncle Techtip's blanket warning against 'pocket' products might not necessarily apply to *Pocket Protex* (for the PCW at least) which is elsewhere highly recommended...

M J Adams, Ealing, London

● **You're quite right. It's a lovely little word processor.**

AND FINALLY...

Thanks for printing my Archimedes letter (*Express 30*), but my two questions seem to have disappeared. These were...

Joel Grounds, Llanfairfechan, Gwynedd

● **Sorry, that's all we've got time for this week.**

(Only joking. We've answered your questions in Tech Tips.)



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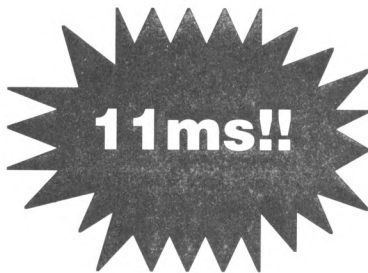
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★ ★ NEW COLCHESTER STORE SOON ★ ★

The stand now training...

The first Computer Training Show (CTS) was held at Olympia between May 31 and June 2. Over 80 exhibitors took space and as many as 3,000 visitors showed up. Steve Jarret was one of them...

CTS was opened by Patrick Nicholls MP, Parliamentary Under Secretary of State for the Department of Employment, and most of the major training companies exhibited, including Applied Learning, Ashton-Tate, BOC Training Services, Datasolve, Kalamazoo, IMSL, and Unysis.

Launched and staged in just over ten months, CTS covered all aspects of computer related training. Some organisations demonstrated the computer itself as a training medium, while others offered traditional training packages for users getting to grips with new hardware and software. Organisations that specialise in developing general training courses jostled for space on the exhibition floor with specialist companies involved with mainframes, networking, personnel

and management training.

High-tech teaching aids were in evidence, and visitors were offered plenty of opportunity to check out the latest audio-visual training packages, including interactive video and laserdisk systems.

A conference running in parallel with the show addressed issues that would concern businesses planning to invest in computer training - two main sessions covered the 'why' and 'how' of educating personnel in the ways of new technology. Similarly, a series of buyers' forums were held during the show to inform purchasing personnel on such diverse topics as communications, networks, UNIX and desktop publishing.

The original idea for the show came from Philip Boyle, a senior sales consultant with ICL and part of the show team, who felt that the time was right for the industry to have its own showcase: "Most of the companies represented here have exhibited at the more mainstream shows, such as PC User and Which?, but really needed a more closely targeted audience where they can approach different sectors - people from personnel, finance, the technical side and line management.

"Very few companies realise the importance of training which is vital to success with new technology. Training maximises the investment in hardware and should be seen as such, rather than simply as capital outlay."

These sentiments were borne out by Sally Preston, project manager for the show. "As part of

the Computing Services Industry, training is just one element of the back-up provided for hardware and software. And although the training industry is relatively new, its growth and turnover is larger, proportionally, than the development and production sector. However, the area of training is seen as just one element of an integrated approach which feeds off the development side and vice versa.

"The event will definitely take place again next year - we already have around 20 companies signed up - but the final format has yet to be decided and depends upon feedback from those who took part. It will also change its title to the Computer Training and Services Show, incorporating other training-related services for personnel and hardware design."



• Visitors had the opportunity to try out the latest training aids and hardware, such as this touch-screen monitor

Interested parties requiring more information can contact Sally Preston at Montbuild on: 01 486 1951

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ACID AUDIO

ART

Heard the latest Prince single? Love or hate it you can't ignore the massive mix of soundtrack samples from the forthcoming Batman movie. Want to get in on the action? It's easy. Andy S-S-Storer slips on the cans and hits the decks.

Compared to the images your ST or Amiga's graphics chips can display and manipulate, the noises the sound chips churn out don't come anywhere near. To bridge the gap many games and demo writers use a sampler – a device that takes any real-life noise and then lets your micro reproduce it – enabling you to master soundtracks and effects on tape before importing to disc with no apparent loss of quality. So how's it done?

A sound sampler comprises a plug-in cartridge containing an analogue-to-digital converter which translates sound waves, recorded via a mini-jack or phono audio input, into numbers. Accompanying software enables you to perform a variety of numeric operations on the sampled sound and thereby create a range of effects. The quality of digitally recorded sound is determined by the number of readings per second, or sampling rate, used to measure the definition of the waveform. Most packages allow you to sample sounds at a rate of up to 30,000 times a second. Of course, the quality of the analogue signal you're sourcing is crucial too – as is the level at which you're recording it. Once you've hooked your machine to the hi-fi or a microphone, you need to carefully monitor the level of the incoming signal, maximising clarity whilst minimising distortion. A variety of visual displays of audio are available for this purpose – from oscilloscopic waveform monitors and 'VU' metering to 3D spectrum analysers. Once on-board you can rest assured the sampled sound is safe in RAM and available for all kinds of trickery. A package offering more acid audio art than any to date is Master Sound.

MASTER SOUND

- ST £34.95 ● Software Horizons
- 01-446-9146

Master Sound comprises a small cartridge, fitted with a standard 3.5mm mini-jack input to take a source such as a hi-fi, Walkman or microphone. Once loaded, the software utilises the full available RAM of the computer – leaving you 300K on a 520, 820k on a 1040. You choose between sampling rates of 5, 7.5, 10, 15 and 20 kHz and click on the digital oscilloscope or LED-style VU meter to set the input level for optimum sampling level. By positioning sliding bars as 'in' and 'out' points of an edit, you can choose where you want the recorded signal to reside in displayed memory. The data appears as a waveform which may be easily magnified for precision editing –

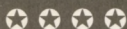


S-S-ST samplers

Digisound ● £89.99

- Siren Software ●
- 061 228 1831

A rather hefty piece of hardware plugs into the ROM socket to accompany GEM style menu-driven software with icon 'buttons' at the bottom of screen for the more common functions. Sample rates go right up to 40kHz and there's a neat status display to inform you of such essentials as remaining available memory, sample length and echo time. The massive range of effects, which can be added even while sampling is taking place, include instant pitch changes at the touch of any and all of ST's keys.

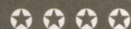


Replay ● £79.95

- Microdeal
- 0726 68020

Replay's plug-in cartridge is

preferable to any of the others since it allows both phono input and output – so you're able to replay all your work back through your hi-fi. The software's neat too – maximum sample rate is an impressive 61kHz and it allows up to ten samples to be assigned keys for instant recall. Aside from the usual range of features, it's also MIDI compatible.



Pro Sound Designer

- £49.95
- Power Computing
- 0234 273000

One of the first ST samplers and perhaps a little dated in terms of features. Coming in both monochrome and colour versions which feature sound chip editor and sample compressor respectively, the rate tops out at 30kHz. But Pro Sound is a part of the same suite as Pro Midi,

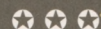
allowing Pro Sound samples to be used as instrument voices on a synth, and Pro Light – a sort of Trip-a-Tron style synchronised colour cyler for fancy screen displays.



STOS Maestro Plus

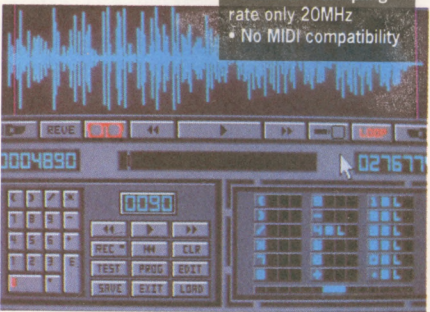
- £69.95
- Mandarin Software
- 0625 878888

Part of the STOS suite of creativity tools including The Games Creator and Compiler, features a plug-in card and all the software needed to incorporate sampled sounds into your STOS programs. Along with a selection of pre-recorded sampled sounds and 13 sound related STOS instructions, the package is possibly overpriced although a cut-down version, without the hardware, is available for £24.95.





• Master Sound's sampler and sequencer screens



HIGHLIGHTS

- The only sampler with a built-in sequencer
- Wide range of easy to use effects

DRAWBACKS

- Maximum sampling rate only 20MHz
- No MIDI compatibility

parts of the sample can be cut, copied, overlaid, faded, filtered, shrunk and made louder by simply clicking on icons.

Where *Master Sound* really comes into its own though is in its inclusion of a one-track sequencer. Entering this mode lets you assign up to 18 samples to the keys on the numeric pad. The idea is to load successive samples into memory, allocate keys to them, and then record a master sequence by tapping the keys in realtime. Repeated tapping of the same key will result in 'n-n-n-nineteen' style stuttering. You can change the pitch of sampled sounds by plus or minus half an octave. In this way, quite complicated sequences of 1,000 seconds in length can be recorded. These can be replayed, fast forwarded, rewind and edited at will - even overdubbed. The results can then be saved to disk.

The one drawback is that the sequencer will only handle sounds sampled at 10MHz - which isn't too clear. It's not a good enough rate, for instance, to be used in disco or live performance applications, which is a shame. However, sounds can be recorded at 20MHz and then squeezed for sequencing at 10MHz overcoming half of the problem, but then the output quality is still limited. However if you're interested in using samples in your own programs then the quality easily suffices. And in this department, *Master Sound* positively excels - samples can be added to your own graphics and text with short BASIC routines. Atari, GFA, Power and HiSoft BASICS are supported and compatibility with *Degas* files ensures you can put some imaginative audio-visual mixes together. All for an incredible £35.



Sampled seconds

The ST and Amiga's bigger memories, speed and popularity make them the main machines for sampling packages - but the PCs and 8-bits do get a look in.

- C64 - Try Trilogic on 0274 691115 and Datel on 0782 744707
- CPC - Give RAM Electronics a call on 0252 850085
- Spectrum - Cheetah is worth a call on 0222 555525
- PC compatibles - Scarce, but try Mercantile and General Facilities on 01 876 1670

Sampler SFX

Most packages will allow you to slow down, speed up, reverse, cut, copy, merge, add echo, reverb and filter sampled sounds. Also standard is the loop function, which allows you to splice a sound into an

endlessly repeatable sequence. Some packages also allow you to squeeze, stretch, fade-in and out, and through MIDI drivers play samples through a synthesiser. If you're serious about incorporating samples

into games or demos then there's also packages available that offer source listings for incorporation into C, assembler and Basic routines along with paint package compatibility for slide show applications.

MEGA AMIGA SOUNDS

Rik Haynes jacks into Amiga samplers to sound out the best one around

The Amiga may not have the built-in MIDI of the ST, but it does have far superior sound abilities to its 16-bit arch rival. The audio-visual custom chips on the Amiga enable it to create four channel stereo audio, making it a top player in the micro sound stakes.

The biggest users of sampled audio on the Amiga are games programmers and demo creators. Probably 99% of all Amiga games incorporate sampled sound FX for effects such as laser fire and explosions, and are usually backed up with a soundtrack which is either snatches of music from a real-life song, or an original composition created by a computer musician using a home-grown sequencer - like the infamous *Sound Tracker* - with sampled instruments for synthesiser, drum sounds, etc.

The Amiga has an impressive array of sound sampling hardware and software available for it, with many products imported from the States. One of the best things about this Amiga sampling hardware and software is that for the most part, each is interchangeable with the other, giving you the best of both worlds. There's also a lot of Public Domain sampling software around, so if you don't like the software supplied with your hardware it won't be too difficult (or expensive) to swap it for something better.

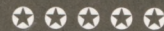
FUTURE SOUND

- Sampling

hardware and software ● £79.95

• Applied Visions on 0923 818078

Our favourite Amiga sound sampler, this high-spec deck is a stereo affair with two phono inputs and a separate microphone input. The software isn't the best around, but the hardware is first-rate, constantly producing the crispest samples we've heard.



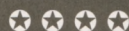
AMIGA PRO SAMPLER

• Sampling hardware and software

• £69.99

• Datel Electronics on 0782 744707

Pro's hardware offers a good range of inputs and comes with a cheapo microphone. The accompanying *Studio* and *Jammer* software look nice, but lack the finer features needed to make them truly usable.



PRO SOUND DESIGNER (v2) GOLD

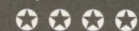
• Sampling hardware and software

• £79.95

• Power Computing on 0234 273000

A standard assortment of sampling software and

hardware which also includes *Pro MIDI Plus*, allowing you to play MIDI samples via a MIDI interface (£24.95). Also available is the *MM5000* add-on musical keyboard (£99.95) and the right hardware and software to connect the C64 *Music Expansion System* keyboard to the Amiga.

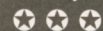


AMAS • Sampling hardware and software and MIDI interface ● £99.95?

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Cheap and unfortunately nasty, *Amiga Audio Digitiser* comes without any software to keep costs down. When we tried using the stereo version, we kept getting terrible background noise, and that was without hooking it up to a sound source!



