

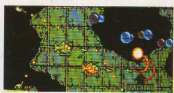
ISSUE 2 ■ SEPTEMBER 1989 ■ £2.95

ST FORMAT



COVER DISK 2

BLOOD MONEY



PLAYABLE DEMO OF PSYGNOSIS' SHOOT-'EM-UP

GO AHEAD!

Make facial fantasies on your ST.
Fun Face review inside,
playable demo on disk

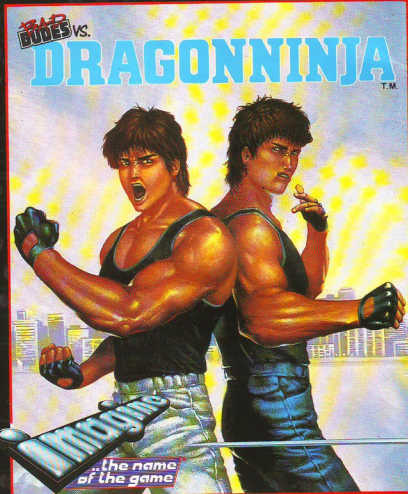


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New Computer Express 5 star

"The graphics are slick, the action is tough ... designed to keep you glued to your stick".
ZZAP Sizzler



"a popular movie license backed up by great game-play, an unbeatable formula – needless to say, I'd buy it ... miss this and you're missing the hottest game of the year".
ST Action

STAI



"A sure winner with the official conversion to the home computer".
The Games Machine

"There is more than enough action in this one to keep you coming back for more".
Ace

"a superb game with such addictive gameplay".
Computer Games Week FAB



BATMAN

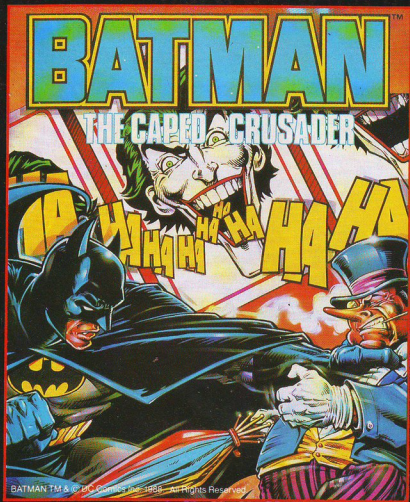
ATARI ST

CBM AMIGA

£19.95 £24.95



INTELLIGENCE



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"Special FX programmed the game and have done a great job, recreating the character of the originals with a hint of humour".

Amiga User Int.

"The characters and backgrounds are striking – each are superlative – the Amiga features a soundtrack in glorious remixed stereo".

The One

"polished in every aspect – from the humorous storyline to the end of the blasting".

The Games Machine Top Score

"... you're in for the time of your life ... fabulous 3D, hours of absorbing play – you name it, Voyager's got it. And that's not all: Ocean throw in a cassette soundtrack which has to be one of the most mind-blowing pieces of music I've ever heard".

ZZAP Sizzler

"... scrolling 3D graphics, the most impressive I've seen on the ST ... a great arcade formula and clever graphics ... an excellent game that will keep you playing for quite some time".

ST Action



STAI

Ocean

ROBOCOP
DRAGON NINJA
VOYAGER

ATARI ST

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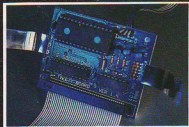
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Side 1

BLOOD MONEY spectacular playable demo of Psygnosis' superb shoot-em-up.
THAT'S FUN FACE Cavendish's hilarious make-a-face program in usable demo form.
GFA FILES programs for use with BASIC tutorial.
FORMAT 16 extended formatter for backing up the cover disk's contents.

Side 2

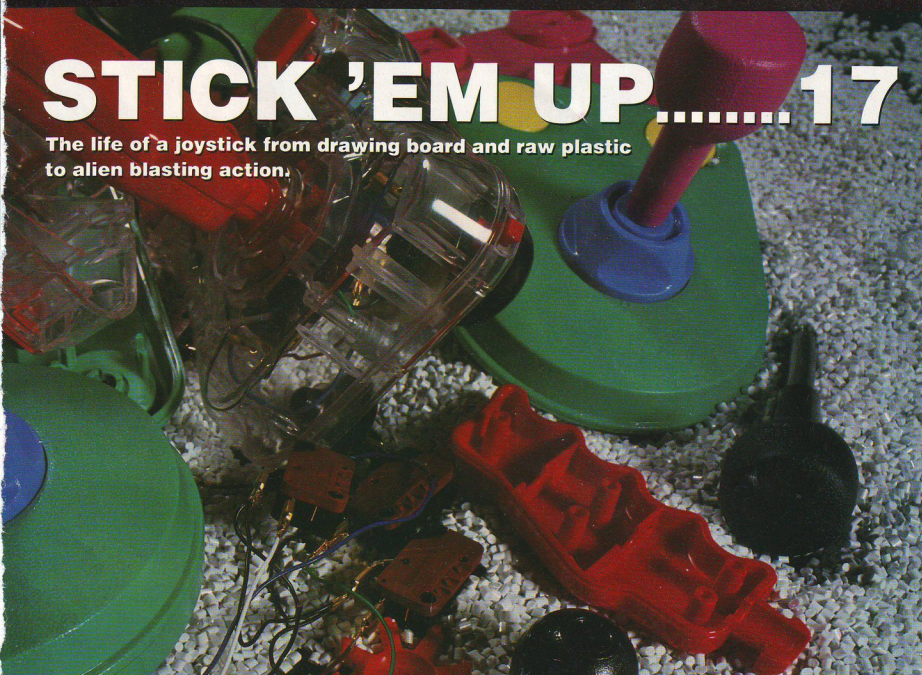
AARGH! keyboard click toggle.
DC CLOCK adds system clock to the Desktop.
BLASTER Defender-like arcade game.
PCOMMAND command line interpreter.
PICTURE GALLERY animation sequence from the animation tutorial.
PD DEMOS the latest graphics and sound demos.



■ Blast your way through Blood Money.

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The life of a joystick from drawing board and raw plastic to alien blasting action.



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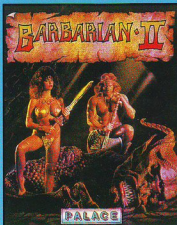
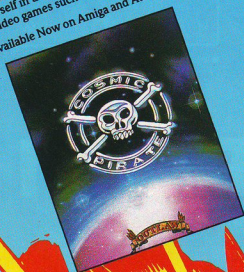
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Working as a space pirate for arch-criminal organisation The Council you go in search of bountiful cargo ships. Succeed and you will gain money to buy new attachments for your ship. Alternatively you might wish to enjoy yourself in the Cosmic Arcade playing video games such as Disasteroids.

Available Now on Amiga and Atari ST.



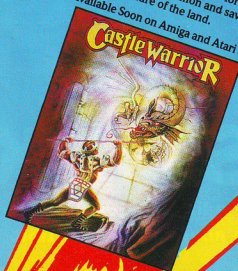
The hit sequel to one of the all time computer game greats!

The search for the evil Drax continues. Now the Barbarian and the Princess fight their way past dozens of incredible monsters, through a maze of caves and dungeons.

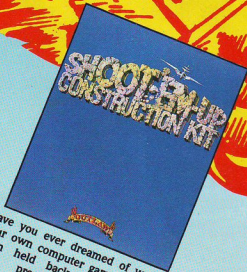
Available Now on Amiga, Atari ST and IBM PC.

Classic arcade-style action for home computers as only the 16 bit machines can deliver: large characters, incredible colours and fantastic sound. The evil wizard Zandor has poisoned your father, Eteired the Good, King of Pacifica. You have one day to force the antidote from the demon and save the future of the land.

Available Soon on Amiga and Atari ST.



EXPLOSIVE 16 BIT ACTION FROM PALACE SOFTWARE



Have you ever dreamed of writing your own computer game but have been held back by a lack of programming skills?

Now is your chance to make your dream come true with Shoot-Em-Up Construction Kit, the arcade game making program that requires no programming skills.

Available Now on Amiga and Soon on Atari ST.



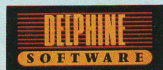
Run, leap, somersault and spin your cyborg through the Bio Challenge assault course. Furious joystick action through many levels as the seconds tick away.

Available Now on Amiga and Atari ST



PALACE SOFTWARE

PALACE





■ *PC Speed* opens up the range of software that can be run on the ST.

PC POWER

Cavendish have gained the distribution rights to a PC emulator developed by Compo in Holland, priced at £379.

PC Speed fits inside any ST and sits on top of the 68000 processor. The tiny board, which offers four times the processing speed of a standard 4.77MHz-rated PC-XT, contains little more than a NEC V30 processor. Virtually all MS-DOS software is guaranteed to run, say Compo. Microsoft's *Flight Simulator*, *WordStar 5*, *PageMaker* and numerous other packages have been demonstrated to work without a glitch.

Hercules and CGA graphics modes, sound, serial and parallel ports, the mouse, and external 3.5 and 5.25-inch drives are all supported by *PC Speed*. Up to 704K, memory permitting, is available to the user.

Any ST hard disk can be used with the emulator, the only restriction being that all PC programs must be in the same partition. Data can be read and written to ST partitions, however.

Cavendish:01-323 1399.

SAM TRAMIEL'S AIM: 'TO KILL OFF NINTENDO'

FIGHTING TALK FROM ATARI

Sam Tramiel, president of Atari, was full of fire about the company's forthcoming range of software and hardware during his visit to the launch of Atari UK's 16-bit software arm held at Silverstone.

According to Tramiel, over 2,000,000 Atari hand-held and portable machines will be sold by this time next year. The colour hand held games console (Lynx), Portfolio and ST laptop combined will do wonders for the company. Said Tramiel, "I use a Portfolio all the time. When Stacy becomes available I'm going to have a hard time deciding which machine to use. The Portfolio provides unbelievable portability while Stacy offers enviable processing power, optional hard drive and up to 4Mb of memory. And the kids just go crazy over the Lynx."

The ST range is expanding with the TTP due to be launched at the largest Atari show held late in August at Dusseldorf. "Many machines that people have been waiting for will appear at Dusseldorf." The TTP, a 68030-based



■ "The essential ST peripheral", according to Sam Tramiel, president of Atari Corp.

machine, is seen by Sam Tramiel as leading the renewed ST push in the States. "Anything launched in the States has got to be powerful - the TTP is the machine to get Americans excited. It has three modes of operation: ST TOS 1.4, MS-DOS and UNIX 5.31. A monochrome resolution of 1280 by 960 is offered as are two colour resolutions; 640 by

480 and 320 by 480. 256 colours from a palette of 4,096 can be displayed in low resolution."

What about the next five years? "We'll dominate the hand-held market and kill off Nintendo", bragged Tramiel. And when quizzed about branching out into other areas he smiled: "Computers and games are enough just now."

ATARI SOFTEN UP

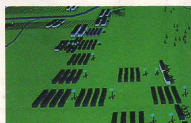
Atari are re-entering the software market with a range of games and applications for the 16-bit market.

Although games form the crux of the software attack, ST owners will also be treated to numerous productivity titles in the Hyper range.

Available now are *Tempest*, *Star Breaker*, *Star Raiders*, *Enterprise* and *Borodino* and *Armada*. *Tempest* and *Star Raiders* are early Atari classics and both retail for £14.99. *Star Breaker*, also £14.99, is basically a fast and furious shoot-'em-up. *Enterprise*, £19.99, is a space exploration shoot-'em-up in typi-



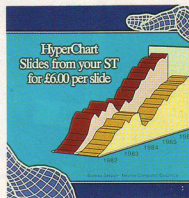
■ *Atari Grand Prix* is a two-player racing simulation, while *Borodino*, below, battles on.



cal *Elite* fashion. You must defend the English coastline in *Armada*, or alternatively re-write history by leading the invading fleet to victory against Howard, Drake and Frobisher; £30 for the privilege, as is *Borodino*.

On the serious side *HyperDraw*, an object-oriented paint package, and a *Lotus 1 2 3* compatible spreadsheet *LDW Power* are just shipping. *HyperDraw* retails for £39.99 - £15 more than *HyperPaint* - while *LDW* costs £149.95.

All Atari software is available from Atari dealers or direct from Atari at Atari House, Railway Terrace, Slough, Berkshire SL2 5BZ.



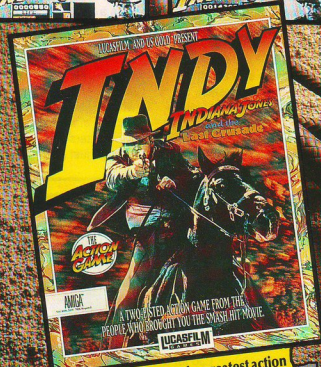
■ *HyperChart*, a presentations package, is the next in the Hyper series due for release. Business graphics and 3D charts can be created and viewed at any angle. *HyperChart*, which will appear at £129.99, is backed by a bureau service offering 2000- and 4000-line resolution 35mm slides.

The Man with the Hat is back!

TINDY

INDIANA JONES
and the
Last Crusade

SCREEN SHOTS FROM VARIOUS FORMATS.



Whip those bad guys ... as only Indy can! Relive the greatest action scenes from the greatest Indy movie of them all. It's red hot, slam bam action in true Indiana Jones style!

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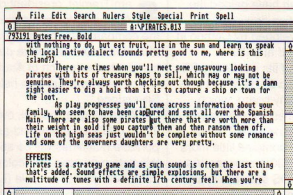
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Springs in summer

U S company Codehead is to have its entire product range distributed in this country by ISM. Along with *MultiDesk* (mentioned last month), ISM will be handling *Regent Word II*, *HotWire*, *Springs*, *G+Plus* and *Code Utilities*.

■ **Regent Word II** is a basic wordprocessor with a budget price, £29.95. Despite the its simplicity, it comes with word count, ASCII save feature, editing and insert modes, block functions, search and replace, and a 30,000 word spell checker.



■ **Regent Word II: budget priced but fully-featured wordprocessor package from ISM.**

■ **HotWire** enables the user to execute programs simply by striking particular keys on the keyboard. Hard drive owners will benefit most from *HotWire*; rather than having to hunt through directory after directory for a program, a keypress can start the program rolling. *HotWire* (£39.95) means an end to time-wasting pointing and clicking. Up to 54 'hot keys' can be assigned.

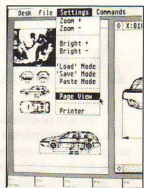
■ **Spring** is the oddest of Codehead's offerings. £15.95 gets you a sack full of tiny springs which fit underneath 520 and 1040 keys. The idea is that you end up with a more responsive keyboard.

■ **G+Plus** is a replacement for GDOS which doesn't slow the computer down, doesn't require complex installation and is compatible with all known GDOS programs. *G+Plus* costs £34.95.

All of Codehead's products are available from ISM at Grove House, Ventnor Road, Apse Heath, Isle of Wight (0983 867488).

Scan and deliver

D ataScan Plus is an upgrade to Kempston's scanning package. The new version comes with a 105mm width hand-held scanner capable of scanning to 200dpi resolution. The software supports .IMG, .Degas and .Neochrome file formats and boasts extensive image processing facilities. The complete package costs £249.95 while the upgrade goes for £25. Details from Kempston, 21 Linford Forum, Rockingham Drive, Linford Wood, Milton Keynes, MK14 6LY.



■ The company behind the *Quickshot* series of sticks, *Spectraideo*, have come up with a radical new number. *QS-118 Wizard* comes with three different control mechanisms, auto-fire and a computer select system. Price: £11.95.



Norwegian blue

Mastertronic have acquired the licence from the Monty Python team to produce a computer game.

Game development is being handled by Core Design who hope to retain some of the original bizarre humour which made the Python series such a hit. Some of the classic sketches such as *The Ministry of Silly Walks* and *The Parrot Sketch* will be included. Preliminary release dates are set for early 1990.

The BBC are planning to repeat highlights from the Monty Python series in *'The Best of Monty Python'* to be shown later this year. The BBC programme will mark the 20th anniversary of the Monty Python team.



Some like it Hotz

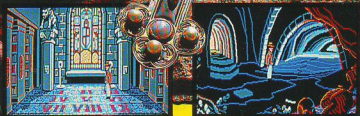
Professional and amateur musicians alike in America are buzzing with excitement after a device called the *Hotz Translator* surfaced at a music show in the States. The revolutionary MIDI device has the production and marketing backing of Atari US.

The *Hotz Translator*, named after its inventor Jimmy Hotz, is born from MIDI mapping and sequencing technology, compact disc technology and force-sensitive keyboard design. Hotz is an independent producer and studio engineer who has worked with artists like B. B. King and Fleetwood Mac. Mick Fleetwood is in fact chairman of Hotz Instrument Technology Systems (HTS).

The *Translator* responds to code buried within a digital recording. The code contains data representing the harmonies present in the music as they change over time. This information is used by an ST as the basis for interpreting incoming MIDI control data from Hotz' innovative keyboard, triggering the playback of appropriate chords, scales and other musical components. Anyone using the *Hotz Translator*, claims Hotz, can play along with the recording and sound competent - even if they have no musical training.



The bad guys are in your face all the way - Nazis, mercenaries, traitors and spies.
Not to mention everything the Luftwaffe can throw at you.
Can you handle the rest?
If you can, you just might earn a higher I.Q. (Indy Quotient) than the man with the whip and the hat.



- Visit dozens of locations not seen in the movie.
- Over 100 sound effects ... plus movie theme music.
- Comes with Henry Jones clue packed *Graill Diary*.

And this time he's bringing his Dad!

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ST FORMAT NEXT MONTH

The October issue of ST Format leaps onto newsgents' shelves on **THURSDAY SEPTEMBER 21**. Justifying for position in the many pages will be:



CHAOS

The algorithms and theory behind the beautiful landscapes created by fractal mathematics. Plus a look at how Digital Pictures make use of such creations.

KILLER GAMES

Format's favourite violent computer games, the enjoyment programmers get from coding screams and blood thirsty scenes, and what the ultimate in gruesome games might look like.

GRAPHICS GALORE

Sensational new section devoted to all graphical aspects of the ST. News, hints and tips, RayTrace and HyperDraw reviewed, and drawing and animation tutorials.

PACKAGE DEAL

Find out why adventure houses like Sierra, Infocom, Magnetic Scrolls et al fill their packages with anything from scratch-and-sniff cards to 3D sunglasses.

DIY PROJECT

Build a device that will display exactly what your disk drive's head gets up to. A simple hardware project that'll cost around £15 in parts.

PLUS

A round up of all the latest wordprocessors and text editors including Tempus 2, That's Write and Regent Word II. Reviews of an accelerator board, genlock device and accessory utility. Pages of hints and tips for your machine.