DISK DOSSIER

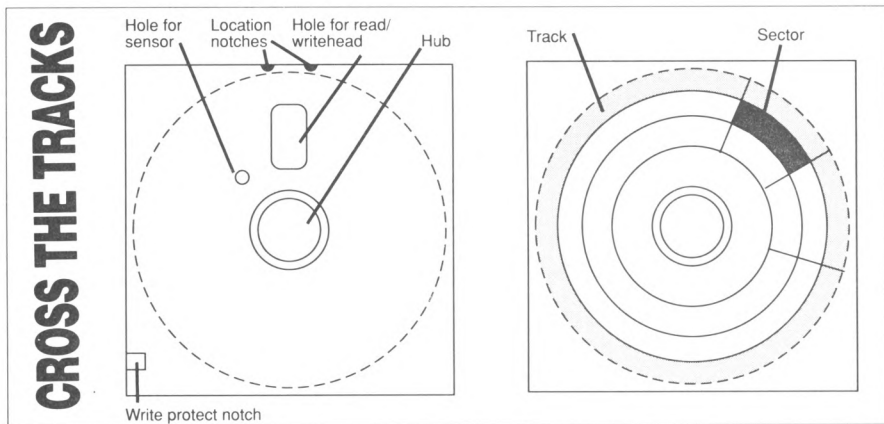
Why do disks fall over? Is an expensive disk better than a cheap one? How do they work? Can you protect your disks against corruption? Jerry Glenwright gets together everything you wanted to know about disks...

Nowadays, you can go to any computer store and buy a 5.25 inch floppy disk for less than the average price of your daily newspaper. The drive itself costs about half the national average weekly salary.

Nothing remarkable about that, you might think, but just a few years ago, if you were the proud owner of a disk drive you'd have basked in the reflected light of green-with-envy computer users unable to afford the several pounds for every blank disk, let alone the hundreds necessary to acquire the drive. Hardly any software was available on disk format because hardly anyone had a drive. Even if you had the moolah, there usually wasn't a drive available for your 8-bit system (with the exception of American machines such as the Apple, Atari 8-bit and Commodore 64. Americans never did rub along with cassette storage). Computer owners had to resign themselves to the long waits and poor reliability associated with cassette backing storage.

The floppy disk as a backing storage medium was first suggested in the early '70s. Several methods of magnetic storage were in use at the time, ranging from endless tape loops to the core memory - a three dimensional matrix of tiny metal rings joined together by fine wires. By sending electrical charges along the wires, individual rings could be magnetised thereby 'storing' information. Core storage offered the massive capacity of about 16K maximum, was bulky and amazingly expensive.

Clearly, a new method had to be devised to



store valuable data in a convenient and cheap way. Enter the floppy disk. Originally 8 inch disks were made which offered the huge capacity - by the standards of yesteryear - of 64K. The disks, at a cost of several pounds each, were comparatively cheap, they were reliable and the drives themselves were affordable to the business users who made up the bulk of the computing fraternity.

America, as always, adopted the new disks readily, but although popular here, they remained obscure outside the business environment. Besides, how were you going to connect an 8 inch drive to your UK101?

Any advance?

From humble 8 inch beginnings, the technology advanced and found its most popular format in the 5.25 inch design. Adopted by IBM's new baby the PC (although this machine originally had a

cassette port too), it could store 180K of data on a single sided floppy. Later, the flip side was employed taking the capacity to 360K.

By the mid '80s, special, expensive, 5.25 inch floppies could store 720K and power users were looking for improvements in the technology to allow faster access times and greater capacity. Several contenders for the new standard were vying for attention, notably Hitachi's 3 inch drive and the 3.5 inch device favoured by the rest of the computing industry. The 'rest of the industry' won and the 3.5 inch format became the new standard.

The only machines which still use the 3 inch format are Amstrad's CPC and PCW range, and the Sinclair Spectrum +3. Supplies of the disks completely dried up in the last few months due to Amstrad's 'contretemps' with its suppliers, and although this situation is now resolved, disks still are a relatively high price.

The 3.5 inch drive was particularly suited to the new 16-bit large memory machines such as the Atari ST, Commodore Amiga and IBM's PS/2 range. The 3.5 inch drive was fast, had a large storage capacity (typically 720K) and was cheap. The disks, although quite expensive at first, lowered significantly in price once they were being bought in quantity, and today most software is available on 3.5 inch disk. They're smaller and more robust and reliable due to the hard plastic outer casing which surrounds the delicate surface of the disk. Don't dismiss the 5.25 inch format, though - there's a small planet's worth of users out there - literally - ensuring that this technology will continue for many years to come.

Initial impressions

Before using a floppy, you set it up for use by your computer and disk drive and this process is known as formatting.

Magnetic fields

So just what is a floppy disk? What is it made of and how does it store computer data?

The floppy is a disk of flexible plastic (usually 'Mylar') coated with a metal oxide which renders it sensitive to electrical charges - the surface of the disk acts in a similar manner to the electro-magnet.

An arm with a read/write head similar to that used in a cassette recorder brushes over the surface of the disk. When an electrical current is applied to the disk via the head, the

oxidant is magnetised, and it is in this way that the disk is made to store data. Reading the data is a simple matter of detecting the tiny magnetised areas using the same read/write head and interpreting this information in a useful manner.

To enable the surface of the disk to be used in a coherent and efficient manner a special program known as a formatter is used on the disk before the initial writing of data. The formatter divides the disk up into concentric tracks and

each track into sectors. Two or more of the sectors are set aside as the directory areas which tell the computer where the contents of a file are being stored. When data is written to the disk the address of the data is also written to these directory areas.

It's like a local post office which holds the name of every person residing in the village and their address. Strangers to the village could find their friends by going to the post office first and getting the address.

Disk operating systems which allow the computer to use the drive provide special programs to carry out the formatting process. But why is this necessary? What happens during formatting?

Imagine the surface of the disk as an uncharted region of rain forest (remember those?). Obviously anyone venturing into this unknown and unmapped territory would quickly become lost and it usually requires many lost explorers before the rain forest is finally mapped and easily accessible by the ordinary traveller.

The read/write heads of your disk drive would quickly become lost on the surface of the disk if you didn't send in the explorer first in the guise of the formatting program. This program 'marks' the surface of the disk with magnetically recorded lines denoting tracks and sectors. The disk operating system can then make use of the disk and find its way around using these lines in the same way that our travellers would use the lines marked out on the maps.

The formatter can set up disks of the same size to offer different storage capacities by marking the lines in different patterns on the disk. Obviously, the drive your using must be able to handle the different capacities. This depends on the ability of the read/write heads to deposit a suitable magnetic signal on the disk and subsequently retrieve it, and also whether the drive can access both sides of a disk or just one side.

For example, the Atari STFM was originally supplied with a 3.5 inch drive which - although the formatter program can format a disk up to 720K - could only use 360K of information because it could use only one side of the drive. Likewise the later machines, equipped with double sided drives could write to either one side of the disk (360K) or both sides (720K) depending on how the disk was formatted. It's a subtle relationship between the two.

So although formatting programs and the disks

themselves may be capable of higher capacities, your drive must also be able to access this extra storage space.

Never mind the quality

Disk quality is a closed subject to many computer and disk drive users. What's the difference between 48TPI and 96TPI? What is TPI for that matter? Are some disks made of inferior products and consequently of poorer quality?

Well although it is indeed true that some manufacturers have, over the years, employed cheap materials and poor coatings of the necessary oxides, which make for bad reliability and a short life, most disks are made of good quality materials and are only designated as being of high or low density (and therefore high or low quality) after the manufacturing process when the disks are tested.

Testing involves writing magnetic information to the disk over and over again, a search for bad sectors (unusable areas of the disk) etc.

The term TPI or Tracks Per Inch is used to denote a disk which has passed all tests and is a high density disk capable of storing information at a density of 96TPI. If the disk fails some of the tests it is designated low density 48TPI. You can use the 48TPI disk to store a larger amount of data than is recommended, but the manufacturer has said that they can only guarantee the disk for a certain amount of data, anything greater and it may be unreliable.

Today almost all computer users have a disk drive - if not, then at least there will probably be one available when they save the required amount - and the use of cassette tape is in sharp decline. No more the half hour wait associated with every program load. ●

Protect and survive

Ten ways to preserve the data on your disks. Of course, it's taken as read that you'll be making frequent backups of everything!

- Never bend your disks
- Don't place the disk in direct sunlight or on any hot surface
- Don't keep drinks next to your disks - sooner or later you'll upset a cup and ruin a disk
- Don't leave your disks in places likely to receive high

doses of radiation, such as on top of a television set or monitor

- Don't put them near or under a telephone - they can corrupt disks too!
- Do keep your disks in their protective jackets or boxes to avoid dust and other objects penetrating the sleeve
- Do store your disks in a purpose-made disk box
- Do wait until the drive light is extinguished before removing a

disk from a drive.

- If you send a disk in the post, use a cardboard-backed stiff envelope and wrap the disk in cardboard or tin foil. X-ray machines at airports probably won't harm your data, but don't risk it - request a hand search
- Beware of notching single-sided disks to enable you to use the flip side. Although this won't harm your drive, data integrity can't be guaranteed

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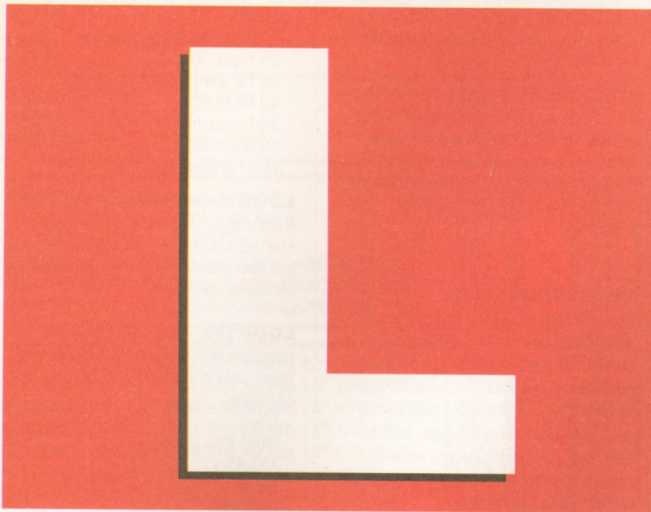
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LABEL (T): A name used in a computer program to represent some abstract alpha-numeric value. By using labels, programs are easier to read and understand at a later date.

Nowadays, the would-be programmer has a large choice of languages in which to program ranging from BASIC and Pascal to C, Fortran, LISP, LOGO and Cobol.



• A number of manufacturers offer hardware/software packages which let you connect two or more PCs to form LANs (Local Area Networks)

LAN (T): Local Area Network. Using cables and special add-on cards, it is possible to link several IBM-PCs or compatibles together. Once linked, users of these machines can access printers, disk drives or any other hardware attached to the network or software held on the system. One of the machines on the network is designated the *file-server* and it is this machine that monitors and facilitates the activities of the other computers on the network.

The network allows small businesses, schools and colleges with limited funds to share one item between many terminals (as the computers on the network are known) efficiently and effectively.

LANGUAGE (L): A collection of related commands that allow a computer user to instruct a computer to perform useful tasks. Many such languages exist, but the most common of these is the BASIC language supplied with almost every home computer. Languages take the hard work out of instructing a computer by allowing users to write their instructions in a series of commands which are similar to those of their native tongue. In the early days of computing, the machines had to be instructed using the binary number system. Programming was a laborious process and often led to errors in the programs, which were extremely difficult to find and solve.

LAP-TOP (C): The generic term for a computer which is fully-featured, yet remains small enough to be carried around on trains, buses etc., and used on a table top or indeed in the lap. Many manufacturers have recognised a possible area of exploitation in the field of lap-tops for the busy, on-the-move executive and have consequently designed and marketed a lap-top of their own. Notable manufacturers are Panasonic, Epson, Tandy, Walters and Compaq.



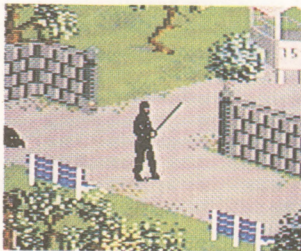
• Laptops are PC-compatible machines that offer all the features of full-sized machines but fold into compact cases for portability and will run on batteries for use on the move

LASER PRINTER (T): High technology printing in the form of a laser which 'prints' an image on a rotating drum. This drum picks up a dry toning powder on the non-lasered parts which is then transferred to paper by impression. The process is quick, clean and of a very high quality. The laser printer is commonly employed in desk top publishing where it reproduces electronic documents at high resolution – typically 300 dots per inch (dpi).

Laser printers have one drawback in that they are expensive (£1,500 or so) when compared with other printers although the quality is far superior.



• Laser printers offer the best quality of all printer types, but are bulkier and far more expensive (typically £1,500 or more)



• Last Ninja II: Sequel to an arcade adventure renowned for graphic quality

LAST NINJA (G): Martial arts arcade adventure featuring stunning backdrops and sprites, which made the C64 look like the Amiga (!).

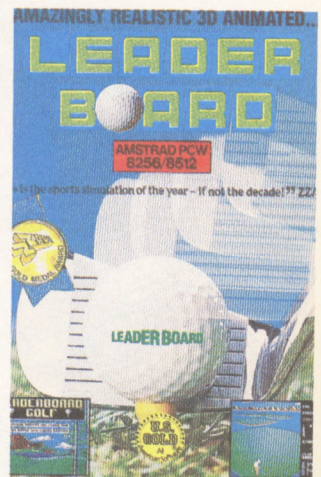
LATENCY (T): The period of time taken by a hard drive read/write head to reach the particular track and block where pertinent information is held. Latency is an important concept when measuring the speed of hard drives. See also *hard disk*.

LCD (T): The LCD or Liquid Crystal Display is used in many laptop and hand-held computers to provide a display medium which has a low power consumption yet offers a clear and readable output. The liquid crystal display has at its heart a series of randomly placed crystals which, when

an electrical current is applied to them, 'line up' in neat rows and become visible. The LCD uses very little power, unlike its cousin the LED, and is therefore ideally suited to portable computers where weight is of the essence. See also *LED*.

LEADERBOARD (G): Definitive golf simulation from US Gold. Converted to most formats, the game has become a best-seller due to its mixture of well-drawn graphics and realistic play.

LED (T): Light Emitting Diode. By applying electrical power to a light emitting diode, the device generates energy which manifests itself in visible light. The LED was used in early



• Leaderboard has become the classic golf simulation

digital circuits such as watches and calculators, but was quickly replaced by the LCD, due to high power consumption. In an attempt to cut down on power consumption the LED was 'pulsed' i.e. the device was made to flash on and off rather like a lighthouse. This action was performed faster than the eye could detect so the LED appeared to be 'on' and power requirements were lowered. Fortunately, even with this development, the LED slipped into obscurity.

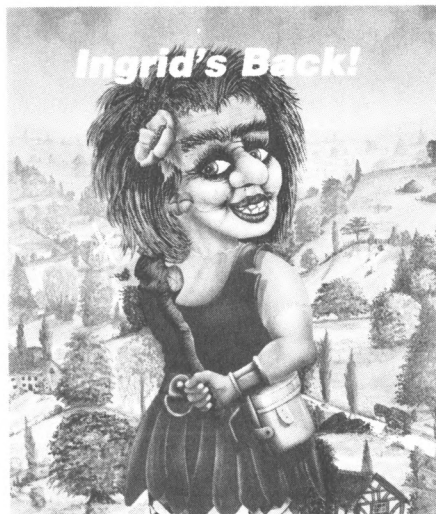
LEISURE SUIT LARRY IN THE LAND OF THE LOUNGE

LIZARDS (G): Developed by Ken and Roberta Williams of Sierra On-Line software house based in the States, this was voted 'Game of the Year' in America in 1988 and was one of the first in a long line of colourful interactive adventure games from Sierra. What made this game notable was the little character - Larry - you move around on screen and the level of smut used to provide a humorous overture to the game. Larry was actually released as a text-only adventure way back in the mid '80's but it wasn't until graphics were added that the game really found a wide audience. Unfortunately, in its sequel *Leisure Suit Larry Goes Looking for Love*, the smut was toned down and the game is consequently lacking in fun play. Other note-worthy titles from the company are *Police Quest* and *Silpheed*.

LETTER QUALITY PRINTER

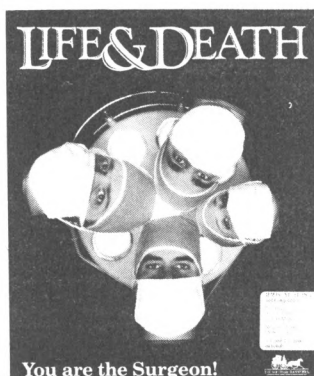
(T): Used to describe printers which can offer a quality of text reproduction similar to that of a typewriter. The daisy-wheel, laser and ink-jet printers all produce high quality text. Unfortunately, several printer manufacturers offer dot matrix machines with an option to write NLQ or Near Letter Quality text which is rarely up to the standard claimed. See also **daisywheel, dot matrix, ink jet, laser**.

LEVEL 9 (CO.): Responsible for a small planet's worth of adventure games for micros ranging from *Oric-1* to *Beeb*, the company is firmly established as a leader of the genre. Notable games are the *Ingrid Gnome* series and *Night Orc*.



• *Ingrid's Back*: Latest release from software house Level 9

LIFE 'N' DEATH (G): Strange surgical simulation from American company Software Toolworks. The player adopts the role of a new surgeon whose job it is to operate on every available patient. A slip of the knife produces blood-curdling screams from your unfortunate victims!



• *Life and Death*: bizarre surgery simulator from US company Software Toolworks

LINE PRINTER (T): A printer which can print a whole line of text at one go. Many of the large printers attached to mainframe and mini computers were line printers, but nowadays, due to an increase in the speed of dot matrix machines, the line printer is almost entirely extinct.

LINKER (L): After a source code program file has been offered up to a compiler, two distinct processes are performed before the program is ready to run. The first of these processes known as the compilation stage, wherein the source code instructions are 'changed' into commands directly understandable by the computer. During this stage, symbol tables are created containing variable labels which have the values assigned at a later stage. Next comes the linking of the program in which each module of code is linked together into a contiguous whole which can be run directly.

LISP (L): A high level language used to code artificial intelligence problems. LISP stands for LIST Processing and was originally devised to process lists of data (not surprising, given its name). See also **prolog**.

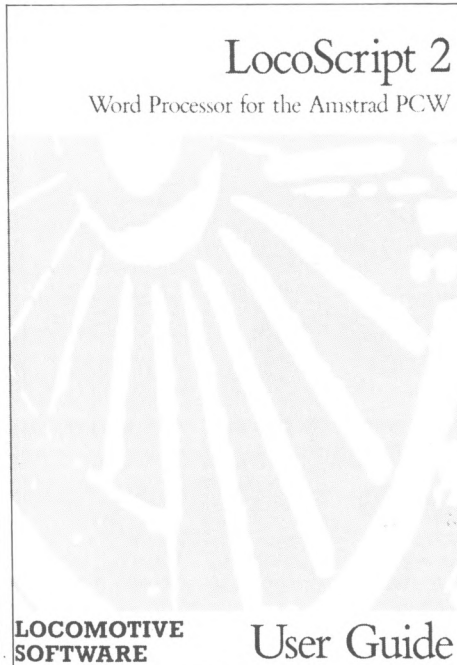
LLAMASOFT (CO.): Software house responsible for games involving sheep, llamas and various other cloven-hoofed quadrupeds. See also **Minter Jeff**.

LOCAL VARIABLE (T): Certain programming languages allow the definition of variables whose values are restricted to the programming module in which they are defined. This means that programmers can use the same variable name many

times without the program becoming confused. See also **global variable**.

LOCOMOTIVE (CO.) Formed in the early '80s by Howard Fisher amongst others, this Dorking-based software company is responsible for *Locoscript* - the word processing software bundled with Amstrad's best-selling PCW machines.

LOCOSCRIPT (WP): Arguable the slowest word processor available, *Locoscript* is nevertheless one of the easiest packages for the beginner. It supports the widest range of languages of any word processing package - including Persian, Welsh, Urdu and Czechoslovakian, amongst others. *Express* reckons a PC version will be out in September.



• *Locoscript 2*: Latest version of Locomotive's hugely successful PCW wordprocessor software

LODERUNNER (G): Early platform game for the Commodore 64 and Atari 8-bit machines. It remains one of the few computer games to be converted to coin-op format.

LOG ON (T): The initial procedure when attempting to gain access to a mini, mainframe or network of computers. During the logon procedure the user will either be prompted for a name or user number and then asked for a secret password. The password is to exclude non-registered users from the system in case they wish to wreak havoc. See also **mini, mainframe, network**.

LOGO (T): Programming language originally designed for use in schools where its English-like graphics commands encouraged programming. Here is a snippet of Logo which draws a box.

To Box
10 Forward 100
20 Right 90
30 Forward 100
40 Right 90
50 Forward 100
60 Right 90
100 Forward 100

LOGOTRON (CO.): Based in Cambridge, this software company started out in the educational market but now produces games and low-cost business software.

LOOP (T): Piece of a computer program which is performed several times until some condition is met. For example:
X%=1
While X%<100
X%=X%+1
Wend
Print X%

The While Wend loop will be performed and X% incremented by one until X% becomes 99, at which point the condition is met, the loop ends and the value of X% is printed.

LORDS OF MIDNIGHT (G): Strategy, role-playing game by Mike Singleton featuring cute sprites, which is held in high regard by Spectrum users.

LOTUS 1-2-3 (INT): Integrated software package which includes modules for spreadsheet, database and business graphics which is so popular it's spawned several clones, notably *VIP Professional*, which offers the same specifications at a significantly reduced price.

LOW-LEVEL LANGUAGE (L): Before the advent of computer programming languages such as Pascal, Cobol and C, programmers had to use assembly language commands which were directly related to binary instructions and consequently difficult to learn and to employ. Assembly language is however significantly easier than using binary.

LOW-RES (T): Graphics capabilities offering a LOW-RESolution of pixels per screen. Early home micros such as the ZX81 offered screen resolutions of 64 x 64 pixels. Contrast that with popular machines of today such as the Atari ST which offers a screen resolution of 640 x 400 pixels.

LSI (T): Large Scale Integration is the term used to describe the cramming of even more components such as transistors, resistors etc., onto a chip of silicon. Contrast with SSI.

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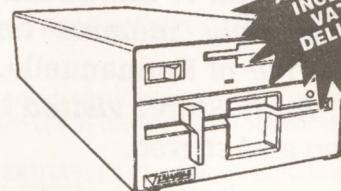
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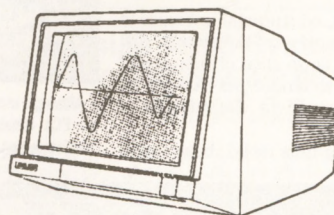
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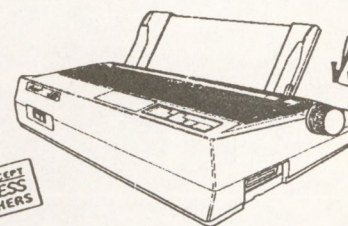


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COKTEL PARTY

Coktel Vision is one of France's largest software houses but probably remains unknown here save for their adaptation of Emmanuelle. Dodging every porny pun in sight, Andy Storer visited their offices and returned both shaken and stirred.

Coktel is going great guns this year with sales up by 120% in France, 170% in the rest of Europe and heading for a turnover of £3 million in '89. Not bad for a company virtually unheard of outside their native country and overshadowed by the better-known Infogrames and Loricels. But the games market isn't their only concern.

It figures

Unlike the rest of Europe, educational software is big business in France with a market worth £20 million and Coktel has a large slice of the action. Everything from atlases to languages, Asterix to driving lessons fill its books to the tune of a turnover of £1.5 million a year.

The company is using this solid base as a



• Although more and of Coktel's graphics are being mastered on PCs running DPaint II, some development work is still carried out on STs and Amigas

platform from which to expand its Tomahawk label to capture a games-hungry Europe. Coktel estimates the combined value of the French, German and British games markets to be around £150 million – with you out there accounting for 60% of that figure.

But half the games buyers in Germany and Spain are PC owners. In France it's up to a quarter and yet over here it's less than 5%. Still, with cheaper and better PCs on the way all the time the only way must be up and throw in the lucrative and largely untapped US market, it becomes clear why Coktel is mastering all their future games releases on PCs.

Coding by the PC

Coktel's programming wing, Inference, operate out of Bordeaux and liaise with designers and graphic artists in Paris for the eight months or so it takes to produce each game. Screens and sprites developed on PC 386s running *Deluxe-Paint III* are sent its way to be pieced together in machine code with arcade action written in C. Inference's own language, a type of *Hypertext*, is used to compose the database for graphic adventures needing text. VGA graphics are treated as the standard – the 32 colours available finding their way onto ST and Amiga screens. Whilst VGA graphics for games are passable, PC sound is lousy. Coktel intends to bridge this gap and offer Amiga-quality audio by developing its own plug-in sound card and marketing it separately; a move already undertaken by a couple of companies in the U.S.

But, seemingly like every other software houses in Europe, Coktel's biggest problem is in finding good programmers. So if you fancy your chances of coding among the vineyards of France why not give them a call. ●

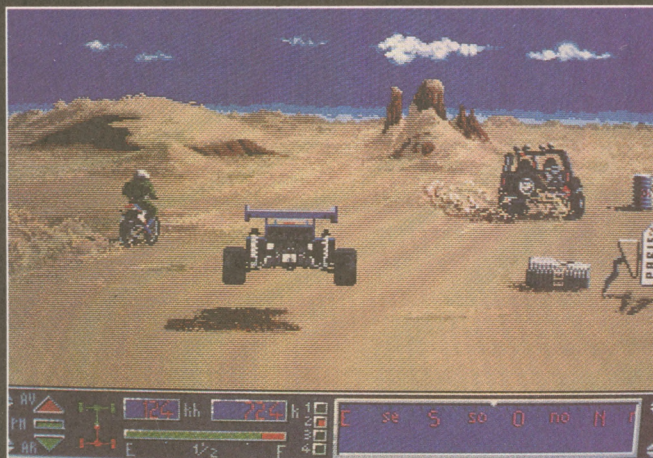
Games Coktel

Coktel's releases for 89 will all be available on PC, ST and Amiga, and comprise a diverse selection of graphically excellent entertainments.