Due to the dynamic nature of the ST market, we can't guarantee that all the features mentioned will end up in next month's magazine. We can, however, guarantee that if anything gets replaced it will only be an even better feature.

LAW PROMISES PIRACY ACTION

Report by Steve Carey

A new law intended to prevent ST software piracy has come into force amid conflicting claims about its scope and interpretation.

The Copyright, Designs and Patents Act, given the Royal Assent on 15th November last year, came into force at the beginning of August. A major revision of the 1956 Act, which naturally did not legislate for computer technology, it attempts for the first time to hand the initiative to those whose intellectual property, in the form of software, is allegedly being stolen.

Millions of pounds of revenue are lost every year, it is claimed, through lost sales. The theft takes place on two levels; privately, between individuals, and commercially, by so-called "pirates". The Federation Against Software Theft has welcomed this latest legislation both because it gives owners of copyright a real chance of catching and punishing the pirates, but also because it serves to highlight FAST's crusade. Stiff penalties, which include the power of seizure of infringing copies, heavy fines and imprisonment up to two years, will act as a major deterrent to commercial pirates.

Now it is an offence and an infringement of copyright to "make, import into the United Kingdom, possess in the course of a business, sell or let for hire, offer or expose for sale or hire, an article specifically designed or

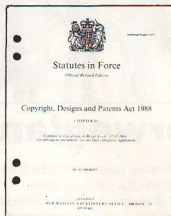
adapted for making copies...knowing or having reason to believe that it is to be used to make infringing copies."

But that is not all. It is equally an offence under the new Act to "make, import, sell or let for hire, offer or expose for sale or hire, or advertise for sale or hire, any device or means specifically designed or adapted to circumvent the form of copy-protection employed."

Doubts have been expressed, however, whether it can be proved that a hardware device or software utility is "specifically" designed to make copyright-infringing copies of programs. The Multifuse, for instance, and the recently arrived Blitz Lead can both claim to have legal purposes other than copy protection evasion.

Last year the House of Lords threw out a case involving Amstrad's twin cassette recorder, despite allegations that it was specifically for the purpose of copying tapes and would inevitably lead to copyright infringement. It could equally be used for copying non-copyrighted material, their Lordships decided. The same arguments will well arise over devices frequently but not solely used to evade copy protection by ST owners.

The Act, some 200 pages of complex and abstruse legal jargon, contains some bizarre anomalies.



While it does not actually define the term "computer" or "computer program" – presumably to allow for the inevitable developments in micro technology – it lingers for a page and a half over the fate of royalties from Sir James Barrie's play Peter Pan! (The reason, incidentally, is that he bequeathed them to the Great Ormond St Hospital for Sick Children, and Sir James Callaghan introduced a clause excluding the play from the normal expiry of copyright. Don't say you never learn anything in ST Format!)

Perhaps the most extraordinary clause of the new Copyright Act is that it is now an infringement of copyright to "publish information intended to enable or assist persons to circumvent...copy protection." If taken literally this would appear to make ST Format liable to prosecution for printing pokes.

QUICKIES • QUICKIES • QUICKIES • QUICKIES

■ Trilogic have manufactured a device that enables any two computers with a TV or monitor lead terminating in a Scart connector to share a monitor. The *Monitor Sharer* costs £15.99 and can be used by, say an ST and an Amiga running from a Commodore 1084 monitor. Trilogic are on 0274 691115.

■ *FM Melody Maker* from Hybrid Arts brings a new dimension of sound to your ST. The hardware device slots into the ST's cartridge port and offers nine FM channels or six FM channels and five drum channels. The supplied software covers all aspects of music making on the ST and comes complete with 78 pre-programmed sounds,

16 different accompaniment styles and 14 chord types. Software houses are to be supplied with the music module, so it is likely that many games in the future will support the device. *FM Melody Maker* costs £69.95 and is available from Hybrid Arts on 01-444 9126.

■ The GFA BASIC 3 compiler and GFA RayTrace are shipping at last. The compiler comes with a 64 page manual explaining how to create executable programs and Desktop accessories. There are options for linking C code, enabling and disabling interrupts, and performing various code optimisations. The compiler costs £29.95. RayTrace lets you create wire frame 3D models in memory; ren-

dering algorithms produce a realistic image on screen. GFA Data Media are on 0734 794941.

■ The second edition of Action Screenplay, the video containing game demos, is available. The second video features an interview with Mark Strachan and Dominic Wheatley of Domark together with demos of *Darkside*, *3D Pool*, *Colossus Chess*, *Total Eclipse*, *Voyager* and *Kult*. Action Screenplay retails for £4.99 and is available from most video stores.

■ *K-Roget*, the thesaurus, and *K-Resource 2* from Kuma are being offered at the special price of £29.95 until September 30. Kuma are on 07357 4335.

XENON

2

MEGABLAST

XENON II: MEGABLAST

XENON II: this time it's war!

The Xenites are back and have thrown time itself into turmoil, only you can save the day – not to mention the universe!

BATTLE through five VAST, graphically UNCANNY levels, DESTROYING wave after wave of EVIL aliens with the DOZENS of POWERFUL WEAPONS at your disposal.

XENON II: HARD, fast COIN-OP QUALITY destructive action with a HOT soundtrack to match... a mind blowingly accurate David Whittaker rendition of the 'Bomb The Bass' Megablast.

XENON II: it's out of this world!

XENON II: it's a Megablast!

XENON II: it's a Bitmap Brothers game!

Available Soon on Atari ST, AMIGA & PC.

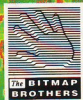


Screen Shots From Atari ST Version



image
works

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MEGABLAST written by Tim Simenon
Produced by Simenon/Gabriel
Appears courtesy of Rhythm King Records
Published by Rhythm King Records



MIRRORSOFT
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Tel: 01-928 1650, Fax: 01-583 3494



The publicity surrounding the launch of Steve Job's seductively designed NEXT computer system has dramatically highlighted the significance of the industrial designer. With product performance taken for granted, it is this hard-to-define design input that can swing the decision of which computer to purchase.

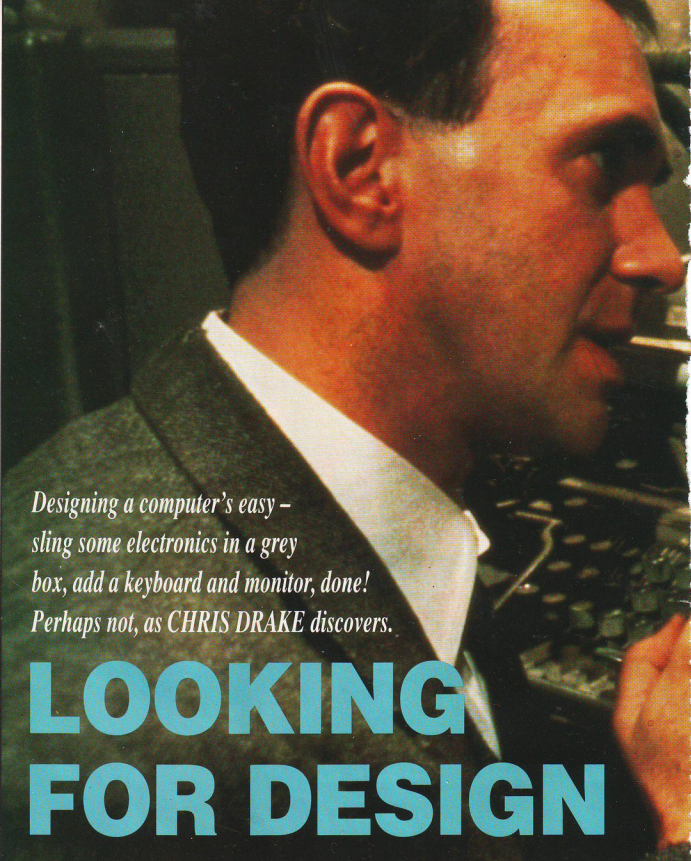
So, what does an industrial designer exactly do, and, more importantly, if the NEXT system was designed years ago and yet is perceived as 1989 'state of the art', what fantastic creations are on the drawing boards now? What will the next NEXT look like? How will you use it?

Industrial design is one of the newest creative disciplines, less than 80 years old. Quite simply it involves the design of products that are to be mass produced. 'Design' meaning not only determining the shape and appearance of the product, but also how it is manufactured and increasingly, how it is to be used. Industrial designers therefore work on a massive variety of products ranging from computers and all types of related information technology based equipment such as telephones, fax machines, laser printers, to washing machines, cameras, cars, trains, the list is endless. Even Skylab was industrially designed. Historically, the roots of industrial design are in America, one of the first uses of the profession being to create irresistible, streamlined automobiles. Today, probably the most publicly well known industrial designers are those specialising in automotive design. Giorgio Giugiaro, for example, styled the Fiat Uno, Strada and X19, Volkswagen Golf and Scirocco, and several Ferraris.

The affects of appearance and usability upon consumer perception of value, worth and cumulatively desire are obvious. If a Skoda was as fast as a Ferrari or an Amstrad performed like the NEXT system, which one would you buy?

BETWEEN YOU AND ME

With the development of information technology the industrial designer's role has changed dramatically. Aesthetics and manufacturing considerations are still very important, but the increasing sophistication of computers and other IT products being designed means that more attention has to be paid to the design of the user-product interface. This interface currently comes in the form of combinations of keyboard, screen, bitpad, touch screen, voice activa-



*Designing a computer's easy -
sling some electronics in a grey
box, add a keyboard and monitor, done!
Perhaps not, as CHRIS DRAKE discovers.*

LOOKING FOR DESIGN

tion, chord keyboard and barcode.

To provide information and guidelines on such a specialised subject, the science of ergonomics and human computer interaction (HCI) has developed.

The computer is now considered to be on the verge of its sixth generation, before we can try to predict what the seventh and eighth generation systems will be like we need a sense of historical perspective.

GENERATION GAME

The first generation computers were genuinely monsters. Valve based, slow, expensive and unreliable, they took over entire rooms. Operators worked 'in the belly of the beast' and adapted their behaviour to meet the requirements of the non-interactive

machine. If the task was changed the machine had to be reconfigured, literally, by rewiring parts of it. Industrial design was not considered, neither was HCI, and the 'user friendly' concept was, to say the least, not an important purchasing consideration.

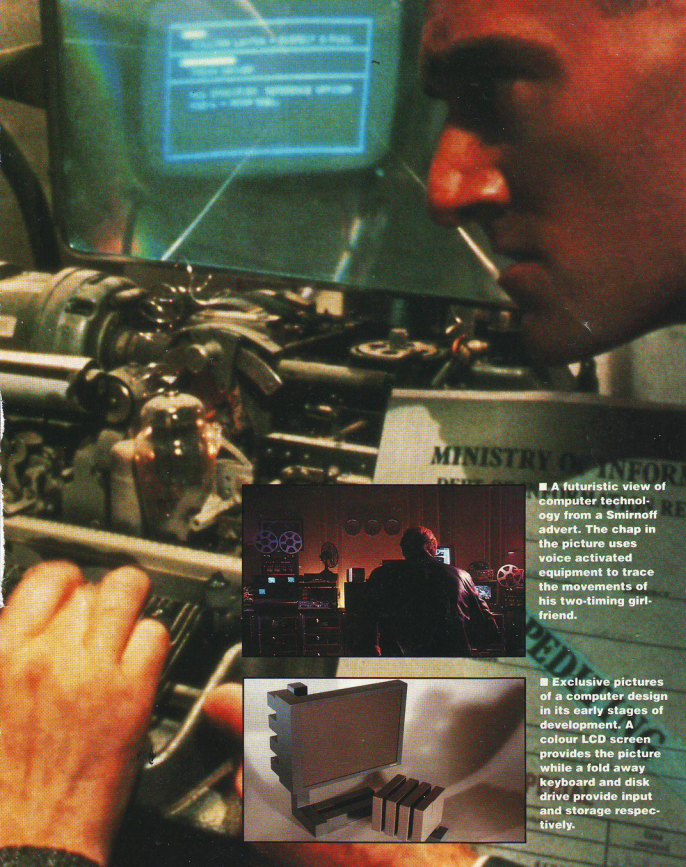
With the advent of virtual machine architecture, software programming was born and programmers had the freedom to use numeric machine code to define the task, quicker than rewiring, but extremely complicated and still not exactly 'user friendly'.

By 1957 problem-orientated languages such as FORTRAN had been developed where real words took over from basic number sequences. This greatly simplified the programmers' task and to some extent, allowed the first non-

experts to use computers.

Programming languages progressed to handle more and more complexity allowing time-sharing, interaction and expert systems. These third generation machines were significant in that they made computers available to non professional programmers who wanted them as tools and who were intolerant of the computers' idiosyncrasies.

By 1973 the microprocessor had been developed and fourth generation terminals were established. In this period the general public started to become exposed to computers. Video games such as Pong were common and pocket calculators (many of them programmable) came into widespread use. Automated cashpoints became a familiar sight and the



■ A futuristic view of computer technology from a Smirnoff advert. The chap in the picture uses voice activated equipment to trace the movements of his two-timing girlfriend.

■ Exclusive pictures of a computer design in its early stages of development. A colour LCD screen provides the picture while a fold away keyboard and disk drive provide input and storage respectively.

■ The main shot above from the sci-fi movie Brazil (aka 1984 1/2) shows Sam Lowry (Jonathan Pryce) peering through the magnifying glass into his computer terminal's tiny vidscreen.

problems of designing computer-based products for completely inexperienced users became apparent.

By 1977 the home computer boom was under way with the launch of Apple II, and then the Sinclair ZX80 in 1979.

By the early 1980s the development and general proliferation of office systems led to socio-economic pressures as trade unions started to address the new technology. Towards the end of the 1970s and into the early 1980s, these pressures led to many myths and misunderstandings of computer operation. This, in turn, led to governments and standards bodies looking at the ergonomic

issues of the equipment and to the publication of the snappily-titled ZH 1/618 Safety Regulations for VDT Workplaces in the Office (1980), DIN 66234 Display Workplaces, Parts 1-6 (1980 - 1984), and the UK Health and Safety Executive booklet Visual Display Units (1983).

Never before had a single technological issue had such a wide coverage in the world's press. There were some major implications for the industrial design of later generation terminals as hardware manufacturers were forced to make radical changes to their products. In particular, display and keyboard were split apart, reflectance values for VDU and

keyboard caseworks were set, and keyboards were limited to a home row height of 30mm.

BLESSED ARE THE WIMPS

Another major milestone occurred in 1980 when Xerox announced a major improvement in software interfaces with the introduction of the STAR workstation with its revolutionary use of Windows, Icons, Menus and Pointers (WIMPs) Xerox also stated that the complete user interface had been designed first, without a single line of actual product software being committed. This system was an influential forerunner to today's Macintosh and totally portable 'laptops'.

As described already, in a

development period of less than 50 years the computer has evolved beyond recognition. The 'future now' philosophies of innovators like Steve Jobs and the Xerox teams at PARC have produced machines that are beautiful, comparatively simple to use and affordable.

The design of present generation of computers is very much a team affair, electronics and software engineers dictating the specification, industrial designers and HCI specialists dictating shape, colour and user-product interface considerations.

The majority of today's computers are very similar in appearance due to the fact that they utilise the same hardware components, the largest of which is the monitor. We work with many different forms of these including raster scan, stroke character, storage tube, plasma panel, liquid crystal display, electroluminescent, three primary raster scan and beam penetration. Of these, plasma panel and single and full colour LCD panels are the most interesting as they are flat, thin, cool and do not have refresh and decay problems.

Factors such as display size and capacity, display stability, contrast and types of characters are influential to the exact choice of display.

Our objectives when designing terminals are to create an object that is 'elegant' and in most cases, as visually 'small' as is possible.

Combined with adjustment of angle of inclination and rotation our designs also aim to minimise glare and screen reflections, eye strain produced by screen glare is the single biggest cause of postural complaint from computer users. To further avoid reflections the colour of the terminal is generally light and semi-matt. All of the above considerations are increasingly governed by strict ergonomic standards.

KEY FEATURE

The other major hardware component that we design is the keyboard, again there is a remarkable visual similarity between different manufacturers products. Today's keyboards are direct descendants of Christopher Sholes' typewriter machine patented in 1867. The keyboard is the most critical interface between you and your computer yet its design is entirely antiquated. The very great majority of keyboards use the QWERTY arrangement of keys on the home row. This is the arrangement used on the first 1867 mechanical version, its

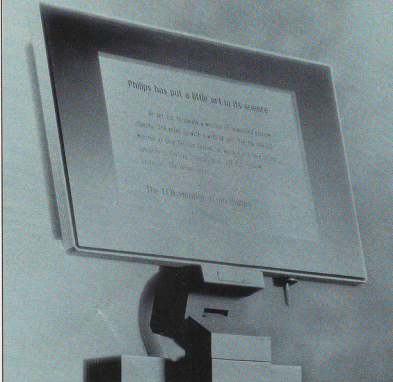
design prevented mechanical type bars from coming into contact with each other by placing letters commonly used together in the English language, as far apart from each other as possible. The QWERTY layout means that 57% of typing workload is on the non-preferred left hand. The antiquated QWERTY layout remains only because it has been around the longest – more effective and efficient alternatives do exist.

The detail the industrial designer has to go to to produce a usable (and legal) design is becoming clear, as should the reasons why screen-keyboard combinations are so visually similar. Despite this, Hartmut Esslinger's design of the NEXT computer is distinctive and effective, due in part to the metal casting technique used to form the enclosures.

BREAKING THE MOULD

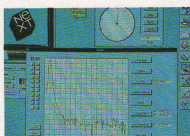
Existing technology dictates and restricts the designs of today's products. New design technology and philosophies will break these moulds and provide radically different next generations. Some of these products are already on the drawing board and in advanced stages of design development, so we can use our crystal ball with some justification.

The design objectives for next generation computers are to overcome existing problems associated with interaction, integration and application, size and communication. Surely the most worthy area for design improvement must be user-computer interaction. This will mean dramatic changes in the treatment of the keyboard. As mentioned already, the QWERTY layout presently being used is antiquated and inefficient. Ergonomic HCI considerations dictate that unless fingers shrink in size, the keyboard cannot get any smaller. For experienced users the keyboard is quite efficient for data input, skilled operators can type 100-150 WPM, however it is a barrier for non typ-



■ Philips' latest, a sleek black and white LCD screen which goes by the uninspiring title of PM 11211. Yours for £699.

ists who can only type 12-24 WPM. Other easier to use data input methods include chord keyboards where input speeds to up to 200-300 WPM are typical and handwriting on touch sensitive LCD tablets. Handwriting is attractive for novice



■ The NEXT machine's graphics interface takes WIMPs to new levels of sophistication.

users and 'see-as-you-draw' systems both on the screen and the tablet (rather like an Etch-a-Sketch toy) are available. However, handwriting is slow, typically 12-24 WPM.