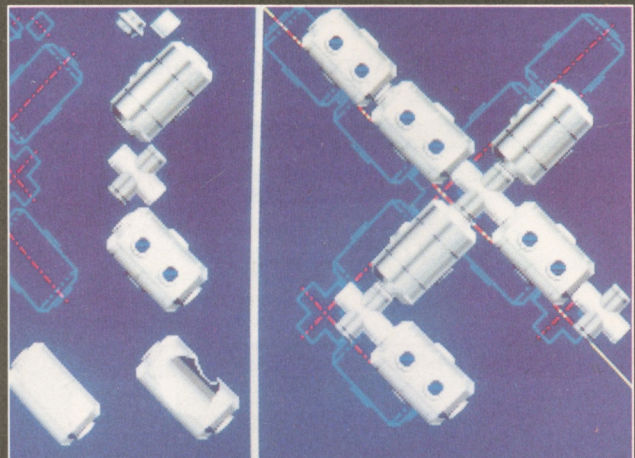
LEGEND OF DJEL

In this massive arcade adventure you play the part of Djel, a magician out to restore peace and harmony to a supernatural world best with sorcerers. Thirty scenarios present interesting mixes of action and strategy involving spell-casting and speedy animated combat in an outing that looks like delivering gameplay to match its graphics.



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LESS HERMES

A 3D strategy game written in conjunction with the European Space Agency in which you control a shuttle in a bid to build a space station and run a satellite park. After space-walks and robot arm manipulations you have to guide the shuttle back through re-entry. On landing you work out another flight path and return to orbit to make more profit from empty space.

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AMIGA BLIT

Atari to go Amiga?

Read any of the various computer magazines that are available and, sooner or later, you're sure to come across a news item on the Epyx portable that Atari have gone to great lengths to snap up.

As reported in *AmigaBLIT* about three months ago, the machine is being produced by several members of the original Amiga design team, and Atari has been quick to play upon this. Sounds great for Atari so far doesn't it! Well, there is an extra little snippet that Atari US won't be so keen to tell you about. Rumour has it that it will be supplying Amiga-based development systems to software houses.

Before a machine is released to the public, it is common practice for hardware manufacturers to send development systems out to software houses so that they can develop products ready for the machine's launch. Unfortunately for Atari, the guys who designed the Epyx system are understandably great fans of the Amiga (which isn't surprising when you consider that they practically made it!). They have therefore used the Amiga as the basis for all their software development work.

Porting the development system over to a machine such as the ST has already been ruled out as practically impossible because the system makes extensive use of the Amiga's multi-tasking/multi-screen operating environment - no other personal computer is even capable of running it!

Greatest Ever CBM Show?

I must admit that I wasn't particularly looking forward to having to trek up to London for last week's Commodore computer Show - After all, I couldn't remember the last time a CBM show had been anything other than 'dull'. Sure, if it's bargains you're after then CBM shows are great. However, if like me it's new products and exciting announcements you want then you can bet that there's a very good possibility that you'll leave disappointed.

Surprisingly, this year's show was far from being dull - in fact I quite enjoyed myself and was pleasantly surprised by the amount of newsworthy products there.

Most exciting for me personally was the appearance of MicroIllusions' pro-standard MIDI sequencer, *Music-X*. After only a ten minute demo I can quite easily say that their really is nothing to beat this product... on any machine. *Music-X* beats competitors such as Steinberg's *Pro-24* and *Dr.T's KCS* in every department.

Commodore shows have always been a great place to meet people and around every corner I found myself bumping into people I knew (although the show Bar seemed to be the place where most were to be found!). Look careful among the vast crowds of people

and you'd have found the likes of Jez San of Argonaut (known as 'Cheryl' to his friends!), Dave Jones and Tony Smith of DMA Design (hi chaps! I know you're reading this) and even certain ST programmers such as Wayne Smithson (currently working on the ST version of *Blood Money*, which is supposedly going to be the best thing STers have ever seen for their machines!).

Rombo used the CBM show to launch the Amiga version of their popular ST frame grabber, *VIDI*. Like the ST version, *VIDI* Amiga is a realtime device that captures frames in an astonishing 50th of a second. The version being shown was only pre-production and did not provide any colour support - that's being incorporated as we speak. How much for this wondrous piece of technology? I hear you cry. Would you believe me if I told you £99?

This year's show was best rounded up by a



• I don't know, the kind of rabble that turns up that these events! From right to left, they are: Dave Jones, me, Tony Smith and Wayne Smithson.

rather irate pensioner that walked up, tapped me on the shoulder and said "Oi!, there's nothin' 'ere for me '64... nothin' but bloody Amigos everywhere you look!".

Hybris Discovery

Here's a quick cheat for those of you struggling with Discovery's excellent shoot-em-up *Hybris*. Load the game and wait for the high score table to appear. Type **COMMANDER** and press the fire button to play. Press 'F10' during the game and your ship should start to glow. This means that your ship is invincible and you've got unlimited energy and smart bombs. Pressing 'F2' to 'F6' will allow you to get the five different add-ons and pressing 'F9' will advance you onto the next level.

Jason Holborn

Virus' Revenge

In the constant battle against the dreaded Amiga viruses, it seems that the virus creators will stop at nothing in an attempt to outwit the designers of virus killers.

The name of *VirusX*, written by the acclaimed American programmer Steve Tibbet, is seen as a symbol of the battle against viruses, and the program was seen, until recently, as the best Amiga virus killer available. To show his good intent Steve includes the source code with every new release of his program. Unfortunately the virus programmers have used his own source against him by producing a rogue version of *VirusX* that instead of killing viruses, writes viruses to your disks. This rogue *VirusX* can be identified by its version number (3.3). If you receive a copy of *VirusX* with this version number, you are strongly advised to erase it as soon as possible.

The most recent release of the genuine *VirusX* is version 3.2. It is understood that Steve will skip version 3.3 of *VirusX* and go straight to version 3.4 for his next release.

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MACHINE-SPECIFIC COLUMNS

PC UPDATE

What's the ANSI

Strolling around through my MS-DOS manual the other day (boy, I lead an exciting life) I came across the entry for the ANSI system driver, ANSYS.SYS. This little program seems to cause a lot of confusion among new and seasoned users alike. It's actually just a screen driver which you can install when you start your PC. It offers a series of simple commands which your PC screen will obey and covers cursor movement, screen colours and the like.

To install the ANSI driver (ANSI stands for American National Standards Institute) you need to copy the file ANSYS.SYS onto the floppy disk you start your machine with, or to the root directory of your hard disk, if you start your machine from there. You then need to edit the file CONFIG.SYS, which must again be on your start-up floppy or in the root of your hard disk, so that it contains

the line DEVICE=ANSYS.SYS, in addition to any other commands. You can use any text editor which will produce ASCII text to do this - RPED, for instance. Once you've installed the driver, restart your PC. You'll notice no difference immediately, but the ANSI commands are now available to you when you want to use them.

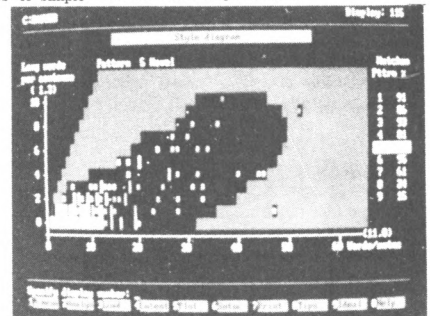
One of the easiest ways of using the ANSI driver is via the PROMPT command. As well as having a number of commands of its own (try PROMPT \$p\$g for a start), PROMPT can also be used to issue commands to the ANSI driver. The \$p\$g command puts the current directory path within the normal A> or C> prompt. This in itself is an almost essential requirement for anyone who works with files in more than one directory.

The ANSI commands all start with an escape character, which can be represented within PROMPT by \$e. Two of the most useful ANSI commands are those to memorise the position of the cursor and to restore the cursor to it. Using these two commands (which have the rather strange syntax \$e{j and \$e{j) and the command to reposition the cursor \$e{x,yH, where x and y are the row and column numbers respectively, you can produce some very interesting screen effects. Try this piece of apparent gobbledegook: PROMPT \$e{s\$e{1;67H\$d\$e{u\$e\$g. The case of the command letters is important and the only space should come between the PROMPT command and the parameter string. See if you can break the command down into its component parts to see what it does. You can build this PROMPT command into your AUTOEXEC.BAT file if you don't want to have to type it from the keyboard every time you start your machine.

The words what I write

Earning my living entirely from putting words to paper has made me increasingly conscious of my spelling and grammar. I've never been particularly good at spelling, but a good spelling checker has taken most of the heartache out of my commonest blunders. Most of the time I can get it right, but it's amazing what you let through when you have only five minutes to catch the post.

A related issue is the style of the text and its readability. There are a number of factors which affect readability, and a new product from Scandinavian PC Systems (0895 679366) called *Readability Plus* aims to assess documents and point out pompous or over-technical writing. It does this in a variety of different ways, including counting the number of long words in your sentences, analysing the number of words not in an established 'core' of common words (which may indicate too much jargon), and scoring on the number of complex sentences in a particular piece of text. It uses several established measures, including Gunning's Fog Index and the Flesch reading ease index. At £89.00 it may be worth investigating, particularly as you can claim a copy at £74.95 under a current special offer.



• The theoretical 'teardrop' shape that good writing should fall within, according to Readability Plus

Norwegian Blues

I don't want to make too much of the sad demise of the Parrot Corporation, especially since it has done sterling work in duplicating the *PC Plus SuperDisk* for the last year or so. However, it's hard to resist some of the many headlines that spring immediately to mind, concerned with ex-parrots and those that have joined the choir invisibly. Perhaps the final word should be left to the poet Bertram Carrot, a devotee of the E.J.Thribb school of poetry.

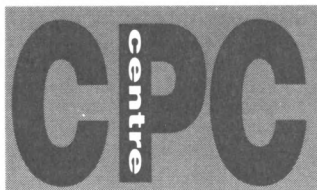
*Farewell then,
 Parrot.
 Few people
 knew you were
 sick,
 when they used
 your name
 in vain.
 It seems you
 slipped
 one disk
 too many.*

Simon Williams

Pop-DOS for mice

I was reviewing Logitech's new PC mouse recently and apart from noting what a nice mouse it is to use, some of its supporting software proved particularly impressive. As well as the usual mouse driver, it comes with routines to 'mousify' otherwise keyboard-only applications, and a mousey front-end for DOS.

Pop-up DOS, as the utility is called, is what it says, a semi-resident mouse-driven DOS utility. It combines Xtree-like directory and file handling with a good little card index, text editor and utilities such as diary and alarm. The only thing which prevents me from replacing my all-time favourite TopDOS, is that the editor has to be called from within a sub-menu. I'd still much rather press [F2] and type a file name. Only the card index, diary and alarm are memory-resident, too. A nice try, but it needs a bit of tidying round the edges.



Licensed to sell...

Considering this is just about mid-summer (though you wouldn't guess it looking out of your window) and the traditional low-point of the games market, things aren't looking too bad. Out at the moment are Hewson's *Stormlord* (loved it), US Gold's *Forgotten Worlds* (liked it) and CDS's 'interactive' *Tank Attack* (i.e. you get a board game and a so-so computer game too).

In the offing there is a veritable blizzard of license tie-ins. Coming soon are Domark's *Licence to Kill* and from Grandslam the eagerly awaited *Thunderbirds*. And there are not one but two Arnie Swartzenegger titles - *Red Heat* and *Running Man*.

My bet for the biggest amount of money shelled out for a single licence, however, rests not on any of these. Allow the shy, retiring people responsible to introduce it themselves: 'US Gold' (for it is they) 'on behalf of Lucasfilm Games proudly present the largest and most impressive computer game/film tie-in ever seen in the history of the computer games industry.' Yup, *Indiana Jones and the Last Crusade* is coming soon.

The argument against massive film/TV tie-ins, of course, is that such grossly stupendous amounts of money are involved in securing the license in the first place that there's only about fourpence left in the kitty to finance the development of a game to match. A notable exception is Ocean's *Robocop*, which has not fallen from the number one spot since New Year.

Still, Lucasfilms has such financial clout behind it that shortage of funds will not be a problem (nor, indeed, any excuse). Expect a tidal wave of promotions as the computer people attempt to surf home on the shoulders of the film people...

Not an anorak simulator

'What, a pinball simulator? A ridiculous idea, it'll never sell!' So you'd say, and you'd be completely wrong. Not only did it sell (for Code Masters - who else? - last year, among others) but if there's any justice it's about to sell again.

Of course Electric Dreams - a division of Audiogenic - is well aware of the potential dangers of marketing a pinball simulator. The very name, *Timescanners*, suggests voyages through the vastness of space or some such

cobblers, and the advertising and packaging is trying hard not to say 'This is a pinball simulator and you'd be an anorak to buy it.' And no doubt Rik 'The Hitman' Haynes will be doing his usual heartless hatchet job. I half expected to be doing one myself, truth be told.

But when a CPC game is as smooth, as fast and as addictive as this one, cynicism is the Wrong Answer and a Bad Thing. *Timescanner* has to be as furious and frantic a game as I've played all year, and I'm typing this extrafast so I can get back to it and have another go. Oh play it yourself and you'll see why I'm so keen.

Many hands making light work

Latest on the Virgin/Mastertronic lightgun is that we can expect a mid-July release. I've yet to get my hands on one, but I can reveal exclusively that it will be the best games hardware offering of 1989 for the CPC.

Steve Carey

Pandora competition

CPC Centre on behalf of Express and in conjunction with Swift Software proudly presents... a competition.

You may recall a fortnight ago this column revealed details of Pandora, a promising new machine-code program generator which can be used, so Swift claims, with even a limited knowledge of BASIC.

Although it uses a form of BASIC, however, Pandora programs are semi-compiled before they run, so it works fast. In place of GOTO, for example, the command LABEL is used extensively, followed by an identifying name which can be jumped to very quickly with a GOTO label instruction. Then, during compilation, labels are replaced with the actual address in memory of the next instruction, so that GOTOs are executed instantaneously. (There will be a full review of Pandora in the August issue of Amstrad Action, out on Thursday July 13th. Don't miss it!)

Pandora normally costs £29.50 (disc), for which you also get a free calculator/watch. But you need not shell out after all, because we have five copies to give away!

All you have to do is to tell me who or what Pandora is or was. Show your classical knowledge (hint, hint) by jotting down the answer on a postcard or the back of an envelope, and send it to: Steve Carey, CPC Centre, Future Publishing, 4 Queen St, Bath BA1 1EJ to arrive not later than Friday 30th June. The first five correct answers plucked by my own fair hand from the CPC Centre top hat will each receive a copy of Pandora. The judge's decision is final.



• Timescanner - so pinball simulators can be cool after all!

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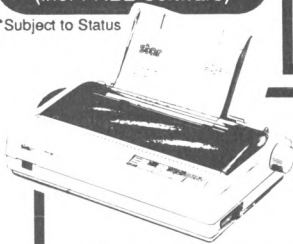
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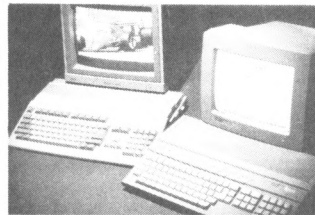
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MACHINE-SPECIFIC COLUMNS



Sound design

Despite being the wonderful computer we all know and love, the Spectrum's music-making capabilities leave several lots to be desired.



• The Atari ST and Commodore Amiga may wipe the floor with the Speccy, but when the SAM Coupe comes out will the tables be turned...?

Frankly, the 48K's *beep* makes those tunes you get when you've phoned someone and been put on Hold sound pleasant. The industry standard AY chip found in the 128/+2/+3 is an improvement, but still sounds a bit Kylie-esque to me, I'm afraid.

The good news is that we could at last have a real treat for the auditory apparatus, thanks to MGT's long-awaited Spectrum-compatible Coupe.

MGT has just supplied me with some detailed info on the Coupe's internal sound chip, and it's ear-watering stuff, Spec mates. The SAA 1099, as it's known, could well be one of the Coupe's strongest features, with six-channel, eight-octave stereo sound and wave form, amplitude and envelope control.

The manufacturer - Philips - seems to have designed the chip with games in mind, and its detailed tech specs seem to suggest that this is one sound chip with definite star qualities! Output is through the TV, and there's even a socket for Walkman headphones - a definite boon to all the families who have to share the main telly with your Spectrum and associated sound FX.

Of course, the SAA 1099 isn't the only attractive feature of the SAM for those of a musical bent. The machine comes fitted out with MIDI ports as standard, making the computer the best musically for the price, and therefore an obvious choice for back bedroom/garage bands the country over.

Much as I hate boasting of how well the Coupe compares with other machines, I feel it's necessary. A lot of people are writing the machine off as little more than an expensive Spectrum with go-faster stripes - and, quite plainly, that's unfair. When it comes to making sweet (or unsweet, if you're playing *Professional Ninja Mutant Death Genocide Simulator* etc) music, the SAM is potentially one of the best machines on the market and without the usually fat price tag to match.

Take the ST, for example. Its three mono channels are easily beaten without sweating any silicon, and even the Amiga's highly-acclaimed audio skills are pretty much humbled, I'm glad to report.

Of course, it's not just down to size - what you do matters too. The good thing is that if software houses do anything to enhance Speccy titles for the Coupe, the soundtrack is the easiest and no doubt the first thing they'll look at - which means upgraders to the Coupe could be sampling stereoscopic sound almost as soon as they buy the machine. Hopefully, software houses will also be willing to exploit the SAM's other abilities and

help prove the machine's worth as a realistic and cheap alternative to 16-bit.

As the countdown to release continues, expect the following two things: (1) more information on the Coupe, and (2) an increasingly enthusiastic column as your columnist approaches near fever pitch excitement.

Upgrade worries

Staying with the SAM a moment longer, R A Dews from Yorkshire has written with some of his thoughts on the computer, and very nice ones they are too. He's not worried about the SAM's potential, but more about how much of it will be exploited by software releases.

He asks, "Will the software houses be bringing out upgrade programs to convert existing software, or will I have to buy a whole new game? And assuming that software houses don't bring out upgrades, what would be the legal position of private individuals who do? Secondly, the SAM has 256K RAM. If it takes 5 minutes to load 48K, will it take 26 minutes to load 256K? I would say a disk drive is a must. At current prices

You scratch my back

Here's another piece of evidence to prove that Spectrum owners are among some of the most generous and industrious individuals in computing.

PJ Bellingham has written in to tell me about a *Scoreboard* program he's written and used in his selected sport of gymnastics for a number of years without complain. It's written in BASIC, and therefore ideal for customising to suit your own chosen activity. In my case, freestyle washing-up.

The program's well-written, quite easy to use and free to all interested parties as long as they send Mr Bellingham an SAE (jiffy bag style) and a blank cassette. The address is 46 Woodside Road, Barnehurst, Kent.

If you're keen to repay PJ's generosity, all you have to do is send me a circuit diagram for the 48K ish 3 Spectrum. He and half the planet have been looking for Speccy circuit diagrams for years, and it's got to such a drastic state of affairs that if any kind-hearted person out there can let me know a source of these rare artefacts they will receive not only my undying gratitude but also some free software. Write immediately (if not sooner) to Robin Alway, Spex, New Computer Express, 4 Queen Street, Bath BA1 1EJ.

this will bump up the price to around that of an ST, and that's too much. For the SAM to succeed, MGT must make drives available cheaply - say £50".

The disk drive point is an important one in my opinion. Loading 256K programs from tape is pretty much impractical, and a cheapish disk drive is a must. The whole industry is moving away from the cassette - only the Speccy and C64 (excuse me while I wash my mouth out) keep the tape-based market alive. America and most of Europe have done away with the things, more or less. Providing them that cheaply will be difficult though, at least if MGT is planning on making a profit.

Time for a crossing of fingers perhaps? I don't think the question of enhanced Coupe software is going to be quite as big a problem as first thought. Advance orders of the machine look healthy, and the SAM's spec means it's worth enhancing games for.

Thanks to R A Dews for writing and for the favourable comments on the mag. If you've got anything to say concerning your rubber buddy/plastic pal, write to the usual address.

Robin Alway

SECTOR 64 SECTOR

Write to the usual address - Sector 64, New Computer Express, 4 Queen Street, Bath BA1 1EJ.

All queries that can be answered will be printed in this column - sorry, no personal replies.

Theory

This week we're going to take a look at scrolling. We're going to tell you the fastest way of scrolling the 64 screen without tricks.

Many games these days feature over 16 sprites, while having full screen scrolling. The processor obviously can't cope with doing all these things in one go, so the best way around this is to use a double buffer method.

For example, if your screen is scrolling down, then while it's going through the pixels

Commodore show

A few weeks back was the 1989 Commodore computer show, which was held at its usual venue at London's Novotel. This year's computer show was touted as offering a slick new look and some exciting features. So Ian and I popped along to see for ourselves.

Friday at the show was packed this year because the schools were on holiday. The first Commodore show that I can remember was also during the holidays. As for the new-look Commodore show, it looked just the same as usual - like a Sunday market. About the only thing that did seem to be different was the lettering on the Arcade entrance!

This year's Commodore show was pushing the Amiga totally - it was almost impossible to find a C64 anywhere. Another thing that Database boasted about was the chance for visitors to ask programmers questions about the industry. The Salon Bourg was packed with budding programmers to be, asking all sorts of questions of their idols.

One of the great features of the Commodore show was the talk in Salon Bourg about television computer graphics. As we found out, getting into this could cost your life! The host said there were a lot of easier ways of earning a living. Have you ever heard of a BBC computer graphics coder becoming a pizza delivery man? It happens. What makes this part of the industry bad is the pressure involved.

To be totally honest, the Commodore show this year was packed, but there was not enough to keep us interested. And as for the new look - think again Database!

Coming soon

Street Cred Football, from Players Premiere (£2.99), should be hitting your local software store very soon, as development house Wow! has just finished converting the game from Spectrum.

Out now

Bomb Jack II has been re-released under Elite's budget label Encore.

Bomb Jack II is very similar to the original, but with slightly different features. It's a better game than *Bomb Jack*, and is a very good buy for budget. If you can remember, a few years back the game was a real arcade game (which I only ever saw once).

You!

Remember, if you have anything that you want mentioned in *Sector 64*, then we will be pleased to hear from you. We like any kind of contribution, whether it's cheats, queries or advice. We're also here to help you, so if you have a routine that you're having trouble with, then why not write to us and we could write it for you and publish it in this column. And if anyone has loadsa cheats for the 64, then send 'em in.

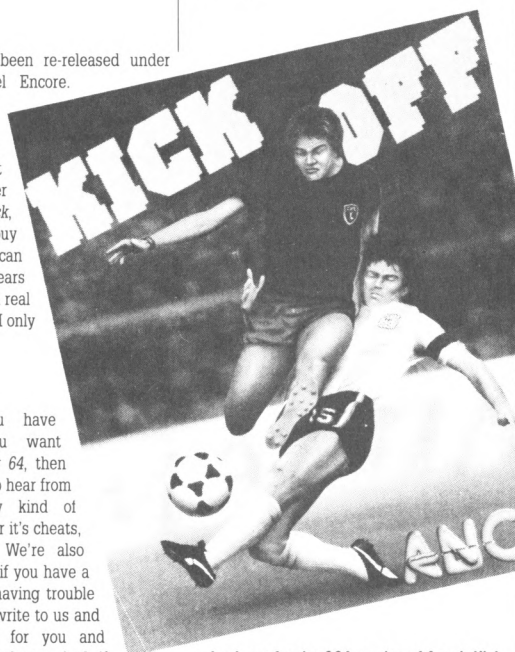
Screen flasher

This week's listing is useful when using your tape recorder to load long, tedious programs. It will flash the screen with colours from signals on the tape; this will make it easier to see whether the tape deck is loading. All we've done is change the vectors at #008-#009 to a place high up in memory which increments to the border. It's nothing big or special, but it does give the look of a fast loader.

```
0 B=53227
1 FORI=0TO20:READA:POKEB+L,A:NEXTL
20 DATA 120,169,128,141,41
30 DATA 3,169,15,141,40
40 DATA 3,88,96,96,96
50 DATA 238,32,208,76,237
60 DATA 246
70 SYS 53227
70 REM *THIS PROGRAM WILL GIVE YOU*
80 REM *LOADING STRIPES WHEN USING*
90 REM *YOUR C2N OR 1541 LOADING *
95 REM *DEVICES *
96 REM *CODED BY IAN AND MIC. *
```

you slowly, frame by frame, update the backdrop onto a screen you can't see in memory. Once the pixels have finished, you display the screen you drew on and move the pixels again while drawing the backdrop to scroll on the screen which was just being displayed. If you keep doing this and vice versa, you will get a very smooth scroll in about 5 chars of processor time.

Ian + Mic



• Look out for the C64 version of Anco's Kick Off - the Amiga version gets a 5-star rating in this issue of Express

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Data remember

Norman Mann of Stoke asks me about databases. Which is best, he wonders, for cataloguing his classical record collection (with over two thousand items!)?

Well, my favourite is *Masterfile 8000*. It offers very fast sorting into order and selection (e.g. just your Beethoven CDs or just your piano cassettes) though this can be a bit involved. It's flexible and powerful and you can set up a variety of formats to display the info on screen or printer. £49.95 from Campbell Systems on 0378 77762. Works from the memory so you might run out of space on an 8256 with a very big list like Norman's.