Talking is another feasible alternative with legible speeds of 120-150 WPM possible. Systems on trial at the moment have great difficulty in deciphering dialect and general mumbling. Also, spoken word structure and punctuation is entirely different to a written alter-

native, as words are blended together and often dramatically shortened. Icon or WIMP driven systems will continue to develop but for experienced users these are generally frustratingly slow.

For the foreseeable future it looks as though we are stuck with the keyboard, or more efficient versions such as the Maltron or the K-Board until speech systems are much more advanced.

I HAVE THE TOUCH

For computer tasks other than data input the future looks more inspiring for improving methods of interaction. 3D imaging techniques are very possible and will allow interactive on screen manipulation and viewing of the image simply and naturally by moving your head, or in effect 'walking around' the image.

Systems which let the computer sense the position of hands in space allowing the operator to 'draw' an object in 3D by moving the hands are also practical.

The facility to input all forms of media such as video or 3D objects will develop. This facility would be interactive and allow for manipulation of the images, and perhaps

modelling of these objects from laser hardened polymer gels.

With later generations, applications of computers will definitely change. There are two schools of thought as to the nature of these changes. The first is that items of information technology equipment will combine together – this is already happening with fax machines combined with photocopiers. Eventually systems will evolve that combine data input and processing with communication, copying and image manipulation. The major obstacle with this type of product is how to construct a successful user-product interface, how do you design a product that has a multiple of different functions without creating the electronic equivalent of a Korean 'multi-tool'?

This philosophy combined with continued miniaturisation of components, replacement of the keyboard by voice input and replacement of the monitor by water-thin full colour LCD panels or holographic 3D display, will result in the computer becoming invisible, built into furniture, applied like wallpaper or hidden under the carpet. Certainly the days of the 'sit-up-and-beg' format are numbered.

Following from this, the second theme is that computing power will be decentralised and applied to a wide range of products, contradicting the theme of centralisation. Lap top computer and Pison organisers are evidence of this market fragmentation. Voice inputs, flat or holographic screens and miniaturised components and memory stores will realistically result in portable systems built into clothes or sunglasses for example. Communication advances will also enhance this situation with two-way information paging and improved, portable power supplies becoming practical. With next generation systems the computer's potential to unconsciously free and expand the mind, without the alienation of an unnatural interface, will finally be realised – watch this space! ■

Early STs consisted of three parts: processing unit and keyboard, disk drive, power supply. The 1985 520ST was not a particularly appealing machine to look at, but that was because the designers were pushed for time. Remember, the Amiga A1000 was due at any moment. At that time it was important to get out first and worry about looks later.

Indeed, not long after, the familiar 520/1040 design was implemented. A few years back the basic ST looked the part – sleek, sophisticated and ready for

action. The designers of the ST were lucky, they managed to come up with a cheap design that was aesthetically pleasing. Something Sinclair and many others failed at miserably. Outwardly the ST hasn't changed, but inside revision after revision has occurred. Some subtle – like type of RAM chips and sockets – and others that affect the machine's operation (double sided disk drive and new TOS ROMs). Most internal

modifications are cost-cutting exercises; originally TOS came on six 256Kbit ROMs, now it comes on two 1Mbit chips. Similarly, most chips used to plug into sockets. Now all – apart from the processor and TOS ROMs – are soldered on to the motherboard. Although these minor alterations might save pennies on a single machine, think of the saving multiplied by 100,000! Home and small business machines will sell

in hundreds of thousands at a low cost – design is of secondary importance to cost savings. Quite the opposite applies to niche-market machines. The Apple Mac, Sun workstations, NEXT, and even the ATW. They look sexy, play the part and cost a fortune.

Atari's Mega range of STs are a step up, design wise, from the basic STs. But a better keyboard, real-time clock and blither hardly justify paying almost £100 extra (the 1040 sells for £399 while the Mega 1 sells for £589). It's all to do with perceived value.

DESIGNER ST



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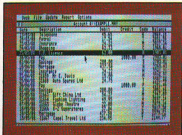
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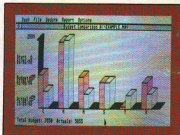
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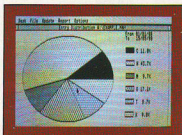
Ron Massey, ST USER

"Personal Finance Manager is a sophisticated home financial package, it will probably help you save money."

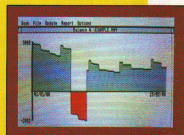
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STICKY FINGERS

JOYSTICKS

There was a time, admittedly many years ago, when computers weren't connected to a joystick. An enormous upsurge in the games scene changed all of that.

Atari were the first to come up with something resembling a joystick back in the 1970s when they introduced their Pong machine. A simple paddle was all that was on offer then but things changed a lot in the years which followed. Hand-held and auto-fire joysticks make up the main differences to have emerged during the intervening years but there have been other models to steer from the norm. Just about every cocktail of shape and colour has been employed, particularly recently, so you might well think that there weren't a lot of new ideas left. However, the future of the stick is not as disappointing as that. There are a lot of ideas in the pipeline and with the gaming industry becoming ever more wealthy it won't be long before we see still more extravagant designs.

Joysticks are big business in Europe and a company which can tackle the market head-on can find substantial rewards. Powerplay are one of the very few joystick manufacturers to take the joystick process from start to finish. Because of their close relationship with an injection-moulding company they are able to design their sticks, mould them assemble and package them ready for distribution. An increasing number of people use joysticks so consideration must go into the whole design process. How will the future nature of the joystick?

THE POWERPLAY OPERATION

Powerplay has been in operation since May 1987 and one of its recognised strengths is the speed



Atari hold the patent on the standard joystick plug.

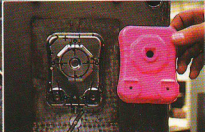
with which it can transform a simple design into a working prototype and then turn this into something which can be boxed up and sent out to the shops. This strength is the direct result of an association with Delph - a company which specialises in injection moulding. This is the process by which grains of plastic are transformed into all the

MARK HIGHAM went to the Powerplay factory in Oldham to find out how a joystick is made and speculate on the future.

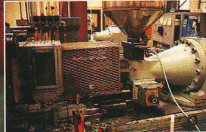
JOYSTICKS



■ Designing a stick involves discussions among the top brass at Powerplay. With a design in mind the next phase is to set up the working out the moulds.



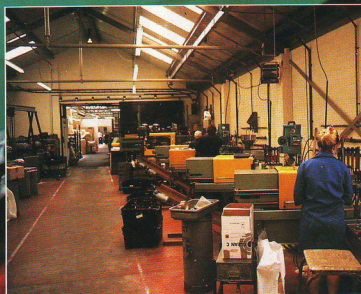
■ Cutting the moulds is the expensive part of the process. The moulds needed for each element of a basic joystick can cost anything up to £24,000.



■ The next step is to press the different sections. By injecting coloured dyes into the molten plastic all sorts of hues can be achieved.



■ On the production line micro-switches and autofire boards must be laboriously fitted by hand, the latter requiring some soldering to be done.



■ The production line can turn out up to 1,000 joysticks a day in peak periods.

plastic paraphernalia that makes up our lives.

Delph are the company behind Powerplay's operation and have been going for 14 years. Originally they made a number of joysticks for other companies until they recognised the selling potential in these items. It was then that



■ Distinctively designed sticks intended for particular games could become the norm.

Delph's boss, Tony Shandling decided to form Powerplay to take over the joystick interests. Delph still mould some of the popular joysticks produced by other companies but it's the Powerplay sticks which really occupy their attention and with a large slice of the market throughout Europe and Australia under their belts, it's a risk which has paid off.

CRUISIN' FOR A BRUSIN'

So what goes into making a stick? The Cruiser was Powerplay's first joystick, making an appearance back in July 1987. The whole manufacturing process is a lot more complex than you might think, being divided into five operations: Designing the stick, Making the mouldings, Pressing the stick, Assembling micro-switches etc. and testing.

The initial design of a stick is worked out between the top brass at Powerplay - Tony Shandling and Helen Roberts. The Cruiser features a unique controller to give it different response tactics so that you can move from the accurate movements required by a golf sim, to the violent bouts necessary in a shoot-up. This idea was an integral part of the Cruiser and was passed onto a designer who would come up with the shape of the moulds needed to press the stick.

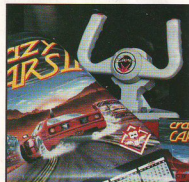
THE FUTURE STICK

It's diversity such as this which will almost certainly find a major market in the future, particularly for more general applications. But all of this can be taken a step further and create a specialist market. Here, one joystick may be reserved exclusively for one type of game. Look at the steering wheel stick from Entertainment International which is designed to be used with their game, *Crazy Cars II*. It isn't an especially robust

design nor does it give quite the right feel for a car game but it certainly represents a step towards reality. Games are constantly striving for that, so a joystick which can be in keeping with the atmosphere is not to be scoffed at.

Designs such as this can be phenomenally expensive to create and joystick manufacturers are as yet uncertain whether they're likely to be popular. However, more timid steps towards this kind of stick are being made. Powerplay do themselves have a line-up of some very impressive beasts which might not aim to simulate reality but do steer severely away from the more traditional black box and stick design.

Once a joystick has been finalised the mouldings must be created and this part of the process is where the big money makes an appearance. Special tools must be designed to press every case (back and front), button and even the plastic shield around those steel handles and these don't come cheap with the outlay for this procedure in the region of £18,000 to £24,000. It can take Powerplay around 12 weeks before all the mouldings have been made ready for punching out every plastic element in the joystick. The next step is to fit these moulds into computer-controlled, high-precision



■ This steering wheel joystick is marketed by Entertainment International and is intended for use with their car game - *Crazy Cars II*.

tools. With computers already in operation at this stage, Powerplay are making the kind of steps which could see short-term interest joysticks produced in massive quantities if that's what future demand dictates.

BIRTH OF A STICK

A joystick starts life as clear grains of plastic which are melted and fed into an injection-moulding machine. Coloured dye is fed in and the molten plastic is pressed between the two moulds. Several machines are used rather than pressing each section in turn so that the turnaround time for each joystick is startling.

With all the different coloured sections now prepared, these are passed off to the assembly line. This is made up of a group of women gathered around wooden benches putting the joysticks together and inserting the micro switches which respond to each movement of the stick. It's the type of process which has been increasingly replaced by automation but that has often been at the expense of quality. Powerplay's set-up makes sure that every stick is tested and has a ridiculously low return rate which quite obviously indicates success. When things hot up around Christmas time, Powerplay can churn out around a 1,000 joysticks a day like this.

AUTOMATIC FIRE

The auto-fire board is soldered in separately for the few sticks which incorporate this. Powerplay say that 20% of their sticks have an auto-fire board although earlier models were fitted with a modified form. There have already been modifications to the auto-fire board but one day maybe joysticks will incorporate variable auto-fire - brilliant for the likes of *Daly Thompson's Olympic Challenge*. Powerplay's own history with the auto-fire board saw them incorporate a special gadget so that holding down on the fire button activated auto-fire but people objected so it was back to the switchable auto-fire.

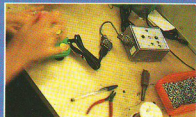
The nine-pin joystick connector which is virtually the industry standard was patented by Atari years ago when they first used it in their machines. Since then every time that it's been used in joysticks or other devices connected to the joystick port, a royalty fee has to be paid to Atari.

STICKS AND STONES

Just five years could see the biggest upheaval in the market ever and it's an exciting prospect. Entertainment International's steering wheel stick was the last major development but just a few years earlier came the *Speedking* and the start of the hand-held designs.

In a few years time the actual stick may cease to exist at all. Instead a car game will be played with a joystick which looks and feels like a real steering wheel and boat games will be played with some form of rudder. We can only wonder at the creations which might appear for a shoot-'em-up.

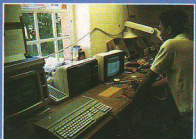
Just how long will it be before games are sold with an applicable joystick all in one package for just £30? Things really are a changin' fast in the world of sticks. ■



■ Every joystick is tested by being plugged into a box of LEDs. Only if the right connections are made will the stick be packaged.

QUALITY CONTROL

Every joystick is tested using a simple box into which the joystick lead is plugged. A quick bout of waggling sets different LEDs on or off and as long as everything is OK here then the joystick is passed on to be boxed ready for sending out to the distributors. Every tenth joystick is removed from this pro-



■ One in 10 joysticks are tested on games in the games room just to make certain that there are no faulty batches. With a new design every stick is tested.

cess and taken to a games room where it is tested out on a game just to make sure that it performs adequately - few other joystick manufacturers are this quality-conscious.

At the moment Powerplay are working on a new stick for the Spectrum. With all new designs every stick is first tested in this way as part of the quality control. The success of this is reflected by an impeccable track record - only 1% of sticks are returned and of these only a quarter are found to be faulty.

Powerplay claim to have 15% of the UK market as their own with around 12% in most other European countries. Germany is reckoned to be the largest market for joysticks since they have more money to lash out on peripherals but with more and more people tumbling into the fantasy world of the computer game, the markets can only get bigger.

Powerplay say that at the moment a joystick design can survive for two years before the time comes for a new model to make it onto the shelves.

You must have seen the advertisements in this magazine offering you software at ridiculously low prices – three pounds a disk and less. They're not conning you, this is the public domain, software for all for the price of a disk.

LEARNING THE DESKTOP

Desktop tutor ■ MPH
Demo 51 ■ £2.25 ■ MPH 10
Chandlers Court, Eaton,
Norwich NR4 6EY.

When you're new to the world of WIMPs the ST's Desktop can look a bit daunting. Not in the same league as an MS-DOS prompt for instilling fear in the computer illiterate admittedly, but disturbing nonetheless.

ST Tour is designed to give you a painless introduction to the mouse, windows and menus. It does this by demonstrating all the features of GEM – scroll bars, close boxes, dragging and so on – and then letting you have a go yourself. The program is marred by a couple of little errors – at one stage for instance we are told that somewhere on the screen is a black pointer; the screen at that time is black.

If this program came with the ST when you bought it it would be useful, but by the time you've sent off for it you'll have picked up all it offers to teach you by trial and error. Schools, however, could find it handy for introducing new users to the machine.

★★★

PLAY IT AGAIN SAM

Play it ■ £2.50 ■
Goodmans PDL, 16 Conrad
Close, Meir Hay Estate,
Longton, Stoke on Trent
ST3 1SW

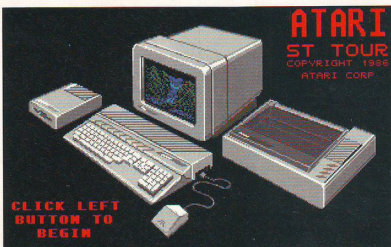
Play It is an interesting suite of programs which lets you build your own demos. You can combine sound samples with Degas or Neochrome pictures in sophisticated patterns.

Play It uses a scripting language to specify the sequence of pictures and samples to be used. There are five sound buffers and five picture buffers, so you have a large degree of flexibility. Commands to scroll pictures and add text to the screen are also included. The demo on side B of the cover disk gives you an idea of what can be achieved with a quite simple set of commands.

The double-sided disk also features a large number of sound samples which you can use for other programs, including James T. Kirk's full "Space, the final fron-

PUBLIC SPEAKING

Sometimes you do get something for nothing. STUART ANDERTON
tours the PD libraries.



■ A beginner's guide to the Desktop gives you a guided tour.

tier..." monologue from Star Trek.

★★★★

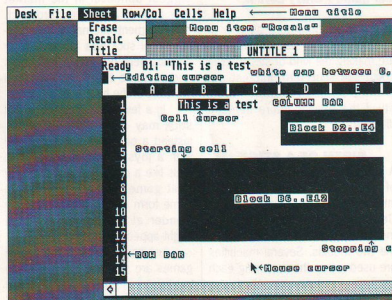
THE WORKS

Public Works ■ £12.50 ■
South West Software
Library, PO Box 562,
Wimborne, Dorset BH21
2YD

Public Works is a set of 'serious' applications from the public domain. A wordprocessor, database, spreadsheet, art package and comms program are all included, along with some utilities.

Taking them one at a time, the spreadsheet offers a reasonable range of facilities, certainly all you'd ever need for home use. It's well documented with a full manual and a set of example sheets. The spreadsheet is easy to use, especially after a few minutes studying the examples.

The same cannot be said of the paint program MasterPaint. There is no documentation at all (unless you read German) and it is clumsy and awkward to use. There are plenty of features tucked away, and some commercial packages



■ Sheet gives you power over figures, and teaches you too.

RATINGS

★★★★ – Buy this disk now
★★★★ – Quality software
★★★ – It'll do
★★ – Dodgy
★ – Steer clear

would benefit from facilities such as being able to directly enter the co-ordinates of a rectangle, but the feel of the program is rather tacky.

The database is simple and very easy to use. While not brimming over with features it contains all you need to keep address records, print out labels and so on. The documentation is very thorough.

The comms program is ST Talk. If you have a modem, ST



■ A brain-taxing shape fitting game from Goodman PDL.

Talk will let you link up to most bulletin boards and other comms users. A built-in phone book makes dialling easy, and the popular XModem file transfer system is used. The program uses the function keys rather than GEM, but is nevertheless fairly simple to operate. Documentation is included.

First Word is the wordprocessor provided – the original PD version of what became First Word Plus. First Word is a GEM-based system which shows you exactly what the print out will look like on the screen. This has obvious advantages, but the down side is the appallingly slow speed. First Word lacks some features, like a spelling checker, but is a very usable program, if you can cope with the waits. Documentation is

provided and is excellent.

A disk full of standard utilities is also included - and every ST owner should have all of these. Taken together the Public Works package offers a very cheap way in to serious applications for inexperienced users. The programs are excellent, *MasterPaint* excepted, and the documentation is an example to other PD software. This is the sort of package which will give the public domain the reputation it deserves.

★★★★

PLAY TIME

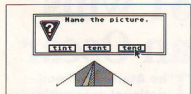
Game 47 ■ £2.50 ■

Goodmans PDL, 16 Conrad Close, Meir Hay Estate, Longton, Stoke on Trent ST3 1SW

Educational software is a badly neglected topic in the ST world, but some software is out there, and much of it is in the public domain.

A disk full of such software is Games 47 from Goodmans PDL. Despite acting childishly on occasion, I don't feel qualified to judge all of this, but it certainly looks good.

There is a simple music program, an arithmetic tester (which defeated me), and two versions of a program which draws pictures and asks you to name them. This

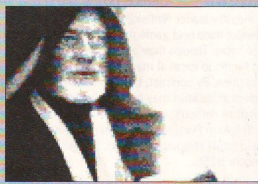


■ I'll name that tent in one....

last program tends to be Americanised (pail for bucket, sled for sleigh, racket for raquet).