Also worth a look is *AtLast Plus*. This is also fast and powerful, and stores its info in a very efficient way so is good for 8256 owners or for people who have very big databases (say a club or customer list of over 5,000 people). £39.95 from Rational Solutions on 0566 81511.

Mini Office (£29.95 from Database on 0625 878888) features a database as well as a good spreadsheet, dubious word processor, handy graphics package and comms module. Not quite fast or powerful enough for large scale use but nice for a small club or collection – and remember the other programs you get for the money.

LocoScript 2 users will probably go for

LocoFile (£29.95 from Locomotive on 0306 740606) which works from within *LocoScript 2* – the others work from CP/M's A> prompt. *LocoFile* lets you define card-index and in the middle of a document you can call up individual cards and paste the information into the document being written. Data files are interchangeable with *LocoMail* users, i.e. businesses and clubs. No limit on file size so good for hard disk owners.

All the above are available from mail order places for considerably less than the prices quoted here – try the ads in the magazine *8000 Plus*.

Pigg book of records

Strangest program: Perhaps the strangest BASIC program ever written for the PCW was that of the PCW owner in Avon who wrote a routine to produce screen dumps (i.e. a printout of exactly what appears on screen) on a 9512 daisywheel. The image was made up entirely of full stops and one screen took several minutes to print out.

● Do you know of any PCW superlatives? Send to: *The Pigg Book of Records*, New Computer Express, 4 Queen St, Bath BA1 1EJ.

Poetry in slow motion

Another classic poem 'improved' by *LocoSpell*. Answer below.

Twos bribing, and the slight toes

Did gayer and girl in the wade

All midst were the boosted

And the more rates outrage.

Answer: Lewis Carroll's *Tale of the Jabberwock*, anticipating the row over poll tax in the last line by a hundred years.

Basil Pigg



A 10 MIPS QL?

Perhaps the ultimate add-on for the QL is a transputer system.

About six QL users have a Concurrent Techniques transputer module connected to their QLs, via an interface designed by Quanta member Neville Smith.

State-of-the-art devices like the transputer and 1 Mbit DRAMs don't come cheap, and prices start at around £725 for a 1 Mbyte transputer system. An occam compiler will cost you another £275.

It might seem a bit daft spending £1,000 on an add-on for a QL that might only have cost you £80, but you end up with a system that will generate and display the full Mandelbrot set in about 100 seconds – probably faster than a Sun workstation costing 20 times as much.

Concurrent Techniques is on (0424) 721768. I should own up to a personal interest in this project, as I am related to Leon Heller, co-founder of Quanta, and concurrent proprietor. This hasn't influenced me in any way, of course!

More Bugs

Repeated string slicing can use up memory that cannot be reclaimed by the *SuperBASIC* garbage collector.

CLEAR, LOAD or NEW will get the missing

memory back. Putting CLEAR and/or RESTORE at the beginning of your program will avoid any problems.

If you have a JS ROM (type PRINT VER\$ to see which you have) and you SELECT ON one of the formal parameters of a procedure, you will get a "bad name" error message, with all parameters but the last one.

SELECT ON doesn't work with character strings, by the way. It does work with numeric strings, because of the coercion feature.

John Torofex

Archive Limitations

Not mentioned in the Archive documentation is the fact that Archive files are limited not by the capacity of the storage medium (100K or so on Microdrive, or 720K on 3 1/2" disk), but by the size of the index maintained by Archive.

In some circumstances, you won't get more than three hundred or so records into an Archive database, before the maximum index size is exceeded.

You can get round this problem to some extent by splitting up your database into several smaller files, but this is a bit messy. Moreover, Archive tends to become extremely slow with large database files.

The version of Archive supplied with the Xchange package for the PC is not subject to this restriction, as it uses B Tree file management.

Next week I'll show you how you can use advanced B Tree techniques on the QL, which allows you almost instantaneous access to databases containing thousands of records.

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Words of wisdom

Results of a recent survey of the software industry have shown that even in this day and age of DTP and high power spreadsheets, the single most common use for a micro computer is word-processing.

Let's hear it for IT

Integration of information technology (IT) into schools is a difficult task, so rarely does there seem to be any correlation between effort and results. The Times/Tandon European Newspaper Day ceremony held recently is an honourable exception. Middleton School, the winners in the primary class, come from my neck of the woods. So when I say I was truly astounded at the amount of work done, you can be sure I mean it. Children who might write one essay a week would manage five or six stories, the equivalent of a whole term's work, in one day. The commitment and enthusiasm of the teachers present was also a joy to behold. The contrast could not be more marked than with normal, trivial uses of computers. It shows that, with proper management, a computer is not just a mundane tool, but also a source of energy and creativity. Let's have more days like this!

Now, this startling revelation will no doubt be met with by waves of total indifference. Quite rightly too, as all Beeb users have long known this little fact. *Wordwise+* and *Interword* are well beloved by thousands of owners for speed of use and simplicity, a great virtue considering the adiposity of many current WPs. Of course *WW+* also has a very useful programming language built in. For example, you can easily get a *WW+* program to strip out formatting codes, replacing them with text commands which can be understood by a typesetting machine. Another bonus is that plain text files in *WW+* are plain, so copying files between machines becomes slightly less of a headache.

On the same theme

One good example of what you can do with the *WW+* programming language is given by a program called *Themewise*. Written by Dr. Lawrence from the University of Nottingham's sociology dept, *Themewise* is a writers' tool that allows analysis of all the text files on a disk, and their recombination in different ways. Dr. Lawrence has promised me a review copy, but in the meantime if you want one, it is available as a shareware product at a cost of £5 +£2 p&p.

Wordy hint

Continuing the wordy theme, here are two hints. First, it's much simpler to copy text files from DFS to ADFS and back by just loading them into *WW+*, and then issuing a *DISK or *ADFS command and re-saving them. Also, a list of comments giving time, date, title and version number which can be kept as a standard file for insertion into your text helps you keep track of your work.

Andrew Brown

MSXTRA

Pac back!

I have been busily playing Grandslam's latest MSX release *Pac Land*, and find it to be quite faithful to the original coin-op - for better or worse.

For those who haven't seen the original, you have - as usual - to collect fruit and power pills. However in this version the perspective has changed. *Pac Land* is played against a horizontally-scrolling background, with you walking Pac from left to right, collecting fruit

Maze help

Good news for Caroline Kyle, a young MSX user who wrote to MSXtra asking if I could help her find the cross in the Konami game Maze of Galious. An avid MSX games player - Kevin, from N. Ireland - has been in touch, and he says that the cross is to be found in world three. To find it you have to go down the ladder from your starting position as far as you can, then go left until you find two floating platforms that you must pass. The next part is pretty vague, but using Popolon, you must jump and strike the wall in this area and the cross will be revealed. Anyone else having problems with games, please write to MSXtra. Like Caroline, you may be lucky and find an MSXer who can help.

etc as you go. Colours are used quite effectively, while sound effects are sparse but adequate. One problem was that the collision detection wasn't all it should be, and quite often I lost a life even though the characters were well separated. This means that you will have to be spot on when you try to jump any "nasty" objects. Another quibble I had was that the supplied instructions were pretty vague as to how you actually start the game. I found that pressing the Space bar only gave you game "credits"; it's the no. 1 or 2 keys that start you off. Also, the loading instructions are wrong, and it should be **BLOOD"CAS":r** and not as printed.

These niggles apart, *Pac Land* is not a bad game, well converted to the MSX. Price is £8.99.

Identity crisis

Stephen Elford of Plymouth writes to ask if the Toshiba HX/10 computer he owns is an MSX 1 or 2 machine. Well, Stephen, on power up, you will notice that on your computer it says "Copyright Microsoft" etc, and then the version of BASIC included in your computer's specification. You will see that on the Toshiba HX/10 it says version 1.0. This means that your computer is an MSX 1 machine, and lacks some of the MSX 2 commands needed on the latter for its extra features, such as higher resolution screens and greater colour choice etc.

Stephen also asks if *Express* could lengthen my column, and I'm sure the Editor would oblige, but only at the expense of width - i.e. it would be twice as long and half as wide! Anyway, *Express* could never afford me if the column were twice the size - I don't come cheap, you know!

Keith Neal

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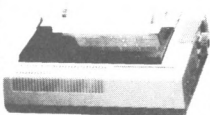
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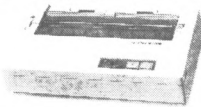
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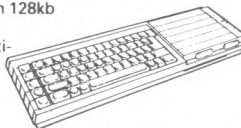
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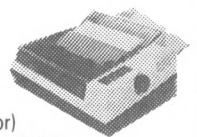
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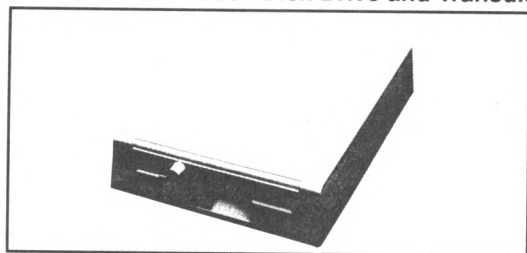
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Location shooting

Rob Berry sent me a letter brimming over with enthusiasm which included some very useful tips for the programmers amongst you. First is the memory location used to generate random numbers. It's 53770 (decimal). To make use of this location to generate say, a random number between 0-9, then type `random=int(peek(53770)*10/256)`. Apparently, this method is much faster than using the RND command from Atari BASIC.

If you want to boot-up from your disk drive or tape then Rob has a little wrinkle which allow you to do this without having to switch off the computer. Enter `x=usr(58487)` whilst holding down the `start` and `option` keys. You will hear the computer make its normal bleep, press return and the machine will reboot.

How many times have you written a BASIC

Letters begin

I've had lots of very interesting letters from Atari 8-bit users up and down the country telling me what they like to do with their machines and what they'd like to see in their column. It's nice to know that you're interested and motivated enough to repay the publishers faith in providing an 8-bit column by reading and taking an active part in its future. Keep it up, huh?

program that you'd like to protect from prying eyes? By putting these two lines of code at the end of your program, you will be able to stop anyone from listing your code.

```
32000 FOR I=PEEK(130)+PEEK(131)*256 TO
PEEK(132)+PEEK(133)*256: POKE
I,155: NEXT I
32100 POKE PEEK(138)+PEEK(139)*256+2,
0: SAVE"C:DUMMY":NEW
```

After you've finished debugging your code, ensure the tape deck is ready for action, type `GOTO 32000` and press return. The program will then be saved. To load the program use `RUN"C:` and the program will be protected. If you're a disk user, then substitute `D1` for `C` in line 32100.

Thanks for those tips, Rob, I shall try to dig up some trinket with which to reward you.

Top ten time

I had a long and very interesting missive from Ms. Linda Tinkler of Wirral, Merseyside.

Linda uses *SpartaDos* (reviewed *Express* 27) and is very happy that it allows her to make use of double density with a drive upgrade such as the U.S. Doubler from ICD. She also supplied a 'top ten' (actually a top 14!) of her favourite software packages, which included such evergreen classics as *SuperScript*, *Pole Position*, *Leaderboard* and the *HitchHiker's Guide to the Galaxy*.

Several correspondents have also listed their favourite software titles. There must be lots and lots of really good software out there that many of you who are new to the world of Atari 8-bit are completely unaware of, so from the next *Antics Roadshow*, I shall try and dig up some of the classics of Atari computing to review as well as anything new that arrives at the office.

Edmund Blake

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TECH TIPS

Problems with your computer? Express's Agony column has the answer. Write in strictest confidence to Uncle Techtip.

Best tips win a freebie - so don't forget to tell us your address and machine

HELP! Hydraulic RAM?

I own an Amiga A500 and am very happy with it (Oh, you don't actually use it for computing then? - Uncle Techtip) but I would like to ask a few questions, here goes:

1. I used to own a Spectrum+ (lucky you can't see me blushing) and I would like to know whether *Green Beret*, *Head Over Heels*, *Way of the Tiger*, *Jack the Nipper*, *Cobra*, *Fist I and II* or *Last Ninja* will ever be out on the Amiga?

2. Can you get viruses from the public domain or commercial software?

3. I was playing *Operation Wolf* on my Amiga and I completed all the levels, saved all the hostages and blew up the final helicopter. But then there was a picture of an old man saying I had failed in my mission, did I complete the game or what?

4. Does the printer port send pulses? If it does, then my friend Yossir Khan has thought of a good way to link an hydraulic chair to the Amiga.

Thanks for listening.

Zaki Ali, Croydon, Surrey

• 1. Extremely unlikely with the exception of *Last Ninja* which I believe is currently being converted.

2. Do you mean for further distribution or to become infected with them? If the latter, then yes, it is possible to be infected with a virus from both PD and commercial software. The Amiga is

particularly vulnerable (which is the fault of the users, not the hardware). Follow the guidelines in Express issue 19 to avoid the virus.

3. I think you can assume that you were unsuccessful in your attempt to complete the mission.

4. The printer port does indeed transmit data signals to hardware attached to this port and it is possible to address individual bits of this port thereby forming a primitive control port. To do this you can use BASIC's *lprint* command i.e. *lprint chr\$(255)* would switch on all the bits of the port, *lprint chr\$(170)* would switch on alternate bits etc. The question is, just where are you going to get a hydraulic chair from?

HELP! Spectrum and MIDI keyboard

I own a Spectrum +3 and a Farfisa FK58 keyboard. Please could you tell me what equipment (e.g. cables, interface or software) I need to link them together as I know absolutely nothing about MIDI. Also, is the Epson LX800 compatible with my computer (using Tasword 3) if I connect it with an Amsoft PL-1 cable?

Andrew Downs, Guisborough, Cleveland

• Do you want the good news or the bad news? The good news is that the Spectrum +3 has a built-in MIDI port. The bad news is that it's non-standard! You must buy an interface if you want to access a MIDI instrument from the humble Spectrum. For a suitable interface

supplier try MGT on 0792 791175.

Software? Well, you could try writing your own - the 'MIDI' port can be accessed directly from Spectrum BASIC, failing that, have rummage through Express advertisers where you will turn up many companies supplying software for your needs.

TIP Deus exit machina

I read with interest the letter in Express 30 from K Ballard regarding the bug in *Populous* affecting disk drives over six months old and would like to relate to you my experiences of this before someone goes out and makes an expensive mistake.

About a month ago I bought *F16 Combat Pilot* for my three-year-old ST and twin half meg drives. I was unable to get it to load as it kept

To cut a - very, very - long story short, I took the computer to another engineer in Preston and at last found out the problem. The drives are running at the wrong speed. It would appear that the new drives run at a slower speed than the old drives and it is this that causes all the problems!

Nigel Blythe, Cheshire

• The problem is with STs before 1987, according to Electronic Arts, which will offer a service to fix the problem - phone its customer service department on 0753 46465.

There's a little utility in the public domain which allows you control over the speed of drives attached to the ST. Although it won't work with protected games software, it may help if you're using unprotected utilities or serious software. Call Star UK on 0224 593024 who may be able to help.



• *Populous* has had problems on some STs - but don't worry, there's a quick answer!

crashing the computer during loading. After returning it to the shop (where it worked perfectly) I tried three other *F16s* all with the same results. I had just spent over twenty quid on a turkey and resigned myself to looking at the screen shots until I could afford a new drive.

To console myself I bought *Populous* the next week in the hope that it would take mind off the disk drive problem. You can imagine my delight when the game loaded perfectly up you the menu screen, loaded the demo then crashed in the same way when I tried to play.

After much hair pulling, I decided that there was a few options open to me: a new ST, a new drive or try and get thing repaired. My brain must have stopped working at that point because I decided the latter was the cheapest option, so I gave the system to the local computer repair centre and left it with them to see what they could do with it.

Ten days later I was presented with a bill for £45 and was told the computer was now fixed. I rushed home and tried to load the two rogue games but to avail. I returned the machine to the repair centre whereupon, after one day, they declared they didn't know what the problem was.

HELP! Island of Capri

Please could you tell me how I can find the start and end addresses of a BASIC program, so that I can peek the memory and convert the decimal values to hexadecimal and then use my hex loader to poke them into a different location? Also could you recommend a cheap but good book on bit-mapping?

W Cooper, Fair Oak, Hants

• I'd love to tell you, but as you haven't told me which machine you have and which version of BASIC...! Write again with full details for more help.

HELP! Assembly instructions

Please could you oblige me by answering a few questions. I own a Commodore 64 cassette based system and I am about to buy an assembler for my machine, could you tell me which one it would be advisable to get, how much it would cost and where to get it?

A McCreadie, No address supplied

• The Commodore 64 was one of the better 8-bit machines and has consequently had a long run of popularity. This means that there is a large public domain software base for the machine.

BUG OF THE WEEK

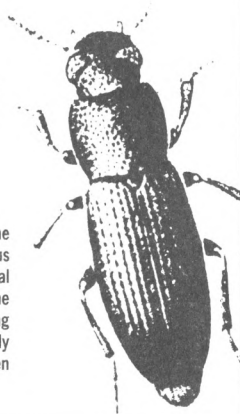
I've discovered a little bug in the Amiga version of *Kick Off* which seriously impairs the scoring possibilities of being awarded a corner kick.

Sometimes, before you've selected the angle to play the ball, all of your team's players inside the box remain frozen to the spot. The clock continues to count down, but no-one can move!

Roy Crimmens, Sunderland, Tyne & Wear

• Congratulations! Your bug has just won you a year's subscription. Anyone else like one? Then get writing...

• *Tribolium Confusum*. The four species of this genus which occur in central Europe are found in the powdered wood of decaying goal posts and have highly adhesive properties when trodden underfoot



By contacting a supplier of this type of software (basically, utilities, games etc., which the programmer has relinquished all claims to and which can be distributed for the price of a disk or cassette). A rummage through any supplier's catalogue should turn up several assemblers. Try Wicked PD on 0268 590571 who stock a large range of C64 PD and should be able to help.

TIP

Missing mouse

We are pleased to be able to answer two queries from this week's *Tech Tips* (*Express* 30).

1. We still support the ZX81 (*Good for you, it's a fine little machine - Uncle Tech Tip*). We hold stock of over 50 ZX81 titles and carry some titles for the 16K Spectrum also.

2. The correct name for Salmeco is indeed Samleco and the address given was correct but they ceased to trade almost two years ago. We are still in touch with the ex-managing director and we will endeavour to solve the original problem. For your information, the machines were not manufactured by Samleco, but by an associated company who also ceased to trade. They were indeed badged by Rotronics who went into liquidation in November (this is becoming a veritable Who's Who of failed computer companies).

If you have any other queries of this nature we would be pleased to help.

Richard Gandy, Capri Marketing LTD, Bucks. Tel. 049481 5677.

• Providing, presumably, that you're still in business when we go to press! Seriously though, thanks a lot guys...

HELP!

PC plodder

I've read your magazine for the last twenty weeks, I have an Amstrad 1640 HDECD and although it is fine, I would appreciate help on the following subjects.

1. I know I can increase the RAM, but what size increase is sensible for the processor to continue efficiently?

2. Can I change the processor if needed?

3. Can I change the EGA card for a VGA card?

4. Can I use a blitter chip and sound chip?

5. Is it better to buy a new machine? (i.e. cheaper, less unwieldy)

The reason that I ask is that I would like to produce my own games creations as a hobby.

C Hilton, Lout, Lincs

• 1. Contemporary sources advise on a megabyte at most. Few commercial programs make use of the extra memory and you have to write tricky bank-switching utilities to use anything more than the 640K directly addressable by DOS anyway.

2. Why? The usual processor replacement for PCs is from 8086/8088 to the faster V20/V30 chips. The Amstrad machines run as fast as they're ever going to so don't bother.

3. Yes.

4. No and Yes. There's no blitter chip available for the Amstrad but there are various sound boards (not 'chips') that can be plugged into a free slot.

5. For games writing? Probably. Sell your old monster and buy a nice new ST or Amiga.

HELP!

From large Acorns...

Is a TV modulator feasible on the Archie (and would any existing modulator fit?) and would the 10% speed increase affect the playability of some existing games by making them too fast? Also, could you advise me on the future of the Archimedes 310?

Joel Grounds, Llanfairfechan, Gwynedd

• As for the first bit of your letter, I'm afraid it's no on both counts. The graphics ability of the Archie needs a monitor to be of any use. Existing modulators would not fit.

I've played *Pacmania* on the Archie and that was fine, so although the machine could conceivably be a little fast for some games, in practise I don't think it's something you'd notice.

The future of the 310? Well, unless Acorn takes a serious look at its potential market and the amount of cash it has to spend, thereby revising the pricing structure of the Archie and the 310 in particular, I would say the machine has a long way to go to become acceptable to a general market.

HELP!

A pox on you

I have a few questions that I will be grateful if you answer.

1. If I write-protect my disks, can a virus still be able to get onto the disk?

2. Do you have to switch power to the computer completely off to erase any viruses in memory or will a soft reset do the job

3. Can you see the virus problem getting worse?

4. Are there any good virus killers on the market

Michael Derrick, Alloa, Scotland

• Ah, some easy ones to finish with...

1. No. Write-protecting disks makes them completely immune to infection.

2. Yes. A clever virus will always be able to dodge the soft reset. Switch off the machine and wait for a couple of seconds before re-applying power to kill any virus lurking in the memory.

3. No. The persons responsible will probably transfer their attentions to mugging, downloading porn and various other hoologan practises (Gosh, sounded almost serious on that one - *Uncle Techtip*).

4. Nothing that I've been able to find for the Archie. Maybe some kind *Techtipper* will call their favourite Uncle with the goodies.



• No modulator for the Archie - so no chance of Zarch running on your TV

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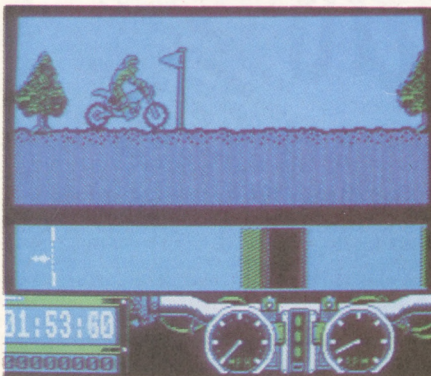
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● The football season may be long gone, but that hasn't stopped Anco bringing out the best soccer sim around. It's a pity Supernova didn't take a leaf out of Anco's book...

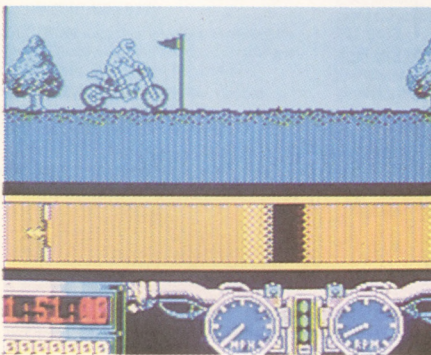
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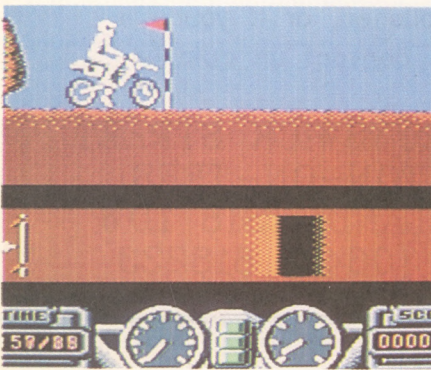
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● Spectrum: On yer bike



● C64: Best of the lot

KICK OFF

ANCO

Amiga £19.95dk
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Perhaps better known for its soft porn strip poker games, Anco has turned its attention to the infamous football-sim genre with *Kick Off*.

● **VERSION UPDATE**

Nothing surprising in the gameplay department, except that it plays the best game of footie around. Everything's here: throw-ins, corners, fouls, free-kicks, penalties, injury time, five skill levels (Sunday League to International), one or two players, league competition (up to eight players and a Save option), four team tactics (defensive, attacking, midfield, sweeper defensive), practice skills and penalties, match duration (10 to 90 minutes). In fact the only missing element is the football hooligan!

● **GRAPHICS AND SOUND**

Kick Off is played overhead. Not much else to say, except the on-pitch furor is constantly kept to a high level. You never have time to relax during a game. All the sampled sound spot-effects are here, from the refs whistle to the cheering crowd.

● **OTHER VERSIONS**

ST *Kick Off* was reviewed in *Express* 24, but after

Latest Kick Off Scores

Bob Wade	1	Rik Haynes	2
Andy Smith	0	Rik Haynes	4
Damien Noonan	1	Rik Haynes	0
Jason Holborn	0	Rik Haynes	3
Steve Jarratt	0	Rik Haynes	2



● Amiga: The keeper takes it in the goalmouth

some extensive *Express* team play we've decided it also deserves a five star rating instead of the four awarded then. Gamewise, the ST version plays a lot faster than its Amiga counterpart, but is slightly less polished. Nevertheless it's still easily the best available on the ST. We haven't seen the C64 or PC versions yet, but they're both due for completion shortly.

Updates as soon as we have 'em.

● **EXPRESS VERDICT**

Latest Score... *Microprose Soccer* on the Amiga (full review next week) made a last minute play into the *Express* office during injury time, but was soon seen off by *Kick Off's* superior playability and addictiveness. Final Score: *Kick Off 5 Microprose Soccer 3*. Well done, Anco you've finally got a result.

To sum up Brian, *Kick Off* is simply the best football sim we've played on any

micro. It's fast, furious, and immense fun. Go and buy it.



Rik Haynes



● The original ST version: Colour bar rasters at the ready in this full-screen epic



● Amiga: Red scores - but it's a game of two halves

Not as you might expect another Codemasters release, *Super Scramble Simulator* is a motocross bike race sim.

● **GAMEPLAY**

Played over 15 terrains, you'll have to take on 1:2 gradient hills, logs, water obstacles and lorries, while keeping an eye on the rev counter and scanner for any impending disasters.