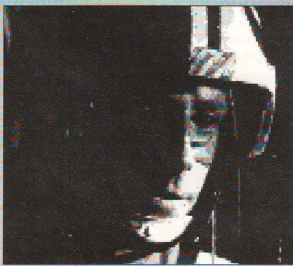
A Simple Simon game with colours and beeps is completely infuriating, as is a shape fitting solitaire game. There is a quiz generating program aimed at older students, which has a few rough edges.

The most interesting program on the disk, however, is *KidPublisher*. This is a program to allow



FEEL THE FORCE

An animated demo of scenes from *Star Wars* accompanied by sampled sounds from the soundtrack is available from The Other PD Library, 108 Kenmare Road, Wavertree, Liverpool.



children to create very simple pages. The top half of the page is a drawing, and the lower half is text. A very simple drawing routine and text editor are provided and *KidPublisher* works with any dot-matrix printer. An interesting program well implemented.

★★★★

TEXTING TIME

TeX ■ £10 for four double-sided disks ■ South West Software Library, PO Box 562, Wimborne, Dorset BH21 2YD

If you don't already know what TeX is then you won't be particularly interested to know it's now available on the ST.

TeX is an extremely powerful and fiendishly complex document processor-cum-typesetter. It is particularly useful for scientific and technical work because of the way it handles equations. The unique

The release of TeX on the ST will be a boon to techies who can now merrily write their pieces on their STs before uploading them onto the mainframe for printout.

★★★★

1.2 Installation

1.2.1 The Processor

To illustrate the program it is assumed to first install the on the console and create a text report document called *text.tex* as you see the original source files. Sometimes you will have to edit the file. The files are then copied to the target machine. This has been applied to the original files and the files are now installed on the file system. You may wish to copy the files to the diskette. You may wish to copy the files to the diskette. You may wish to copy the files to the diskette. You may wish to copy the files to the diskette.

1.2.2 Editor

The same program will only be installed with one of these. This is the only one which is available on the ST.

■ TeX: Powerful typesetting facilities but a bitch to use.

feature of TeX, however, is that it is available for virtually every computer, including mainframes, and files can be exchanged freely between them.

CALLING THE LIBRARIES

I know there are a lot of PD libraries out there that I've never even heard of, so talk to me!

I'm always on the look out for the best public domain software available, so show off the contents of your catalogue. Send the best to: Stuart Anderson, ST Format, 4 Queen Street, Bath BA1 1EJ.

SUPPLIERS

Most of the programs mentioned this month are also in the catalogues of other suppliers sometimes with different names or coupled with different software. Try contacting:

ACE COMPUTER SUPPLIES, 2 Old Mill Close, Market Weighton, York YO4 3DU

ALPHA COMPUTING, 32 Meadow Drive, Halifax, West Yorks HX3 5JZ

BUDGE UK, 5 Minster Close, Rayleigh, Essex SS6 8SF

COMPUTER CONNECTIONS, Ashlaw House, Euximoor Drive, Christchurch, Wisbech, Cambs PE14 9LS

ENTERTAINMENT SOFT, 4 Trelawney Drive, Tilehurst, Reading RG3 5WQ

FLOPPYSHOP ST, 50 Stewart Crescent, Northfield, Aberdeen

GOODMANS PDL, 16 Conrad Close, Meir Hay Estate, Longton, Stoke on Trent ST3 1SW

MPH, 10 Chandlers Court, Eaton, Norwich NR4 6EX

PARADISE COMPUTERS, 9 Westfield Cres-

cent, Brighton BN1 8JB.

RIVERDENE PDL, 63 Wintingham Way, Purley on Thames, Berks RG8 8BH

SOFTVILLE PD Service, 55 Highfield Avenue, Waterloo, Hants PO7 7PY

SOUTH WEST SOFTWARE LIBRARY, PO Box 562, Wimborne, Dorset BH21 2YD

ST UK 1 Bartholemew Road Bishops Stortford, Herts CM23 3TP

THE OTHER PUBLIC DOMAIN LIBRARY, 108 Kenmare Road, Wavertree, Liverpool L15 3HQ



ALL THE WAY FROM AMERICA

Colour in your hand

Atari announced the world's first color hand-held game system at the June Consumer Electronics Show in Chicago. The 1lb unit features fast action, dramatic graphics, realistic four-channel sound and a built-in color monitor. Up to eight systems can be connected for multi-player games.

One game card, about the size of a credit card, comes with the system. Five additional games, developed by Epyx, Inc., a California-based developer of games software, are already available for the system. The games include *California Games*, *Blue*

Lightning, *Impossible Mission*, *Monster Demolition*, *Time Quests and Treasure Chests*, and *Gates of Zendocon*.

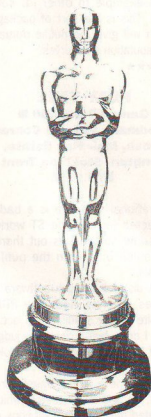
Product specifications include a system clock operating at 16MHz, 3.5-inch diagonal color LCD screen, and 16 colours on screen selected from a palette of 4,096. Controls include an eight-way joystick, two fire buttons, five function keys, volume and contrast. The system is powered by six AA size batteries, an AC adapter, or car cigarette lighter adapter. The image on screen can be flipped upside-down so the system can be easily played by left-handed people.

Industry leader Nintendo announced their black-and-white hand-held game machine, Game Boy, at the same show. Though their product is not as feature-rich, Nintendo excel at mass-marketing and distribution. By contrast, industry watchers fear Atari's production facilities may have problems meeting Christmas demand.

The Atari Portable Color Entertainment System should begin shipping in August. Suggested retail will be under \$150.



■ Atari's hand-held flagship.



Atari sell off US shops

Atari Corporation have announced plans to dispose of the Federated Group of consumer electronics stores.

Originally, Federated had approximately 60 stores in Arizona, California, Kansas, New Mexico, and Texas. Now, only about 20 stores remain, all in southern California. Marketing and management efforts have always been concentrated in the southern California region, making these stores the most successful and the most salable assets.

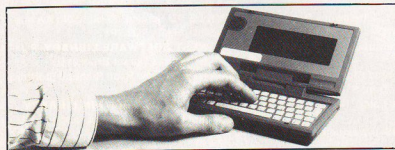
According to Atari, the disposal of the chain will have no effect on a lawsuit filed against Federated's former board of directors, charging that the chain was overvalued at the time of sale to Atari.

In the beginning, Federated was seen by insiders as an attempt to distribute Atari products through a company-owned store. Many said Jack Tramiel's vision was to emulate the success of Tandy, a U.S. giant whose products (such as the popular TRS-80) are distributed through Radio Shack, a nation-wide chain.

Portfolio update

Shipping of Atari's new Portfolio computer in the U.S. has already been delayed. Despite high market interest in the hand-held machine, FCC (Federal Communications Commission) approval has not yet been obtained, delaying production at least six more weeks.

Portfolio is the hand-held PC. It will retail for less than \$400 in the U.S.



SCANNER HERE SOON

Migraph, Inc., a leading developer of ST graphics software, has announced a hand scanner for the Atari ST. The scanner is able to scan a four-inch wide strip, and has four adjustable scanning resolutions, including true 300 and 400 dots per inch.

The scanner will begin shipping this summer, initially bundled with Migraph's *Touch-Up* pixel editing program, for US\$499. Migraph are located in Federal Way, Washington.

ST wins an Oscar

The Atari ST gained national recognition recently when Dave Grusin was honoured for Best Original Score at this year's Academy Awards ceremony. Grusin, a renowned jazz composer and musician, created his award-winning score for the motion picture, *The Milagro Beanfield War*, with an Atari 1040ST.

NINTENDO BLAMED FOR PROFIT DROP

Atari's first quarter finances showed a net income of \$3.3 million, based on net sales of \$88.8 million.

President Sam Tramiel blamed declining income on competition from Nintendo and the increasing value of the U.S. dollar in exchange with European currencies.

TELEPHONE LINES

The meaning of life is an odd thing to ponder while wandering around a computer show but at the June Atari event there certainly wasn't much else to do. But in between visits to the bar I did manage to find something which looked vaguely appealing on the stands.

Hi-Tec were there with a brand new modem which looked for all the world like a certifiable traffic light. A long strip of 11 LEDs which flash red, green and amber faster than a strobe didn't really make you think "modem" but just to keep up with tradition the set-up was shoved into the industry-standard black box. But where this gem really takes off is with its vast range of baud rates - 300, 1200/75, 1200 and 2400 are all supposedly - a range which only usually comes with a massive price tag.

Speed buffering up to 9600BPS means that even if you have software which cannot support split baud rates then you can still make contact - not a feature to be sneered at considering just how awful most ST comms software tends to be. MNP level 4 error correction is also on offer as well as a battery-backed phone



■ Hi-Tec's new modem: still a bargain.

number store and an impressive self-test routine.

Now comes the important part. Hi-Tec are selling the modem at £279 which is fairly impressive for the features on offer. The reason for this generosity is not that Hi-Tec want to save us all some dosh but because the modem is just going through BT approval. As soon as BT approval is established then it'll leap to a massive £399 - to pay for the costs of approval! claims Martin Spalter from Hi-Tec. Either BT really are a group of money-grabbing individuals or Hi-

THE BLACK BARON is here again, this time with details of a new low-cost modem from Hi-Tec and Microdeal's sexy BBS software.

Tec have gone totally insane and decided that they'd like to retire to the Bahamas. Anyone who purchases the pre-approved version will also have to suffer some problems with the internal ROMs. Hi-Tec say they are having some difficulties obtaining the correct chips so users may well experience a few glitches in the internal software.

Sysops have already shown interest in the modem which is hardly surprising considering that they'll get the approved version for just £200.

MICRODEAL GO PUBLIC

ST bulletin board software isn't exactly common. If you want to set up your own board then Microdeal's BBS 3.0 is the best way to do it. There are around 20 boards using this system and the signs are that it does a good job.

Besides all the usual options such as customising menus and displays, BBS 3.0 includes its own language to let you do anything



■ The Gnome at Home: the original BBC bulletin board still going strong.

Dark Side, a public user system. Both boards use BBS 3.0 and Mark says that he hasn't come across anything he couldn't do. "If there is any complaint about BBS 3.0 then it has to be that its own programming language is complex and difficult to use.

Owners of earlier versions can upgrade for £20 while new sysops will have to fork out the £49.95 asking price.

Microdeal can be contacted on: 0726 68020.

OLD TIMERS

Perhaps one of the oldest and oddest public bulletin boards systems to offer viewtext is the **Gnome at Home** board based in London. It still runs on the original BBC setup. This features several BBCs networked together to allow users to communicate with each other while on-line in a fashion which only Micronet could previously offer.

Gnome at Home became subscriber-based some years ago but the system still caters for non-subscribers with only certain specialised areas out of bounds. Still, at £5 per quarter subscription is unlikely to affect your night out with the magnificent Melissa, even if she does spend the whole time drinking rum and pineapple.

With the rising popularity of the ST, a specific section was set up on Gnome at Home called the 1632 club. This is dominated by ST news and reviews. Everything

from information about new ST magazines to reviews of ST comms software are featured as well as a user helpline.

Additionally, babble boards offer fora for debate on politics, technical information, the comms scene and even the ailing BBC. Messages are left here by users and you can then reply to these with your own opinions. There is also the **Dwarfen Realm** - a fantasy RPG which is taken very seriously.

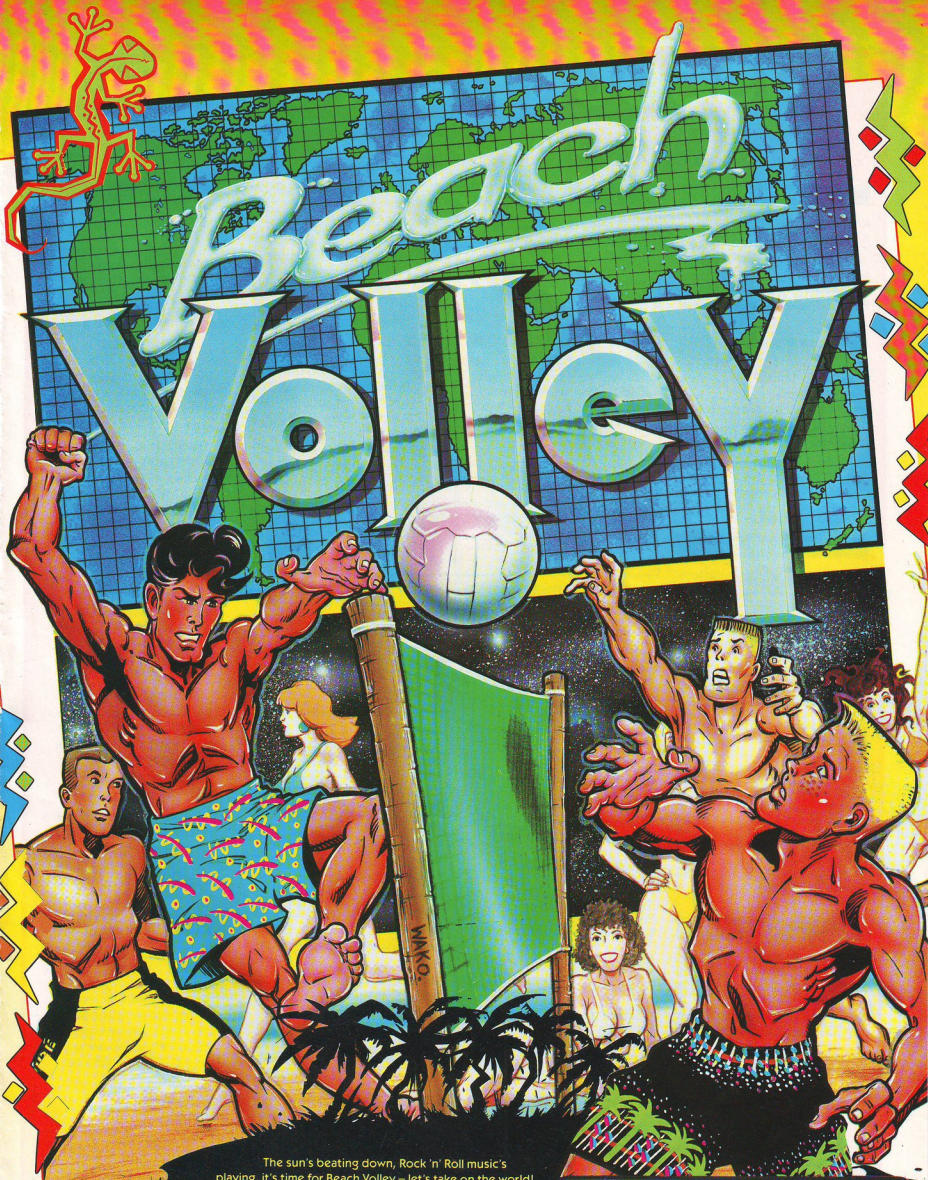
The gnome theme is exploited across the whole system which seems strange until you meet the sysop in person. He's a dead-ringer for the little bearded guy who sits in Harry Cross' rockery during Brookside.

Being a viewtext system, you can enjoy the benefits of colour displays and paged menus. These allow you to enter a page number in order to move around the board - a great method for finding your favourite pages.

The Gnome at Home operates 24 hours a day using the 1200/75 viewtext standard and can be reached at: 01-888 8894. ■

CALL UP

If you know of any bulletin boards with unusual sections or areas of interest on the commercial systems then drop us a line. Boards with dodgy sections would be especially interesting. Send your tips to: THE BLACK BARON, ST FORMAT, 4 QUEEN STREET, BATH, BA1 1EJ.



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Atari ST for Beginners.....	£12.95
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FACING FACTS

It's a fair cop, guv, I'll come quiet:

STEVE CAREY investigates

*how the police can fit you
up for a crime with the*

amazing new E-FIT system,

and on page 28 reviews

That's Fun Face, a unique

new kind of ST program

that works in the same way.

What do you do when you are on the run from the police, prime suspect in a murder enquiry? Hide, naturally. But if you were spotted at the scene of the crime you could easily be identified. So you have to change your appearance – and hope that no-one recognises you.

Police forces have for decades relied on Identikit and Photofit in their hunt for muggers, murderers, robbers and rapists. But this method of reproducing what a witness recalls has serious drawbacks. It is paper based and so difficult to manipulate: if an eye shape is wrong the only way to alter it is to touch it up with Tippex. And besides lacking subtlety it is not systematically ordered. Furthermore as fashions and facial appearances change (pre-war faces just

do not resemble eighties' faces) old features must be replaced, an expensive procedure. It is limited in size, and as with all "hard" media increased size must be traded against a decrease in the convenience of use. And finally, of course, the finished result is far from satisfactory. The artificiality of the image detracts from the resemblance to the person sought.

It was inevitable then that computing would come to the aid of the police. We have become accustomed to hearing of remarkable advances in forensic techniques such as genetic fingerprinting, and the use of computers in aiding information storage and retrieval being applied to the search for apparently motiveless serial murderers and so on. It is thought that the search for Peter Sutcliffe, the

"Yorkshire Ripper," forced police forces to move more quickly towards databases and the computerised storage of information.

Now Photofit too is gradually being complemented, and may eventually even be replaced, by computerised systems that can create images as sharp and as lifelike as photographs without the need for large collections of mugshots and the painstaking assembly of Photofit images.

One of the most advanced currently operational systems in the world is E-FIT.

IF THE FACE FITS

E-FIT – Electronic Facial Identification Technique – is not the only computerised system of facial identification in existence. But it is unique in using "sampled" features taken from real donors and



ALTERED STATES

Scenes from Schwarzenegger's *The Running Man*. What happens when technology is so advanced that film can be manipulated electronically? Wonder no more – the technology's here.



■ Wouldn't you just love to take these men home to show your mummy? Io's E-FIT can come up with several billion others if none of the above take your fancy.

stored systematically in a computer database. Each feature can be requested individually by name, the result of a system codified in a research project carried out by Professor John Shepherd at the University of Aberdeen.

So, you can call up all the long hairs and "flick" through them for a closer match. Combine the nine different features available from the database – 86 face shapes, 265 hair styles, 31 moustaches, 22 beards, 83 pairs of brows, 172 pairs of eyes, 135 noses, 141 mouths and 55 pairs of ears (totals constantly growing) – and the number of faces that can be created is immense, as you can imagine. (In fact you can't: it's above 200,000,000,000,000,000 –



a meaningless figure, as we shall see.) All a witness need do is recall memorable features and that huge field rapidly comes down to just a few possibilities.

Components of the system are simple and cheap: a PC-compatible with a 70Mb hard disk; a Pluto graphics unit (with frame grab capability); keyboard; screen to display text and menus; second screen showing the E-FIT itself; and a graphics tablet and bit pen. The system can be hooked up to video recorders and cameras, and hard copy printing is well supported – almost any

MAKING FACES

If you're strapped for the odd 15 grand or so to invest in E-KIT don't despair. For less than £40 you can get a good taste of the policeman's lot with *That's Fun Face*.

Launched at the Atari show in June, *That's Fun Face* is an offshoot of a Belgian project called *Fun Face Professional* to create a replacement for Identikit. (If they want credibility I suggest a name change, but that's their affair.) The professional program, which has some striking similarities to E-FIT, uses faces taken from Dutch, Belgian and German police forces, and is expected to be finished within the year and available to Continental forces (though not this side of the Channel) soon after.

Although the "sampled" features of *Fun Face* are not taken from donors as in E-FIT, there are enough

similarities to give a good impression of what using police systems is like. There is a collection of hair-types, eyebrows, eyes, ears, noses, lips, chins, moustaches, beards and glasses to choose from, and the combination of these enables faces to be created.

Although *Fun Face* is a "fun" (ie cut down) version of the police program and inevitably is capable of a good deal less than E-FIT's two and 17 noughts, it still claims a remarkable 5,576,787,923,200,000 possible faces. There's a random face generating feature that creates a face every half second or so, and it would take – get this – 11 million

centuries, give or take a second or two, for it to show all possible combinations.

FRIENDLY FACES

So we're talking power here. We're also most definitely talking user-friendly fun, too. The manual is written in a chatty, informal style that will have you either chuckling away or chewing the carpet in minutes: "We can't think of any valid reason why you should quit the program," it kids you, "but since other programs seem to have a quit option, we thought it would be nice to have one too." Me? I need a new carpet.

Installation is so easy even I

couldn't mess it up, and once loaded it's a matter of doing what comes naturally. Click on the hair icon and you get a hair-type; add the other features similarly and you create some kind of face, often very bizarre indeed. You can then cycle through each item individually, if you're attempting to match a particular face. One very definite problem here is that features are stored apparently at random, so a long, flowing hippy hairstyle is next door to a severe short back and sides. But once the face fits you can identify and recall its features by number, so there's no excuse for losing it again. (You can also save the face



■ The E-FIT system in action.

thing from a monochrome thermal printer upwards. (Output is standard RGB video or monochrome composite.) The image produced has 576 dots by 288 dots with 128 levels of grey – the effect is similar to looking at a photograph.

But E-FIT is not simply a system for the assembly of pre-formed features, for using *Designer Paint*, the art system available for the editing and touching up of E-FIT images, it is possible to add features not contained in the database. Faces can be scarred, bruised, burnt, bumped and generally bashed around; lines and moles can be added and lips fattened; glasses and teeth can be smashed and tattooing done while-u-wait; hats, earrings and other cosmetic effects can be provided free of charge. Add that potential to the two and 17 nudges mentioned above and you'll see why the figure is meaningless!

MAKE OR BREAK

It is make or break time: the research has been completed, the first sale made. But its success depends on those, people who have had little experience of computers and lots with Photofit. If they don't like it then Io Research, who are

behind the system, may as well write off E-FIT and put the whole thing down to experience.

Hertfordshire police, the first force to have purchased it, have been using E-FIT for several months, and have created over 50 portraits in that time. Detective Sergeant Briscoe and Detective Constable Newberry – neither of whom had any previous computer experience – are impressed.

"We had one witness last week," said Briscoe, "who was unhappy with the E-FIT we'd done. Eventually she realised it was the left eye that was wrong: 'His left eye was a little bit closed,' she said: 'If you had that eye on the other side it might be better.' So we took the eye out, turned it round and popped it back in, and immediately her estimate of the likeness went up from 50% to 95%." It's that level of subtlety that makes nonsense of a simple estimate of how many faces can be created, for the variety is infinite: "With Photofit you couldn't alter it,

POWER PAINTING

Designer Paint, just to offer some kind of comparison with *Degas Elite* and *Quantum Paint* offers a choice from 16.7 million colours and includes features such as airbrush, transparent colour, colour cycling and compression, smooth shading, distortion, propagation and a range of image processing techniques including outline detect and pixelation. Yet it is easy enough for a police officer with no previous computer experience to pick up quickly and easily.



■ Faces on video can be altered.

except by, say, snowing it over with Tippex. The art system with E-FIT is amazing: lines, brushes, whatever."

Yet despite the system's power, variety and subtlety, witnesses are not led to expect that the finished result should be an exact likeness of the suspect. "They should expect something like a non-identical twin," said Briscoe. "But we have had victims of indecent assault involved in creating an E-FIT, and as we add the finishing touches, it's possible to see the victim become visibly distressed, and even start shaking."

The system's potential is only beginning to be tapped. "We are sometimes required to assist in the identification of a corpse," said Briscoe, "and as I'm sure you'll appreciate we're not happy presenting photographs of the dead, who may be badly damaged, to relatives. In such cases we photograph the person on video, feed the image into E-FIT and then work on it. We can do a very good job of 'restoring' the person, so that what we end up with is an unblemished image of someone who simply doesn't look dead at all."

Nor is E-FIT limited to faces. "Say we're looking for a vehicle involved in a

SMELL'S ROTTEN

Desmond Morris argues that we each have such an individually distinct facial appearance because our sense of smell is so poor.

Where dogs, for instance – whose olfactory powers are up to 1,000,000-times greater than ours – perceive the world primarily by odour, we depend on sight. And we need very little to identify someone: we rarely make mistakes, which is why they're so embarrassing.



whole, of course, as a .FAC file)

WHACKY FACES

As with E-FIT there is an art program allowing pixel-orientated editing and alteration of the face you have built. There are all the features here you would expect – painting in transparent and various colours; filled rectangles, ellipses and polygons; sprayscan and so on – and some that are new, certainly to me. There's some rather neat shadowing effects, for instance, and the speed of black line filing and switching is quite extraordinarily fast.

There is also a wide range of whacky effects such as mirroring

and flip-flopping, squeezing and flattening, outlining and etching, darkening and lightening, pixelation, inverting and rastering, shadowing and multishading – if you can imagine it, *Fun Face* can do it! The Paint menu can save and load faces and any other picture in .PI3 (or .PI2 in medium resolution) and .JMG formats, so pictures from *Degas Elite*, for instance, can be imported for you to play with. One important limitation: you cannot port an artworked face back into the Face menu. Printing is well supported for nine-pin and 24-pin Epson-compatible printers, as well as for the SLM804 laser printer. Even laser-

compatible PostScript files can be created.

DESERT ISLAND DISC

The unexpected thing about *Fun Face* is that what you think it ought to be good at it isn't, and what you might overlook it does supremely well. By that I mean you'd probably have a great deal of trouble creating a recognisable likeness of a friend, but that on the other hand the Paint menu, which has features most other dedicated paint packages seem to forget about, is superb.

The manual calls *Fun Face* "unique" and points out that it doesn't fit any category. That is cer-

tainly true, and while you may find the occasional use for it if you need an unusual image or illustration to something you're doing, you may find it soon becomes a program you can't justify in terms of usefulness, but which is such a hell of a lot of fun to use you wouldn't want to be parted from it. ■



That's Fun Face
Cavendish ■ £39 ■
01-323 4761

SPLIT PERSONALITY

Artists have always been fascinated with the mysterious relationship between the face and human personality and identity. A pop video by Godley and Creme a couple of years ago used computer graphics to create composite faces that were half man and half woman, half black and half white and so on.

hit and run accident," explained Briscoe. "We know we're looking for a red Ford Cortina with a dented bonnet and a displaced licence number plate. Now it's all very well issuing a statement describing the vehicle, but it makes much more of an immediate impression if we mock-up that image. Using E-FIT that's exactly what we do. We take a picture of a similar car using a video camera and then port the picture across into E-FIT's graphics program. We can dent the bumper and displace the licence plate on a perfectly good Cortina".

Other uses for the computer are emerging all the time.

A unidentified badly injured girl with drips up her nose is photographed, the picture imported into E-FIT and the tubes "removed" to make the image presentable for publication. A corpse found in a deep culvert at the edge of the motorway is photographed at the mortuary and the image then smoothed over: the parents ask the officers where they had obtained a photo of their son. A man who has had a beard for 10 years shaves it off on the evening he goes to a disco and is murdered: a photo of him is "shaved" in E-FIT so witnesses can be found. Photofits can be tidied up to remove those lines and differences in shading that make many Photofits look like a cartoon.

In situ pictures are possible too, with an E-FIT overlaid onto a model's body on a photograph taken at the scene of an incident.

Only full-face pictures are possible with the E-FIT system, however lo point out that there is no conviction on record due to a profile Photofit, so it's not a serious drawback.

TT TOPS

Software development for Atari's '030-based TT machine is already going ahead in Holland. Dutch company Compo - responsible for the *That's* series of programs - revealed that they are working on a professional version of *That's Fun* for use by Dutch, French and German police forces.

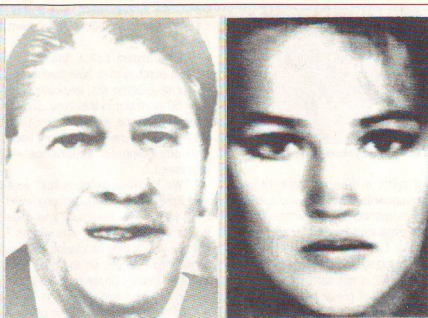
TV EYE

Recently on BBC TV's *Crimewatch UK* a blurred picture taken from a security video recording of a jewellery shop raid was used as the basis for an E-FIT produced by Hertfordshire officers Briscoe and Newberry. *Crimewatch* regularly uses Photofits, Videofits and more recently E-FITs as part of its search to identify villains.

Yet there is a source of potential conflict here between police and television producers, for their needs are not identical. While the police are after criminals, the Beeb's first priority is viewers.

Beeb graphic artist Tim Platt works on a Quantel Paintbox to "doctor" images on Photofits, adding colour and texture and removing the lines that betray its origins as a number of separate elements. "We always work in the presence of the witness and a police officer," explained Platt: "we would never be allowed simply to tinker with a picture to make it more suitable for television."

Yet over at Hertfordshire HQ Det Serg Briscoe is not placated. "We're certainly not allowing the BBC to tinker with our images!" he insisted: "Their



FACE VALUES

The police aren't the only ones to use computer technology to generate images of faces. American artist Nancy Burson uses a computer to meld photographs of people together into composite portraits.

Using stretching techniques to match the sizes of the faces, and weighting each individual one according to its importance to the final image, she creates pictures with a message. One image, above, combines the faces of the world leaders, weighted according to the number of missiles they control; another merges actresses faces into a stereotype of 'beauty'.

GOT TO GET A WITNESS

These are not just hypothetical instances, but are all taken from the working experience of police officers. The database is continually being added to, and will be edited and amended as fashion dictates. And because it can be linked with other systems its usefulness will grow as other uses for silicon technology emerge.

Imagine a future in which prisoners are photographed and images stored on

videodisc. A crime is committed, with a witness present. That witness assists an officer in the creation of an E-FIT, which can then be used to trawl the database of existing convicts for likely matches. Or take a shot from a bank raid video and just ask the computer for the name and address of the thief. Sounds fanciful? It probably isn't more than a year or two away.

Soon no criminal will be able to relax, as long as there's a witness... ■

graphics artists bland out pictures and may make it better viewing, but they don't do us any favours."

What does Tim Platt say to the accusation that, as "entertainment," *Crimewatch* is quite happy to doctor images to make better television? "Actually it's not quite as simple as that," he says: "often the effect of colouring - which is after all an important element in any visual identification of a person - is to enhance its likeness to the suspect. Witnesses can be very struck by the improvement."

Briscoe is not convinced. "Skin tone is certainly important," he admits: "but it's so subtle and so difficult to get right that we prefer not to use it where it might detract from the likeness. After all, it's very misleading if you get it wrong."

Despite the difference of emphasis the police and the Beeb are happy to use each other to enable them to do their jobs. Use of police material gives *Crimewatch* "bite" and authenticity, while the police benefit from the mass exposure of such images.



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ON THE DISK

PLUS:

Side A

GFA DEMOS

This month's GFA BASIC programming tutorial deals with the subject of graphics and the demo programs mentioned in the article are sitting in the GFADEMOS folder.

FORMAT10

Last month's disk formatter is repeated on the cover, only this time it works properly. Last month it would only format drive A, but now it's fixed. Sorry!

Side B

DC CLOCK

Banish irritating left wrist movements! Just double click on the program and you'll have the clock displayed in the top right hand corner of the screen.

PCOMMAND

One thing that the ST lacks and the poor Amiga has is a CLI, or command line interface. No more messing about with the Desktop menus and file operations are much simpler thanks to wild cards.

AARGH!

Is there anyone out there that likes that irritating click that you get every time you press a key on ST? If so then don't use this desktop accessory which can switch off that very same click.

BLASTER

The old arcade classic *Defender* gets renamed and zaps onto your ST screen. Nostalgia time as you remember your mis-spent youth feeding the arcade owner.

TINYVIEW

A slide show program that displays Tiny format pictures. This month part of the animation tutorial is shown.

TINYSTUF

Pictures on the cover are often compressed to save space and so *Tinstuff* comes into its own in converting Tiny, Degas or Neochrome pictures from one format to another.

VKILLER

Long ago there was a virus killer on the cover but we thought it was about time that we gave you another to help protect your programs from harm.

The cover disk contains 800K of demos, games and utilities, but unfortunately not all 520STs have the double-sided drives needed to get at all of it. To counter this problem a special format has been devised that allows single sided STs to read the 400K on the A-side of the disk, while double-sided drives can read both.

There are effectively two sides to the disk, A and B, and you can only run programs from one side at a time. To change sides you just have to

click on the program called "GOTO_A.PRG" or "GOTO_B.PRG". If you have a single-sided ST then don't worry about doing damage to your disk, you can't swap to the other side. Sorry, but there you have it. If you want to hold of the B-side of the disk then see page 36 for details.

One final and important point, the ST Format cover disk must be left write enabled at all times. If it isn't then you will not be able to switch to the other side of the disk.

BLOOD MONEY

PROGRAM: BY PSYGNOSIS

SIDE: A

MACHINE: ALL COLOUR STS

FILES: BLOODMON.TOS AND OTHERS

Another Format Gold makes its way onto the cover. *Blood Money* is a fast and furious scrolling shoot-'em-up with hordes of poor defenceless (well, nearly defenceless) aliens to blast apart.

The version on the cover is level two out of the four levels. One or two players can take part and play simultaneously to fight for money and glory.

One or two joysticks are required to play the game. Just double click on the file BLOODMON.TOS in the BLOOD folder to get blasting.



■ *Blood Money*, the ultimate ST shoot-'em-up?

FUN FACE

PROGRAM: BY CAVENDISH

SIDE: A

MACHINE: ALL STS

FILES: FUN_DEMO.PRG,

FACE_DEM.COL,

FACE_DEM.MON,

FUNFACEC.RSC,

FUNFACEC.RSC

Fun Face serves no useful purpose whatsoever, but then again games serve exactly the same purpose. What you do is draw faces using a

Photofit type system made up from eyes, nose, mouths, ears and so on and just muck around with them.

A drawing section of the program allows you to further customise the faces for greater variety.

Switching between the face builder and art section is done by clicking on a brush icon or face icon which appear on the respective screens on the bottom row.

Help is available at the touch of a key, just press the [HELP] key when the mouse is over an icon and instructions appear at the top of the screen.

You can get the program to run automatically through a sequence of random faces by holding down the [ALT] key and clicking the mouse button.

Only two of the programs features don't work on the demo version of the program: printing and saving and loading disk operations. To get a hard or floppy copy of the face you'll have to get the fully-fledged program.



■ Pulling faces with *Fun Face*.

DEMOS ON THE DISK

All the demos are on side B of the disk in the DEMOS folder.

ST FORMAT DEMO

A demo with loads of colours, bouncing words and some free advertising for your favourite magazine. What more could you ask?

SINE TEXT DEMO

Text crawls across a multicoloured screen following a sine wave pattern. Count the colours.

PLAY IT DEMO

Mixing digitised sound tracks and *Neochrome* or *Degas* pictures is made simple with *Playit* and there's a short demo on the cover to act as an appetiser.



GFA DEMO

PROGRAM: BY BARRY CAPEL
SIDE: A
MACHINE: ALL STS
FILES: ALL FILES IN ANIMATE
 FOLDER, LISTINGS FOLDER
 AND SPRITED FOLDER

This month's GFA BASIC programs cover the subject of graphics. The LISTINGS folder has a half dozen drawing programs in it which culminate in a sprite designer.

SPRITED has five short programs that redesign the mouse pointer and the ANIMATE folder has a couple of example programs that show just what can be done with a bit of artistic ability and GFA BASIC.

All of the programs use the extension .LST because they take up less disk space and can be used in GFA BASIC version 3 if you have it.

To load in a program you have to first clear the GFA BASIC interpreter by on NEW and then click on MERGE to load one of the programs.

GFA CONVERT

PROGRAM: PUBLIC DOMAIN
SIDE: A
MACHINE: ALL STS
FILES: GFA_CONV.LST

Converting ST BASIC programs to GFA BASIC is made simple by the use of this little utility. All you have to do is load this program into GFA BASIC and run it.

A file selector box will appear and you just have to select the file.

name of the ST BASIC program to be converted and then choose a filename for the converted GFA BASIC program from another file selector box. After a short while you'll have your converted program on disk which can be loaded into GFA BASIC and should run perfectly.

DC CLOCK

PROGRAM: PUBLIC DOMAIN
SIDE: B
MACHINE: ALL STS
FILES: DCCLK31.PRG,
 DCCLK31.RSC

Time is an illusion, lunchtimes doubly so. Meaningless and unconnected it may be, but it's a reasonable way to start a dissertation about a clock.

The clock in question is a real time clock which sits at the top right of the screen. When you first double click on the clock it asks you for the time and date and sets both. Now you can always keep an eye on the time without having to take your eyes off the screen for a moment.

If you want to turn the clock off again then just re-run the program and it will vanish.



■ Tell the time without moving a muscle with **DC Clock**

PCOMMAND

PROGRAM: PUBLIC DOMAIN
SIDE: B
MACHINE: ALL STS
FILES: PC.PRG,
 PCOMMAND.TXT

Carrying out operations on a lot of files on the ST can be very tedious using GEM, but that's the only way that it can be done. What is really missing is a command line interface (CLI) like the one found on the Amiga.

With PC.PRG though your problems are solved because it's a CLI program for the ST. With it you can copy, delete and rename files, create or delete folders, find or set the time and many more.

Wildcards are supported which



■ Pcommand opens up the wonders of DOS commands.

means that you do things like delete all files with the extension .BAK (with ERA .BAK), list all files on disk beginning with P (with DIR P.*), and other similar disk operations.