● **GRAPHICS AND SOUND**

Your sprite and the backdrops are detailed enough, if a little bland, and there's the usual assortment of bike sound FX.

● **OTHER VERSIONS**

C64 *Super Scramble Simulator* is by far the best 8-bit version, with slightly more colourful backdrops, better audio and more playability. The CPC version is OK, but its audio quality isn't up to the Spec's spec. We haven't seen the 16-bit versions up and running yet.

● **EXPRESS VERDICT**

Enjoyable for a couple of plays, *Super Scramble Simulator* smacks more of a budget release than a full price game.



Rik Haynes

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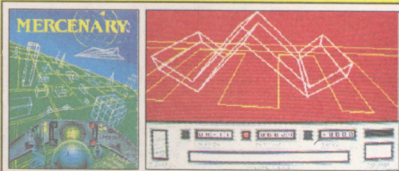
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• ST: Erupting into play

Pinball sims range from the mediocre Code Masters effort to Anco's addictive Wizard. With a touch of sci-fi, *Time Scanner* pitches somewhere between the two.

● **GAMEPLAY**

Time Scanner is a four-stage pinball game split on two levels, each requiring their own particular tactics. Whether it's lighting the lamps of the Volcano and Pyramid stages, or knocking down the targets of the Ruins stage, the method remains the same – namely to flip on your shift keys like crazy and use the space bar to tilt to your heart's content. Unfortunately, the features incorporated in the design of the tables are a little sparse.

● **GRAPHICS AND SOUND**

Sound comprises a forgettable backing tune and spot effects that can be written off as unbearable. Only half the screen is used at any one time, though the actual visual designs are very competent. The flow of the ball is also somewhat suspect, with collision detection on the flippers falling from time to time.

● **OTHER VERSIONS**

The Amiga version, as yet unseen, will undoubtedly leave the ST version miles behind in the sound department – it couldn't be any worse.

● **EXPRESS VERDICT**

Pinball is a game which would seem to lend itself ideally to conversion on computers – a little imagination and compulsive gameplay would go a long way. *Time Scanner* has neither. For the price of this game you could go down an arcade and play the real thing a hundred times.



Andy Storer

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Tommy Docherty had a job. People were actually buying Abba and Sex Pistols records. British streets were full of royalists celebrating the Queen's Jubilee and *Swap Shop* was torturing a young generation of TV freaks. 'Twas 1977 – the year *Space Invaders* arrived.

Supernova Software, presumably in an attempt to rekindle the spirit of '77, has unleashed an *Invaders* clone onto a reluctant world of Amiga owners.

SILKWORM

VIRGIN GAMES

Amiga £19.99dk
Also on Spectrum, C64, CPC, ST

Silkworm is a coin-op conversion of a less than well known horizontally-scrolling shoot-'em-up from Tecmo.

GREAT FUN

● **GAMEPLAY**

One or simultaneous two-player action as you and a friend take control of a helicopter and jeep through hostile landscapes filled with enemy helicopters, mobile missile launchers, gun emplacements, mines, droids, missile emplacements and giant attack helicopters, to name but a few.

● **GRAPHICS AND SOUND**

Visuals are pleasing enough, the sprites are finely detailed and the backdrops are picturesque. *Silkworm* scores most highly in the audio department, with some of the clearest sound sampled spot-effects we've heard in any Amiga game. The Euro-pop soundtrack is a little unoriginal though.

● **OTHER VERSIONS**

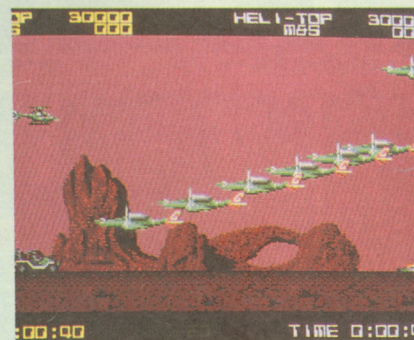
We've played the other versions in varying stages of completion, and they all seem competent enough. Look out for updates shortly.

● **EXPRESS VERDICT**

Silkworm isn't original or particularly stunning – it's just great fun to play.



Rik Haynes



• Desolation in the desert



• Night falls, and the action goes on...



• Up against the end-of-level guardian



• All tanked up and ready to go

● **GAMEPLAY**

The number of computer owners who don't know how to play this must be as insignificant as the number of people bonkers enough to fork out £15 for such nonsense.

● **GRAPHICS AND SOUND**

There's something distinctly wrong with launching an *Invaders* clone in 1989, but to actually produce a bad rendition should be made a criminal offence.

Classic Invaders is slow and has even less character than the original. The sound is enough to drive a good man insane. To pick out each individual fault would be crass – suffice to say that this is not a good game.

● **OTHER VERSIONS**

PC, PCW and ST. It would be a surprise indeed if any of these are worth the asking price.

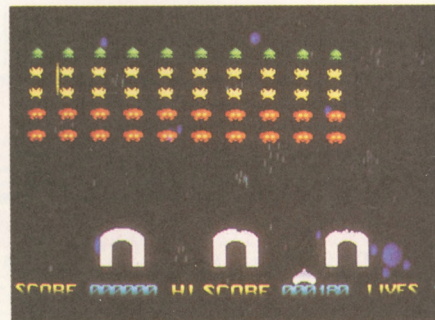
● **EXPRESS VERDICT**

Utter rubbish! There are infinitely better *Invaders* games floating around in the Public Domain (such as Amiga

Invaders) and about a billion better ways of spending £15. Simply appalling.



Colin Campbell



• Classic? You must be joking...

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2086 CD	712.17 819.00	821.74 945.00	1051.30 1209.00	885.21 1018.00	994.78 1144.00	911.30 1048.00	1020.87 1174.00
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Beyond our Ken

Ken Mosley, the man who calls a spade a trump

Spies the limit

After revelations that the Red Menace is infiltrating British computer shows, we see that *Electron User* magazine was approached by the Russkie Institute of Scientific Information asking for information. And publishers Database actually obliged!

No I'm no anti-Communist, but if we indulge in this sort of cheap publicity-grabbing toadying to the Evil Empire, who knows where it will all end. Send them a few pokes for BBC BASIC and let them get away from shows with a carrier bag full of Spectrum cassettes one minute, and the next, Boris will be guiding computer-controlled missiles along Oxford Street. It's time someone put their foot down.

Power of advertising

I cannot believe the advert for this new games label 'Microstatus'. The software, says the ad, is 'as smart and intelligent as those who choose to play it.'



Smart? The lad gets his clothes from Oxfam and has walked out the optician's with his test frames on. Intelligent? When his 1925 Model T breaks down on the M25 and the AA bloke says he doesn't even know a man who can, don't come crying to me. No wonder his bit of skirt - though of course she's wearing men's trousers, as you're not allowed to look like a woman and have a job these days - is looking so stoney-faced. Why couldn't her pillock of a boyfriend have a sensible car like a Fiesta or a Sierra? But no, he has to go for the image, which means he believes that if he smokes a pipe and wears a scarf even in mid-summer people will think he's a stockbroker or analyst. In fact, of course, they just think he's an overpaid limp-wristed Southern soft-lifer.

Now I'm no inverse snob but as a Northern lad it makes me puke to see 'status' measured in terms of material possessions. My Dad smoked a pipe, had a Model T and an ugly stoney-facced woman but he was never on any adverts.

Just shows the bias against Northerners is stronger than ever.

Beat the pirates

There seems to be a lot of talk about copy protection lately, whether it's right or wrong etc.

Quite clearly everyone is missing the point. Look at Iran; steal a loaf of bread there and it's off with the right hand. Not much crime there eh! Say what you like about Islam but it certainly gets people into line. Now I'm not necessarily advocating sharia-style laws, but if you really want to stamp out this insidious evil of software theft you must be firm. I'm all behind FAST. Police should be able to search suspect houses without warrants, hold suspects for 24 hours while their software is checked out and the guilty imprisoned for up to five years.

Crime does pay

On a similar note, I see that City firms are not shopping hackers who've stolen money from them in return for letting them go.

While not wishing to encourage blatant criminal activity such as this I can't help feeling that some firms have got their just desserts. We all know the sort of insider trading that City people do to line their own pockets at the expense of the rest of the country. It was only ten years ago that banks stopped charging you for having your money!

In paying the criminals off like this they're only storing up trouble for themselves - I mean, if someone nicked your computer and you paid them for doing it you wouldn't be surprised if they did it again. No, they're paying the price for not putting their trust in the security forces. If only they'd gone straight to the police in the first place they'd be alright.

A rumour is abroad

Now we're being told that British computer graduates are being taken by foreign companies. I can't help saying I told you so here. Back in 1965, when my brother Ron emigrated to Australia in the Brain Drain to be a Car Park Attendant in Sydney, I wrote to the *Yorkshire Post* saying something should be done. Was it? Was it heck!

It's quite clear why people are leaving. It's because this once-great Empire is going down the chute. We return our colonies to the Chinese, we fritter away our North Sea Oil revenue on keeping the unemployed, and we don't pay the cream of our universities nearly enough. No surprise they're off on the first Virgin flight to Disneyland as soon as the grant runs out.

We ought to do it more like the States - make 'em all pay for their years at university, like everywhere else, and use that money to pay them more when they start work.

NEXT WEEK

Aaaaaaargh!!!!

What to do when things go wrong! The Express guide to getting your computer repaired

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Download your data from space

CGI

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Suggested List Price: £219.95

8-UP! FastRAM

Maximum Memory in One Slot!

The FastRAM card that every Amiga owner will eventually come to - why limit yourself to only two megabytes per slot? 8-UP! will take you all the way to the top of the auto-configuration memory space of EIGHT MEGABYTES! 8-UP! is available in two versions, the standard DIP model accepts 2,4,6 or 8 megabytes of 1 meg DRAMS. For maximum flexibility there is the SIMM version which lets you custom configure with mixed 256k and 1 meg SIMM modules, including MicroBotics exclusive PopSIMMs. 8-UP! is a power-efficient, zero wait state, autoconfiguring design. "The latest and greatest" (Amiga World, Jan. 1989). 8-UP! is available now.

Suggested List Price: £124.95

MouseTime

The easiest to use, most cost-effective implementation of a battery backed clock for the A1000. Passes the port through for joysticks or other devices. Complete with WorkBench software. Available now.

Suggested List Price: £22.95

For the
Amiga 500...

M501 Memory + Clock

Half a Meg at a Great Price!

As we are all coming to realise, a one megabyte Amiga (at least) is a necessity not an option. When you add the inboard 512k memory and clock module to your A500 make sure it's a MicroBotics M501. Note that just like the Commodore and unlike some third party expansions, we use a long lived rechargeable NiCad battery - which you'll never have to replace. Set the MicroBotics clock using the same WorkBench software as you would use for the Commodore clock. What's the difference? You get to keep £25 compared to the Commodore version. The M501 is available now.

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StarBoard2/500

Two Megs PLUS a Choice of Modules.

The premier memory expansion for the A1000 is now available on the A500. In its own case with an independent power supply strong enough to handle StarBoard2 and a second A1000 style StarBoard2, all the power and flexibility of this great expansion device is available to you. Up to 2 megabytes of autoconfiguring, zero wait state FastRAM, MultiFunction or SCSI module capability for math chip or fast SCSI hard disk interfacing. StarBoard2 also has an LED diagnostic/confidence light to indicate the power-up state of your Amiga and expansion. An A1000 style StarBoard2 can be connected to the bus pass-up for a total of FOUR megs and two modules. "The best ..." (Amiga World, Jan. 88).

Suggested List Price: £224.95

For the
Amiga 1000...

StarBoard2

The Expansion of Choice

The superb memory expansion for the Amiga 1000, still going strong! Up to 2 megabytes of autoconfiguring, zero wait state, FastRAM in a sleek, all steel Amiga coloured case plus the capability to accept either of the two daughterboard modules, the original Multi-Function Module or the new SCSI Module. StarBoard2 is powered by the bus (up to two StarBoard2's can be supported by the A1000) and passes it on.

Suggested List Price: £224.95

MultiFunction Module

High Tech at Low Cost

This daughterboard installs on any StarBoard2. It features a socket and software for the 68881 Math Chip as an I/O device (MicroBotics pioneered this approach on the Amiga - now directly supported in the maths libraries of AmigaDOS 1.3). StickyDisk gives you the most "bullet-proof" rebootable RAM disk - its hardware protection turns it into a solid state, superfast disk. Parity checking of StarBoard2 RAM can be enabled when extra parity ram is installed. Finally, the MultiFunction Module carries an easy to use battery-backed clock to set the system time on startup.

Suggested List Price: £65

StarDrive SCSI Module

Fast, Low Cost SCSI Module

When installed in any model StarBoard2, StarDrive offers you cost effective, pseudo-DMA access to SCSI hard drives and other devices. Fast, easy to install including driver software and disk diagnostics. StarDrive also includes a battery backed clock to set system time on startup.

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