Full instructions on PCommand's command syntax are provided in the text file PCOMMAND.TXT. After only a short time you'll wonder how you managed to survive without a CLI on your Desktop.

DEMOS AND PICTURES

If you have any demos lying about that you think are good enough to go on *ST Format's* cover disk then send them in to the address below. Try and keep them under 200K and they must be in a form that can be clicked on from the Desktop.

Budding artists out there stand to earn themselves some ready by sending in their works of art. It doesn't matter what the pictures are in: Tiny, Degas, Neochrome, Spectrum 512 or Quantum Paint we'll use the best on the cover disk. The best picture every month will earn the artist £30. What more of an incentive do you need?

FORMAT10

PROGRAM: BY A. PERSON
SIDE: A
MACHINE: ALL STS
FILES: FORMAT10.TOS

The *ST Format* cover disk uses a special format of 80 tracks and 10 sectors rather than the usual nine sectors. This allows us to squeeze just that bit more onto the cover for our beloved readers. Therefore if you tried to copy all of the files on the cover disk onto a normal disk they won't fit. FORMAT10.TOS solves the problem by formatting a disk with 10 sectors. You can format either drive A or B and choose double or single-sided.

Don't worry about accidentally formatting your *ST Format* cover disk though, because the program checks to see if the disk to be formatted is a cover disk and asks for confirmation if it is.

AARGH!

PROGRAM: BY A. PERSON
SIDE: B
MACHINE: ALL STS
FILES: AARGH!.ACC

The most irritating thing about the ST is the horrible click that you get every time you press a key on the keyboard. One way to solve the problem is by turning the volume down on the monitor, but then you can't hear any other noises or sounds that the computer makes. Thus AARGH! came into existence.

AARGH! is a Desktop accessory which has but one function, toggling the keyboard click state. Select it once and the click goes off, do it again to turn it back on.

To install AARGH! on a disk just copy it onto your boot disk and whenever you boot up your ST from that disk silence is just a pull down menu away.

**BLASTER**

PROGRAM: BY A.W. BROOK
SIDE: B
MACHINE: COLOUR STS
FILES: BLASTER.PRG,
 PANEL.DAT, SPRITES.DAT,
 HISCORES.DAT, README.BLS

Blaster is a version of the original arcade shoot-em-up *Defender*.

All of the features are there, hordes of aliens invade your land and try to kidnap your people. If they leave the atmosphere then they mutate and attack the planet's defender. Later levels have more aliens and different varieties of bad guys.

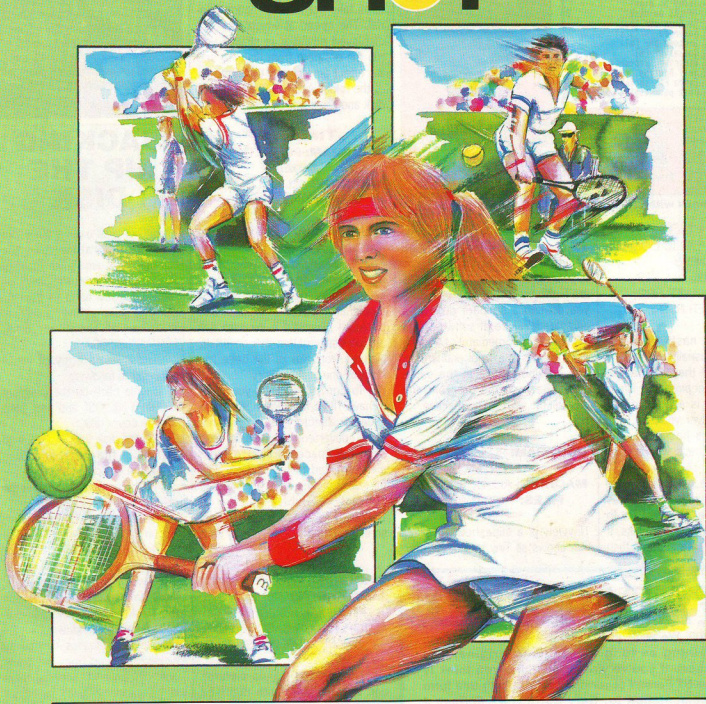
Just double-click on the file BLASTER.PRG and get blasting those baddies.

■ Back in the days when policemen were still old and Labour still had a unilateral defence policy there was *Defender*: now reincarnated on the disk as *Blaster*.

**GAME CONTROLS**

There are some keyboard commands to help you play the game.
 Joystick - Ship control and fire.
 Space - Bomb.
 Help - Pause game.
 Esc - Ends game.
 Q - Quits program and saves highscore table to disk.
 H - To see highscore table.

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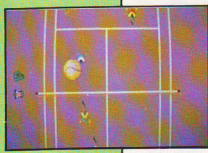
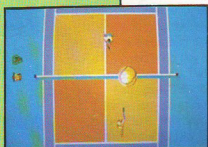
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Tel: 01-928 1454.

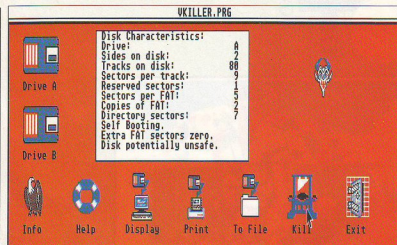
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Screenshots from Atari ST version





■ Take no chances with viruses – use **VKiller**.

VKILLER

PROGRAM: PUBLIC DOMAIN
SIDE: B

MACHINE: ALL STS
FILES: VKILLER.PRG,
VKILLER.RSC

Viruses can do nasty things to disks and they usually don't show themselves until they've infected several disks. Keeping your disks write protected is a good deterrent, but when ever you save programs the disks has got to be write enabled. That's where virus killers come in.

Long ago we put a virus killer on the cover, but we thought it was about time another one went out to help protect your valuable disks. If you have a disk that's in doubt then

just double-click on VKILLER.PRG and check the disk. If it's safe you'll be informed by a smiling face appearing on screen. Dodgy disks are highlighted by a devil's head. If you do find a suspect disk on a commercial piece of software then DON'T kill it immediately because many games auto-boot and viruses and auto-boots live in the same place. Back up the program and then kill the virus on the backup.

TINYVIEW

PROGRAM: PUBLIC DOMAIN
SIDE: B

MACHINE: ALL COLOUR STS
FILES: TINYVIEW.PRG

Tinyview is a slideshow program that shows all Tiny format pictures

in the same directory as the *Tinyview* program. This month the pictures are a sequence of pictures take from the animation tutorial. The speed at which they are displayed however is slow if you run the program from disk. To see the effect better copy the contents of the folder ANIM_TUT into a RAM disk and run it from there.

TINYSTUF

PROGRAM: PUBLIC DOMAIN
SIDE: B

MACHINE: ALL COLOUR STS
FILES: TINYSTUF.PRG

The pictures on the B-side of the disk are in one of three formats: *Degas*, *Neochrome* or *Tiny*. If you want to load the pictures into an art package then you will have problems unless you have the right package. *Tinystuf* is to help get around that problem by converting pictures from any of the three formats to one of the others.

To convert pictures you need to have TINYSTUF.PRG in the same folder or directory as the pictures to be converted and you also need sufficient space on disk to store the converted pictures, allow 32K for every picture that you want to convert. Double click on TINYSTUF.PRG and follow the on screen prompts.

AUTOPLAY

PROGRAM: PUBLIC DOMAIN
MACHINE: ALL COLOUR STS

FILES: AUTOPLAY.PRG,
AUTOPLAY.SCP, BASCODE.EXE,
UNI.PI1, PERFECT.SND

Neochrome and *Degas* pictures can be combined with digitised samples from *Replay 4* to produce demos with the aid of *Playit*. *Playit* is a program from the Goodman PD Library (0782 335650) on disk GD287, but on the cover disk is a brief example of what can be done with the program. All you have to do is click on the file AUTOPLAY.PRG and away it goes.

The program can be put in an AUTO folder, but if so the files AUTOPLAY.SCP, BASCODE.EXE, UNI.PI1 and PERFECT.SND must be in the root directory.

THE FLIPSIDE

Single sided drive owners can get hold of the B-side on disk by sending their name and address with a cheque or postal order for £1.75 to: B-Side, Future Publishing, The Old Barn, Somerset.

BACKING UP THE DISK

The cover disk uses a 400K per side format rather than the normal 360K and so to fit all of the programs from the cover on one disk you'll need to use the special formatting program supplied on the cover disk, FORMAT10.TOS.

To make a copy of the A side do the following:

- 1) Double click on the program "FORMAT10.TOS" and then take out the cover disk.
- 2) Put the disk that you want to format in the drive and then follow the on-screen prompts.
- 3) Put the cover disk back in the drive.
- 4) Double click on both the Drive B icon and on the Drive A icon. If you have only one drive then put the newly-formatted disk in the drive when it asks for drive A. You'll now have two windows on the Desktop, a cover disk one and an empty window.
- 5) Copy the files as normal by picking them up from the cover disk window and dropping them in the empty window.

Don't copy the files by dragging the drive icon in which the cover disk files are into the empty window because the cover disk contains some hidden files that you don't need.

DON'T copy the file GOTO_B.PRG because it will damage data on your disks.

6) To copy side B of the disk, double click on the file GOTO_B.PRG and repeat the above process.

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Yes, earn £800. We want your software – games, utilities, demos, anything as long as its good, original and preferably short. If you've written anything you think is worthy of the *ST Format* cover disk, send it with this form and full documentation to: Gary Barrett, *ST Format*, 4 Queen Street, Bath BA1 1EJ.

NAME

ADDRESS

DAYTIME TELEPHONE

PROGRAM NAME

SIZE OF FILES IN K

DESCRIPTION

Enclosure 2

Don't forget to: ■ Enclose an SAE for return ■ Include on-disk and paper documentation ■ Write your name and address on the disk ■ Use a virus-free disk.

Please sign the following declaration: This program is submitted for publication in *ST Format*. It is wholly my own work and thus I agree to indemnify Future Publishing against any legal action should copyright problems arise.

HAVING TROUBLE WITH THE DISK?

We have done our best to check that the programs on this month's disk are simple to use, error free and have no known viruses. However, we cannot answer telephone queries on using the software, and we do not accept liability for any consequences of using the programs.

If your *ST Format* disk is faulty – and out of tens of thousands duplicated some are bound to be – you should send it back for a free replacement to:

ST FORMAT SEPTEMBER DISK, DISCOPY LABS, UNIT A, WEST MARCH, LONDON ROAD, DAVENTRY, NORTHANTS NN11 4NA.

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GFA BASIC is a powerful graphics tool. BARRY CAPEL explains where to draw the line.

THE PLOT THICKENS

GFA BASIC has a superb range of commands available. You can create screens of diagrams and pictures using the GFA shape commands or build pictures up from coloured dots using PLOT, you can even manipulate pictures created in art packages.

Sections of the screen can be cut out and moved around the screen, stored in strings for animation, or saved to disk. There are general commands for clearing the screen, changing the colour of shapes and text you produce, and the speed of GFA BASIC even allows you to draw on one screen while looking at another then instantly 'flip' between them.

As you will see from the box over the page, the list of graphics-orientated GFA commands is comprehensive. There are several programs on the cover disk to demonstrate the graphics capabilities of GFA BASIC stored in .LST format. They can be MERGED into GFA BASIC 2 or GFA BASIC 3.

PLOT ON THE LANDSCAPE

The easiest of the graphics commands, is PLOT, where each dot on the ST's screen can be 'lit' up, by giving the X and Y location of the pixel to turn on.

The ST's screen resolution (number of pixels across and down) in low res gives you 320 pixels across (0-319) and 200 pixels down (0-199). Each pixel has its own X,Y location, (X is across and Y is down).

PLOT 160,100 will light up a single pixel roughly in the centre of the screen.

The opposite of PLOT is

POINT, which when given an X,Y co-ordinate, will return the colour value of that pixel.

DRAWTO.LST uses the left mouse button to draw on the screen using the PLOT command. Colours are 'picked up' from the palette at the side of the screen with the right button using the POINT command. Pressing both mouse buttons at the same time will end the program.

The listing starts with the simplest of the commands, CLS, which is used to clear the screen.

The line MOUSE X%,Y%,Z% reads the mouse's X and Y position, and the status of the mouse button (0=none pressed 1=left pressed 2=right pressed 3=both pressed). Using the values of X% and Y%, the program draws lines to each new position while the left button is pressed. Each pixel is lit in the colour set with the COLOR command (note the spelling!), and when the palette boxes are clicked on, the C% = POINT(X%,Y%) command picks up the colour from

under the mouse pointer, stores it in the variable C, and issues a COLOR C command.

SPRITES

Sprites are available in GFA BASIC, or perhaps I should say sprite! There is only one.

There are two uses for the SPRITE command, the first is for an object like a player-controllable helicopter in a game which does not blank out the screen when you move over it, and the second use is for re-defining the shape of the mouse pointer. Due to its single colour few programmers use the sprite for the first reason.

Defining the mouse pointer is done with the DEFMOUSE x command, where x is one of the predefined ST pointers - useful in your programs to show what mode you are in, (crosshair to draw, caret for text, and so on). SPRITE allows you to make up your own, on a 16 pixels square grid. This size is fixed.

SPRITED.LST is a small but useful program which allows you to

create a true sprite of any colour, and save it out as a GFA BASIC listing, which can be run on its own, or merged into your programs.

Each sprite has its own mask, which is simply a border around the shape to make it visible (a red arrow would disappear if moved onto a red area without a mask).

The decimal equivalent of the 16 pixels width of each of the 16 rows is stored in a word (two-byte) long string and is converted using MKIS(value) where value is the decimal equivalent of the 16 bit binary pattern created.

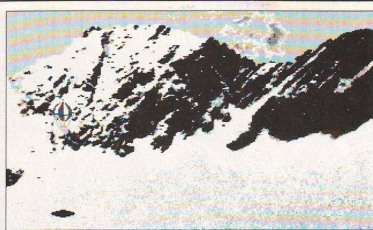
Draw your sprite by single clicking on the large grid with the left mouse button. (In black regardless of any colours selected). Draw the mask with the right button. The numbers down the right side show the current decimal values of each row for the sprite data only.

When completed, select the colour you want the sprite to be, then click on TEST. Your sprite will now be shown. Click on any colour to change the pointer. When you are happy with your sprite, exit test mode by pressing the right mouse button. You can now click on Save to write out the listing to disk and then create another one. Use the listing on its own, or merge it with your own programs.

In the listing, the first two MKISs each have 1s in them. This is the X and Y position (on the 16x16 grid) of the 'hotspot', so when the ST checks for the mouse's current X,Y co-ordinate, or when using the POINT command, this is the pixel in the pointer that it checks under. If your customised pointer doesn't use the top left corner (1,1), you can change the first

3504
3504
3504
3504
3504
3504
7608
6552
14748
12604
29070
24966
57735
49539
49539

SPRITED demonstrates the translation of sprites into numbers, shown on the right.



■ A sequence from the animated balloon flight on the cover disk, created with GFA BASIC. A sequence of pictures is stored in a string array.

two MKIS numbers to any grid co-ordinate.

Due to sprites being single colours, their use in games is limited, so a better 'sprite' can be achieved by cutting out multi-coloured areas of the screen, and moving them over the screen with PUT and GET. Although not technically sprites, I will refer to them as such.

GET *x,y,x1,y1,string\$* cuts out a rectangle from the screen whose top right corner is at *x,y* and bottom right is *x1,y1*. It is in fact, a bit-mapped section, and stored in the string variable 'string\$'. After a GET, the original screen remains unchanged.

PUT *x,y,string\$(mode)* puts the sprite back on the screen at position *x,y*, in a variety of modes, such as OR and XOR. When the mode is omitted, the sprite overwrites what was originally there. (Refer to the manual for more details on modes). PUT_GET.LST on the disk shows what effects can be produced.

If you look at the listing, you will see that the sprite (screen_slice\$) is placed on the screen at random X and Y positions. Remove that line, and place the following lines inside the DO loop and run it.

```
Mouse X%,Y%,Z%
```

```
PUT X%,Y%,Screen_slice$
```

Notice that now, you can 'paint' with the screen sprite. The problem is, when an 'object' does not completely fill the rectangle you cut out, the outside area of the rectangle blanks out what was on the screen. To cure this, you have to use the XOR mode to place the bit-pattern on the screen. This means that the pixels on the screen are compared with your sprite, and the pixels of one are only lit when pixels of the other are not. In order for this to work cor-

rectly, there must be a 'hole' in the screen which matches identically the pattern you wish to place.

This is done with a mask, (a screen chunk of the same object, with all colours set to the same), placed on the screen in the (NOT S) AND B mode. All pixels lit in both the sprite and screen are then turned off, leaving a hole for you to place the 'sprite'.

GRID.LST gives you a screen similar to the sprite editor, but with a 20 by 20 grid. This time, you can draw in any of the 16 colours, and as you draw, the mask is drawn too!

When complete, click on test, and you will switch to a blank page on which you can paint with your 'sprite' by using the left mouse button. Pressing the right button will return to the grid, but the program will 'memorise' the picture so far with the SGET Screen\$ command ready for when you return next time, at which time it will replace the screen with SPUT Screen\$.

Designing another sprite and testing it will allow you to add to your canvas. Press the space bar to clear the drawing area.

Storing a succession of 20 slightly different series of pictures in a string array, ie AS(1) to AS(20), and placing them on the screen in a loop, you get an animated 'cartoon' effect.

You can see how nimation is implemented in the last two programs on the disk, ANIMAUTO.LST and ANIMOUSE.LST. Run ANIMAUTO first, then when it's finished, run ANIMOUSE to fly the hot air balloon yourself with the mouse.

The animated frames can be created with PLOT etc. and cut out with GET by hand, or you can use a commercial program designed for the job, such as SpriteMaster or AB Animator. ■

GFA BASIC'S SHAPE COMMANDS

The shape commands allow you to draw boxes and circles with single line commands. The CIRCLE command, for example, needs to know the centre point (X,Y), and the radius (R).

```
CIRCLE 50,50,25
```

will produce a circle with a radius of 25 pixels, and whose centre is 50 pixels across, and 50 pixels down. The colour used is that of the last COLOR command used.

Arcs can be produced by adding the start and end angles (in tenths of a degree) to the end of the command, ie.

```
CIRCLE 50,50,25,0,900
```

PCIRCLE will produce a filled circle as per the fills in the manual.

For ellipses, ELLIPSE *x,y,rx,ry* is used in the same way as PCIRCLE, only two radius

points are required. *rx* is the horizontal radius, and *ry* the vertical. For filled ellipses, use PELLIPSE, and for ellipse arcs, add the start and end degrees as with CIRCLE.

Rectangles are produced with the BOX command, by giving the X and Y co-ordinate of the top left corner, and the X,Y co-ordinate of the bottom right corner. ie. BOX 100,100,130;130. Again, COLOR sets the colour of the lines.

PBOX produces a filled rectangle as per the fills in the manual.

RBOX gives rectangles with rounded corners.

PRBOX results in a filled, rounded cornered rectangle.

The thickness of lines drawn with DRAW,

LINE, BOX and CIRCLE are set with the DEFINE *s,w,b,e* command, where *s*=style (1-7), *w*=width (must be an odd number), *b*=beginning and *e*=ending line style (0:normal 1:arrow 2:rounded).

The fill style is set by the DEFFILL *c,a,b* command, where *c*=colour (0-15), and both *a* and *b* denote the fill style from the table in the manual. This command affects FILL, PBOX, PCIRCLE, PELLIPSE and PRBOX.

The short demo CIRCLES.LST demonstrates the CIRCLE command, and the program KALEIDOS.LST is a nice example of drawing using the BOX command. Pressing the right mouse button allows you to choose different colours to draw with. Try altering the 'BOX' lines in the main WHILE...WEND loop.



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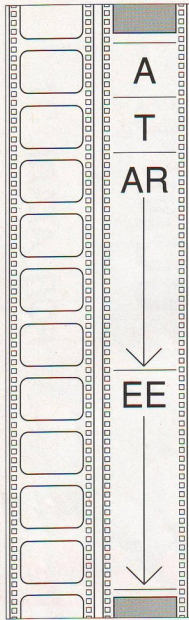
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THINK SYNC

One of the trickiest parts of animation is portraying speech.

MARK PICKAVACE is your elocution tutor.



■ A frame-by-frame phonetic breakdown of the word 'Atari'.

In live-action films we very quickly notice if the speech does not fit with the picture. When the sound is 'out of sync' with the image only by a few frames it is obvious that there is a problem. When an animated character is required to speak the combining of the original sound with the graphics must be very precise, otherwise the results are not worth the effort involved.

The start point for any animated speech is the recorded sound track.

Animating a word being spoken and then trying to get the sound to fit is just not going to work, take my word for it. In conventional animation the sound is placed on magnetic track which is the same size as the film, i.e. 35mm. It is the editor's job to create a 'phonetic breakdown' which means writing the phonetic sounds on the opposite side of the film to where the sound is recorded. On the left I have duplicated the magnetic strip for the word 'Atari'.

SEQUENCE	SCENE	'ATARI'										SHEET	
1	1	1	2	3	4	5	6	7	8	9	10	FORMER DISTRIBUTION	1
		A											
		T											
			AR										

■ The animator's 'dope sheet' for the word 'Atari'.

Alongside the magnetic track is the film so that you can see a direct relationship, on a frame-by-frame basis.

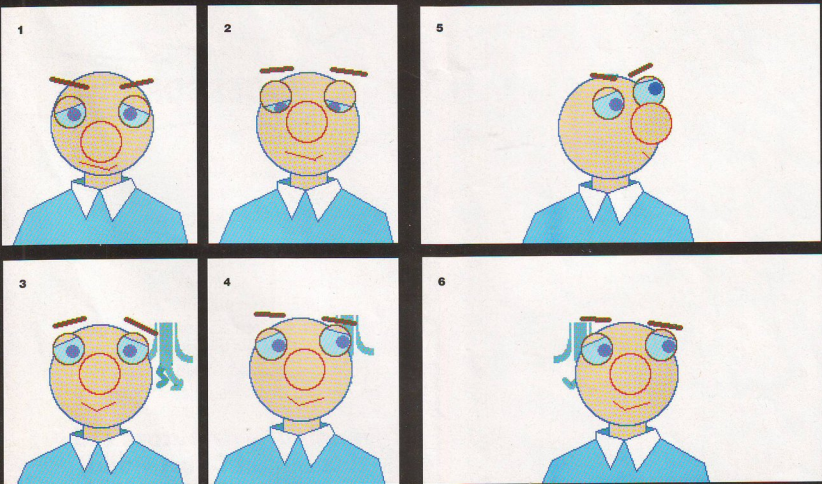
The entire soundtrack for most scenes will be marked in this way, the information is then transferred to a bar sheet and finally to the animators dope sheet. This is what is shown above.

Once the animator is in possession of the dope sheet he can begin the creative processes which he hopes will end in sound and animation in perfect harmony.

ACCENTS ON SPEECH

The term accents does not refer to the dialect of the language spoken but to accentuating the spoken sections. If you observe any political figure trying to make a point you will notice that he or she will give a single word extra emphasis by including a gesture or extra volume. This directs the audience to take special note of that word or its association with the movement.

From experimentation early animators discovered that the accent should normally appear



about three to four frames before the sound or word to be accented. I would like to give a logical reason behind this idea, but nobody could give me one. The exact positions of the mouth depend a great deal on what sort of person and how their face is shaped. For that reason have not given you specific mouth outlines for different sounds. This is something you should learn yourself.

The number of actual mouth shapes is actually quite limited because many vowels and consonants look the same if you cannot see the tongue. A good example is that the 'p' in pat looks the same as the 'c' in cat when animated. This highlights the key to lip-sync animation, that you are animating the sounds and not the words. Their is no reason why you could not create lip-sync animation for a foreign language which you do not speak. Human beings thankfully only have one mouth and restricted ways of using it. If you want to learn more about this subject I suggest you find a book specifically about phonetics.

ANTICIPATION

If you are fortunate enough, as I have been, to have looked at old Warner Brothers cartoons frame by frame you may come to the conclusion that much animation does not actually exist. Let me rephrase that - a good animator often uses the brain of the audi-

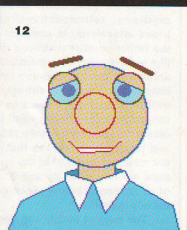
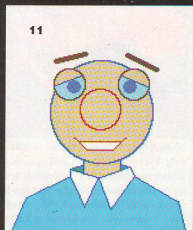
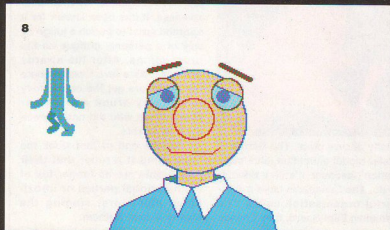
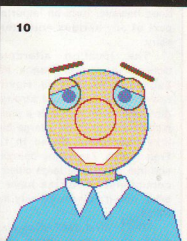
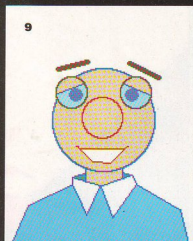
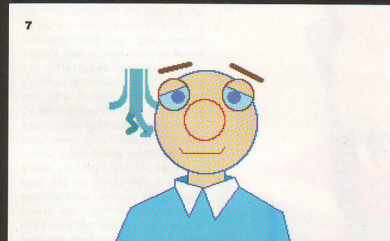
ence to enhance or even augment what he has animated. If you take any Road Runner film their is always a scene where the Road Runner says 'Beep Beep' and runs off, and is then pursued by the Coyote. What I just said is true, up to a point. What actually happens is this: The Road Runner said 'Beep Beep'. Whizz lines appear around the Road Runner's legs. The Road Runner moves a little to the right. He disappears and is replaced by whizz lines going off left. The Coyote makes a large gesture that he is about the pursue. He disappears and is replaced by whizz lines.

The truth is that they never ran off screen, our brain just added that. Its basis for that conclusion was based on several facts. In both cases the character anticipated his exit by making a small movement in the opposite direction. He also 'staged' his exit by holding the pre-run position for a moment so that we could guess what comes next. The whizz lines enforced the conclusion that the characters had just exited - very quickly - left. The brain does not easily accept that characters should just vanish when all our data points to them running off screen, so it convinces us that we should believe they did. In this way an animator can reduce his workload, knowing that if prompted the human brain will contribute large sections of animation, just to maintain the sanity of its owner.

HINTS FOR LIP SYNC

- The mouth positions should fit exactly with the relevant phonetic sounds. Some animators prefer to have the movement one or two frames ahead of the action, this is surprisingly successful. The opposite can be said of letting the speech drag behind the action which always looks wrong.
- When the dialogue is very fast it is often necessary to animate the mouth every frame and not every other frame. The solution to doing twice as many drawings is to place the mouth or head on a separate 'level' of cel. This means that the head or body can remain still or animate on twos while the lips are moving on ones. If you want to see a classic example of this technique, the lip sync in the Flintstones uses this trick.
- The vowel sounds produce the most distinct mouth shapes, which are 'held' over a number of frames. The consonants are more subtle, and less easily identifiable without the accompanying sound. The ideal person to animate lip sync would be a deaf person who can lip read, they can notice the very subtle differences between consonants. Animators are rarely concerned about such fine detail which must make most animation almost impossible to lip read. The mouth is always sprung open and then slowly closed when a vowel is spoken.
- Not all consonants are just filling movements between vowels,

- b, f, m and l should be formed correctly and need a full two frames to be clearly identified.
- Their are no strict rules about the shape of the mouth for any sound, it is very much dictated by the character design. The exact shape that you create should be influenced by the nature of the character and the contents of the dialogue.
- The only way to get your characters looking right is to base them on yourself, so its time to get in front of the mirror, close the curtains and make strange faces.
- Unless you are animating a very 'over-the-top' person you should under play the lip movement, if you hit those vowel sounds and make small flowing actions in between then your lip sync will look natural.
- The best way to enhance animated speech is to accentuate the dialogue with small tilts of the head. The eyes can also be employed with blinking and looking away adding volumes to the meaning of a close-up.
- If you break down a soundtrack you will discover that in the course of normal spoken English not all words are separated by quiet gaps. Words flow together in a stream of rolling sound. So don't put closed mouth positions between each word. Only close the mouth when a true blank appears.



BIG SCENE

For the purpose of using many of the animation ideas that I have presented you with I devised a small scene which I have animated. The action is as follows; A man is looking downward and depressed. He hears footsteps coming. He turns in reaction to the sound. Recog-



nizes the other character. Turns to camera. Says the word "Atari" And smiles.

I split the problem into two distinct parts, the background walk cycle and the foreground character. The walk cycle was drawn over 10 frames from some original Degas images re-touched using *Flair*. This was then reloaded into *Cyber Paint* where a longer 80-frame sequence was composed. I could have used *Cyber Paint* to do the whole job but it has a poorly

THAT ALL FOLKS!

Some of the most skillfully animated and most enduring characters came from the Warner Brothers' studios. The animation department was located in a line of pre-war huts behind the main sound stages, these buildings were so derelict that they became known as 'Termite Terrace'.

In the mid 1940s the animators produced an animated short film, such as *Bugs Bunny* or *Daffy Duck*, every five weeks. Considering that each one ran for a typical five or six minutes the throughput was impressive. Many classic animators worked at Warner Brothers including Chuck Jones. In the '40s and '50s there gathered a group of talented people whose only interest was in creating amusing and stylish animation. They won numerous Oscars as a result.

The large range of characters included *Bugs Bunny*, *Porky Pig*, *Wily Coyote*, *Road Runner*, *Daffy Duck* and *The Tasmanian Devil*.

They even produced the only 3D cartoons I am aware of. Having never seen these I am unable to report just how good *Bugs Bunny* was in the third dimension.

Although well known within the animation industry the people in *Termite Terrace* often missed the limelight of the live-action departments. It is rumoured that Jack Warner was quite shocked to discover that within the large organisation he controlled there were 'animators!' This is backed up by the memoir of a Warner Brothers executive who recalled watching a *Bugs Bunny* cartoon with Jack only to have him remark, "Gee, I wish we had something like that!".

implemented *ZOOM*, which is the main feature I use to draw any bit graphics. Once I had that complete I could concentrate on the main action in the foreground. When designing the character I was determined to keep him as simple as possible, to this end I gave him a spherical head and no chin. The use of circles throughout greatly

simplified the drawing and animating of the character.

These are the three key points that I painted first: first frame looking down, then looking straight ahead then turning to see the 'Atari'. From these I generated the rest, using movement in arcs, blinking and eye movement to give more depth to a straightforward



sequence. Once this section was complete I experimented with various combinations of timing, between the front and back elements. This was made easy by *Cyber Paint*'s 'UNDER' option, which enables you to place saved animation sequences behind the current one.

The whole process took around six hours to do and the end result lasts for about seven seconds, when run at 12 frames per second. ■

You may have seen reports the World Festival of Film in Cannes, which takes place every year in May. The animation industry also has a world festival though is not as heavily reported or attended. It does however form an important part of any serious animator's diary.

The location alternates between Anneci in France, and Zagreb in Yugoslavia. Having attended both I would strongly recommend Anneci, it is a small, picturesque town on a large blue lake near Mont Blanc in the French alps. Zagreb by comparison has what most large cities in communist countries have to offer, fine if you are heavily into trams.

The festival itself takes place over about four days, this includes the usual round of competitions, 'retrospectives' and press interviews. In contrast to the rather somber reactions that film makers give new productions, animators tend to express their likes and dislikes quite strongly. A well-liked film can expect to be accompanied by cheering and the ceremonial throwing of lolly sticks and paper planes. Those that do not meet the approval of the audience are barracked by animators of all nations shouting epithets, usually in French.

The subject matter and 'look'

FROM A TO Z



of much of this animation is usually dictated by the nationality which produced it. The French are quite obsessed with stylistic sci-fi films, which although they look very impressive are prone to have

totally bizarre plots. The Germans prefer model animation, and 'claymation', because it's very difficult to do. The Canadians have a wonderful organisation called The Canadian Film Board, they finance

eskimos to make animated films about their lifestyles before they all started making films for a living. The Japanese and Chinese both draw on their historical and cultural backgrounds to produce epics. They are renowned for their graphic texture, strange techniques and they way that the simultaneous translators always get stuck on describing an obscure farm implement half-way through. The British and the Americans both make the mistake of making films that animators enjoy, thus removing them from any possibility of winning a prize.

This whole creative symphony culminates on the last night of the festival when winning films are shown again and prizes are awarded. Animators who have been nominated but have not won are not recognized for their passiveness. It has been known for a spurned artist to punch a judge by way of a personal critique on the proceedings. After the awards there follows a lavish party where the animators get the opportunity to get very drunk and further abuse those who did not appreciate their talents.

By the end of that week the locals find it a relief that their restaurants are no longer full of multi-national parties of intoxicated animators, singing the Mickey Mouse Anthem.

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We bring you the best both now and in the future. But of course if you're a long standing reader you'll know that already.

THE PEOPLE

ST Format's games crew consists of Mark Higham (a man who's reviewed just about every type of game there is and has been playing them since the early days of the *Dragon 32*) and Gary Barrett (Mr Adventurer himself, who's been at it since the *CPC* was awake – and reviewing games too). Other experts are brought in to review any game that requires specialist knowledge

HOW DOES IT WORK?

We play each game that comes into the office and listen to the opinions of other experienced games players before making a judgement. The reviewer has to justify his scores for graphics, sound and appeal before rating an overall score on all of these factors plus other subtleties not possible to rate individually.

RATINGS

It is our policy to give space only to the games we think make up the best of the month's crop.

0-29% These type of games are usually so appalling that we don't want to give them space.

30%-49% Ratings in this region are awarded to games which might be visually appalling but are surprisingly addictive. Or they might have fun simple graphics and gameplay.

50%-69% Game in this band may be addictive or boast a clever plot.

70%-89% This score is awarded to games with good graphics and gameplay. Any in this range and above are recommended purchases.

90%-99% Winners of the *ST Format* Gold awarded to only a handful of games. Here there must be an original approach or outstanding achievements in the programming or graphics fields. Above all, a game in this region must have an exciting gameplay.



GOOD SPORTS

**Sport games go wild
on the *ST* – page 69**

ROBOCOP

OCEAN - £19.99



■ Murphy meets ED209 at the end of the level.

Robocop has recently been breaking records for the number of weeks at number one in the software chart. The question to ask though is why? Does it have wonderful gameplay? Are the graphics truly awesome? Does the sound leave the poor Amiga standing? Or have people just fallen for the hype again?

If you've seen the film then you'll have a rough idea of the plot. Cop chases criminals, cop gets shot and killed, scientists replace body parts with cybernetic limbs and make a robotic law enforcement device. Your mission is to wander the streets of Detroit in the guise of RoboCop wiping out crime by killing criminals.

The game is split into three types of stage: patrolling the streets, a shooting gallery and a photofit session. When you're walking the streets you have a trusty gun and cybernetic punch to deal with the villains. Extra weapons and energy can be picked up to help you in your mission. A fearsome ED209 robot guards the end of the level and takes multiple hits to destroy.

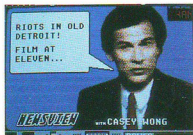
In the shooting gallery sections you can practice your gun play which will be needed later to deal with a hostage situation and the photofit sessions must be completed so that you can identify the leaders of the crime ring.

Robocop has one thing going

for it, there's a tasty bit of digitised sound at the beginning of the game. But that's it. Music is diabolical throughout the rest of the game, and the graphics are nothing special.

With regard to those questions at the beginning of the review, Robocop must sadly fall into the category of an over-hyped game. People should learn to buy a game because of the quality, not the fact that they liked the film, arcade version, book, etc.

Gary Barrett



■ Criminals meet the hard reality of Robocop's fist.

GRAPHICS	8
SOUNDTRACK	6
SHORT TERM INTEREST	7
LONG TERM INTEREST	6
OVERALL	56%



RED HEAT

OCEAN - £19.99

Another American city is in for a fun time in yet another Ocean film tie in. That old favourite for violent films with lots of punch power is here again, Arnold Schwarzenegger. In *Red Heat* he



■ Punching through opponents in the guise of a communist Arnie.

plays a Russian detective who joins forces with an American cop to destroy a drugs dealer from the good old US of SR.

The action is split into four stages with bonus stages along the route to help boost your score. It all starts in a sauna where you have to beat your way through a multitude of muscle bound commie criminals and get information on where their boss is hiding. En route you'll find food to rebuild your energy which is depleted whenever a punch is landed or you're hit by an object.

Arnie's next stop is Chicago where he invades a hospital armed with a pistol and has to shoot or

punch his way through more muscle bound men, but has to take on some gun-toting nurses too. The next step in the violent investigation takes you to the streets where a violent gang of scum, the Cleanheads, have to be dealt with in the same manner. Finally you'll have a confrontation with Viktor, the man that you've travelled from glorious east to capitalist west to find.

Graphically *Red Heat* is



■ Why has Arnie's head gone all white and round?

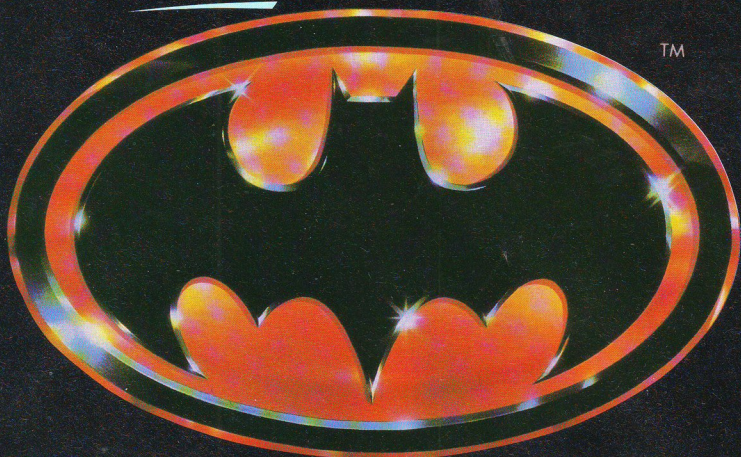
impressive with lots of detail and a very well drawn Arnie, but the playing area is small, only about a third of the screen. Sound effects are good and the tune is best described as tolerable.

Ocean have again proved that a good film does not a good game make, but the poor old public are likely to suffer with their pockets. One of two things is likely to happen, either the public will stop buying games licensed from films or the companies will start doing good jobs of the conversion.

Gary Barrett

GRAPHICS	9
SOUNDTRACK	5
SHORT TERM INTEREST	6
LONG TERM INTEREST	5
OVERALL	52%

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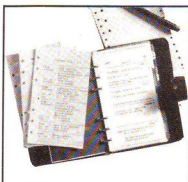


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VERMINATOR

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At long last the game that was always coming soon but not quite here has arrived.

Things are looking grim in the once tranquil tree world of Dendra for the level of pests and vermin has risen to epidemic proportions and it's your job as the verminator to stop it rising even further. Armed with an assortment of different weapons you must wander the great oak tree pounding those pests wherever you find them.

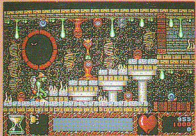
Jake the verminator begins his mission armed only with a mallet and a bank loan of 1000 credits.

Both banks and shops are well signposted throughout the tree which is fortunate as the tree is quite vast (over 250 screens) and it's very easy to get lost. It's also fortunate because money and more specifically the making of it is an essential part of the game. Once inside the shop you find several shelves packed with equipment which can be selected by moving a rotating coin that represents your money over an object and pressing the joystick button. Equipment ranges from a simple brick at 200 credits to falcons at 4000. As price in general represents performance your measly 1000 creds will only stretch to a catapult and the trusty brick.

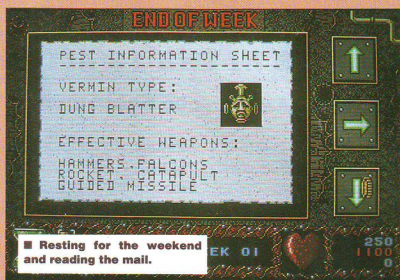
Though pasting the pests is your trade, contact with the critters doesn't do you much good either and your depleting life force is shown in the form of a heart that



■ Doing a spot of shopping for pest-bashing gear.



■ Into the catacombs, mallet at the ready.



cracks from bottom to top as you become weaker.

Just to add to your problems ghost-like muggers also float around the tree often in

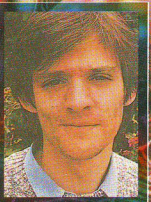
gangs of two or three. Not only do they take great pleasure in beating you about the head with a stick they also steal your money for good measure. Watch out for brown-cloaked muggers as a few



EFFECTS

Music plays throughout the game as well as during loading and though not outstanding both these tunes are enjoyable and don't grate or detract from the gameplay. An option is given to turn off the music. Graphically *Verminator* scores really well with a huge variety of different colourful scenery and smooth animation in Nigel Brownjohn's instantly recognisable style.

■ Right: Programmer Nigel Brownjohn.



encounters with these will soon leave you impoverished. This in mind a visit to the bank is always a good option, what you are not carrying they can't steal!

Money can also be won in the casino near the top of the tree where you have a choice of playing dice (get a double to win), fruit machines or blackjack but if gambling isn't your scene and you are truly desperate for cash you can always go to the mob.

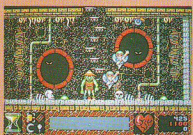
Being lent money in 1000 cred installments may sound like a good thing but if you are late in repayment you'll find yourself being chased around the tree by the mob's boys and you can never be sure the dodgy goods will work properly.

A verminator's life is not all hard work and at the end of each week it's time to rest, recuperate and read your mail. This includes notes on the latest pest plagues and any extra credits or debits your bank account has incurred, but weekends never last long so you are soon back to the grind stone.

CONCLUSION

Pest control has never been so much fun and with a huge play area and plenty of weapon upgrades *Verminator* will keep you critter crunching well into the night. *Verminator's* vast playability will cause bags under the eyes of many an avid gamer.

Dave Packer



■ The verminator encounters some more critters ripe for the mallet.

GRAPHICS	9
SOUNDTRACK	7
SHORT TERM INTEREST	8
LONG TERM INTEREST	8
OVERALL	83%

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Every now and again an incredibly simple game comes out which is endowed with all the style of a council estate but has an addictiveness factor that shoots through the roof. The last game on the ST to follow this route was *Skweek* from Loriciel, but now *Leonardo* has stepped into the limelight.

You play the role of the title character who's a compulsive thief. The challenge area consists of 50 different levels in which the point is to pick up as much money as possible. To move onto the next level you need to push three similar items into a row. If you come across the key icon then you advance immediately to a bonus level where you must push three chains of pearls into a row by kicking them along. The key is just one icon, others to be found across the maze affect the outcome of your trip. For example, wads of money are there to be collected. Then there are the occasional paralysing rocks which can halt the movement of the ghost and watchman and even sticks of dynamite can be tracked down.

Kicking is the only way to move anything in this game. Boulders can be shunted along with a kick until they're path is obstructed then a kick will destroy them. Other objects cannot be destroyed.

■ You've kicked one string onto the top line and must now try and get all the rest up there as well.



■ With the second string up against the top line you apply a neat little kick to get it next to the first one.

■ Finally there's the third one to come. When they're all in line it'll be into the next level.



LEONARDO

STARBYTE/ENTERTAINMENT INTERNATIONAL - £19.95

The ghost and watchman chase you around the maze most of the time. Although they can't be killed, they can be sent back to the watchtower by flattening them with an object. The watch-tower is one small area of the level where the ghost and watchman kip down for the night. On some mazes you can block it in with boulders and then kick something over the mischievous pair to force them to return to the watchtower. With a boulder in front they won't be able to escape, giving you free reign of the level.

EFFECTS

Leonardo will hardly go down as a masterpiece in terms of its graphical qualities. There's little being achieved within the actual gameplay that couldn't have been done on an eight-bit machine. However, as you can see from the screenshots, the sprites are detailed and large. Even with four-directional scrolling they move around fast enough to keep the game addictive.

Unfortunately sound is limited



■ The pearls must be kicked into line but this level is slightly harder because you can no longer trap the ghost and watchman.

to a tedious range of ridiculous spot-effects.

you'll lose the game.

Leonardo is a fun game to play, especially with the added strategy element. But it is nothing more than that. It isn't the kind of game that you pull out to impress a girl at a party with the brightest and best graphics ever but nevertheless it does have a highly addictive gameplay.

Mark Higham

GRAPHICS	6
SOUNDTRACK	3
SHORT TERM INTEREST	7
LONG TERM INTEREST	5
OVERALL	62%

CONCLUSION

What is most annoying about this game is the ease with which you can set up an arrangement of items almost in a row, but from which it's not possible to win the level. Just kicking two items into corners will mean that you'll lose the game because it's impossible to kick an object out of a corner. Just this element stops it from being the sort of childish game you pull out for a bit of brainless entertainment. You need to be able to remember how the screen is drawn up to work out how the best way of kicking the three items into line. If you mess up the planning then



■ Some levels have huge boulders which can be kicked around so that ghost and watchman are trapped in the watch-tower within the first few seconds. The objective is then to kick three similar items into row. However, you can mess it up so that they can't be kicked close enough - as above.

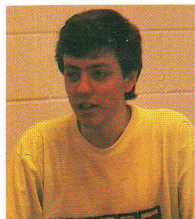
BLOODY GREAT!

After the stunning graphics of Amiga Blood Money, Psygnosis are bringing out the ST conversion. MARK HIGHAM went to Liverpool to meet the programmer.

Blood Money's Amiga original was heralded for its superb animation and sprite control but any chance of an ST conversion was laughed off. However, Wayne Smithson spoke to the Amiga programmers some time ago and decided to take up the gauntlet. Psygnosis realistically expected the backdrops and some of the sprites to go but Wayne had other ideas.

Preferring to work on original concepts, this is his first conversion. Previously Wayne has written *Baal* on the ST and the Amiga port (but we don't talk about that). He also confessed to being behind *Skyrider* - the first horizontally-scrolling shoot-em-up on the ST.

Psygnosis use a PDS II system for all their coding so the Amiga



■ **Smithson: "If the ST had a blitter chip as standard then it would be faster than the Amiga."**

code was on this. Wayne spent a month getting to grips with Dave Jones' code. "The main problem was that it didn't need to be super-efficient," says Wayne. Amiga hardware routines were used to move sprites and these aren't available on the ST so routines had to be written to replace them.

To maintain essential speed three planes of parallax scrolling have been used instead of four and some of the graphics have been cut down. For example, the game opens with tracker gun



■ **This screen is from 'It Can't Be Done' - Wayne's latest game. It moves horizontally at fantastic speeds.**

emplacements which follow you around the screen and it was decided to shave several lines off of these. Then the trackers appeared in odd positions. This kind of tedious problem can absorb more time than tackling the serious ones such as scrolling.

One big problem was the sprites. Although sprite emulation on the ST isn't difficult, it gulps down memory - nasty with 120K of sprites. It gets worse using animation because one sprite must be stored several times. Wayne uses a special method of storing sprites, first in one position and then as they would be if shifted. 16K of specialised code was needed to scroll them. The result: all sprites for each level are held in memory without disk accesses - only end-of-level guardians are loaded from disk.

ORIGINAL GRAPHICS

All Amiga graphics by Tony Smith were ported across to the ST using DOS to DOS. With these picture files in .IFF format, they

were loaded into Degas and saved back onto disk in .P10 format. Mirrorsoft's *Art Director* was used for storing the sprites back out disk because it's the only art package to use co-ordinates.

The most complicated challenge was the horizontal scrolling which took two weeks to resolve. At the moment Wayne is working on a game given the working title 'It Can't Be Done'. It features horizontal scrolling at astonishing speed.

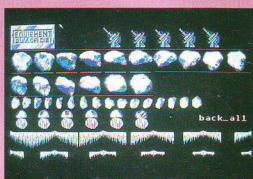
Wayne is reluctant to talk about how he achieved fast scrolling in *Blood Money* but he did explain that the game uses three screens in memory. Two screens contain the scrolling picture two steps on and these are displayed in turn while the third one is worked out. This method of picking up a screen, scrolling it and putting it down again takes five frames. After working out clock cycles and times on paper, this was brought down to just 2.25 frames. The Amiga runs in three.

Wayne started life with a Dragon and says: 6809 code was a good base for 68000. "I just had to learn to think in terms of words instead of bytes."

Looks like he managed that alright. ■



■ **The Walkers use 18 frames to keep the animation smooth enough. Even the jellyfish take between 12 and 16 frames.**



■ **Various sprites used in the game. These are ported across to the ST using DOS to DOS and then converted into a usable format using Degas Elite. Finally Art Director is brought in to change colours and make minor adjustments to sprite sizes.**

Wayne has managed to use up to 512 colours on screen at once. "The ST has its own copper chip," he explains. "This can be programmed very quickly, using virtually no processor time. All you need to do is set timerb to count and wait 10 lines or so before switching the palette over." This effect is used on the status line at the bottom of the screen.

BLOOD MONEY



PSYGNOSIS – £24.95



■ Providing it isn't your last life, when you die your character returns but flashes for a few seconds. In this time you are immune to attack.

You must have heard of *Blood Money* by now – the Amiga version has virtually become a classic and after a long wait it's finally time for the ST's turn to hog the limelight.

Blood Money is a shoot-'em-up in the typical arcade mould – fly through one level after another confronting a giant end-of-level guardian in a bid to amass a gigantic score.

However, there are some major differences which really make it a great game. First off, the game uses four directional scrolling which moves along at its own pace, separately from your movements. This means that your character is forced to follow the natural direction which creates its own problems – a move around the wrong side of a wall can see you trapped among debris and unable to do anything but die.

A central idea in the game is money – hence the title. By blasting away the aliens you can run along behind them like a parasitic Hoover and pick up all the coins that they drop. Some aliens are harder to destroy than others but these invariably carry more money.

There are four planets to overcome and each one comes with a price tag of \$100 more than the last. You begin the game with a bank balance of \$200 so you could go straight in to level 2 but this leaves you with nothing for bolt-on weaponry. You assume a different character for tackling each planet – helicopter, submarine, astronaut and space craft.

Shops are scattered liberally throughout each planet and you

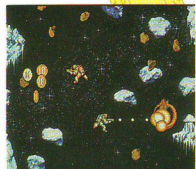
can fly into these to use your cash to purchase new weaponry. There are eight types on sale. These consist of earth and skybound missiles, bombs – which make gates spin like Catherine wheels – rear firing and long-range missiles.

Speed-up can also be purchased to make you move faster through tricky situations force-fields for limited invulnerability and even extra lives.

There are several types of aliens involved in the game: the



■ On the top is a screen from the ST version. The lower picture is the original Amiga version.



■ Two people can play simultaneously - fortunately you can't kill each other.

first can be blasted away. Some eat up more firepower than others but they all drop coins. The second won't kill you but will steal your money. Then there are the massive sea-serpents which come out from the edges of the screen and obstruct your progression.

Hazards make it tough especially the gates. They spin round and you must steer your way through them, other gates can only be opened by firing at them and by far the worst obstacles are those which are perfectly hidden in solid walls. The only way to find them is to fire up and down the entire wall until something moves - damn distressing when you've got a squid hot on your tail.

EFFECTS

All the aliens for each planet are loaded into memory when you first select where to go so no disk accesses are made during gameplay. However, just before you reach the end-of-level guardian, the display halts while the guardian is loaded up. This is the only intrusion in what is otherwise a smooth operation. Scrolling is marginally slower than the Amiga version but animation and sprite control are just as perfect.

Aliens are often extremely large and colourful with the majority individually animated. The jellyfish and walkers in particular are

an impressive bunch. End-of-level guardians are massive and eat up the firepower but they've been so beautifully animated that it almost hurts to watch them explode into a mass of flames.

The 3D opening sequence which made a big impact on the Amiga version has not been included here because it was felt that there wasn't enough time.

Sound was not present in the version reviewed but we understand that it will consist of standard spot effects.

CONCLUSION

Shoot-'em-ups are a common breed so finding one that actually has something above the rest is rare. However, *Blood Money* has that elusive quality. For a start, the graphical effects almost border on a programming miracle with smooth and exciting animation. Four-directional scrolling adds an additional maze element but it's the money idea which really gives it a glow of originality. It runs slightly slower than the Amiga version which is in fact a positive point. Many claimed that the Amiga version was far too difficult, this slight reduction in speed resolves that.

Blood Money is still a shoot-'em-up so there's no getting away from the hackneyed theme of blasting everything that moves in your bid to meet the end-of-level guardian, but with each planet populated by animated aliens, it's better than any other ST shoot-'em-up.

Mark Higham

GRAPHICS	8
SOUNDTRACK	?
SHORT TERM INTEREST	8
LONG TERM INTEREST	9
OVERALL	90%



■ Get past the end-of-level guardian and you get a healthy injection of cash.



■ You get the chance to buy extra weaponry at the equipment stores dotted around the level.



■ Jellyfish pulsate up and down and move towards you.



■ In an instant they've become a threat.



■ All four planets use some kind of super-alien which is meant to keep you glued to the screen - it works.

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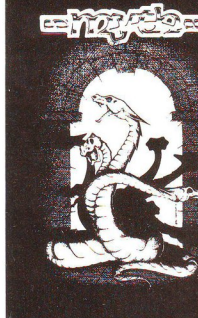
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Myth was rated at 90% by Keith Campbell of Commodore User. He said "Don't be put off by it being a mini-adventure..."

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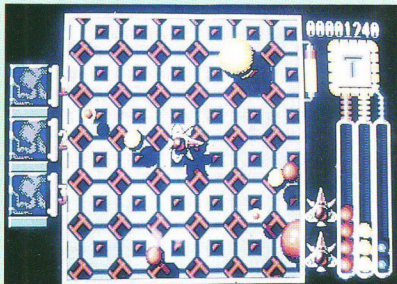
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What has a crystalline substance with a hardness of seven got in common with Firebird's latest game? Simple, they both have the same name. Quartz is basically a scrolling shoot-'em-up set inside a crystalline structure rather than the more conventional outer-space scenario.

Much of the action takes place in the crystalline lattice which plays very similarly to the old arcade classic Asteroids. Your ship sits in the centre of the screen and it scrolls in any of eight directions as you fly around the lattice. Hadrons are large spheres in the colours red, blue and yellow which fragment when you shoot them to form quarks. Blasting a quark causes it to release short-lived neutrinos which you have to collect. Don't touch the quarks or hadrons though because valuable energy will be drained from your ship.

To the right of the screen are three tubes into which collected neutrinos are stored. When all these have been filled to the top you can trade them for a "power



Zoom around the lattice blasting hadrons into quarks and quarks into neutrinos. Neutrinos will boost your weaponry.

up" to improve your chances of survival. Extras range from bombs and destructive flame weapons to armour and ship repairs. Only three weapons may be fitted to your ship so you must choose carefully.

The path to the nucleus is not a standard route, it varies from lattice to lattice. Scrolling shoot-'em-

ups is what they all are, but they vary in the direction of the scroll: left, right, up or down.

Deep within the crystal structure lurks the nucleus, rotating away and just asking to be obliterated. So off you go to send it for a final, destructive spin. No nucleus in its right mind would sit there

undefended and so you have to avoid hordes of sub-atomic particles and other deadly traps to reach the core. Destroy the nucleus and you can start work on another lattice.

EFFECTS

Music is excellent and so are the sound effects. Both have been done by Wally Beben. The parallax scrolling is across all eight directions and the sprites are both detailed and colourful. A lot of work went into the sound and appearance of Quartz and it shows.

CONCLUSION

Quartz is a good mixture of game styles that work together to produce a very addictive game which should keep you blasting away for many a long hour. Strap on weapons are always a good thing to help keep you interested in a game and strategy comes into play in choosing which weapons with which to equip yourself.

Gary Barrett

QUARTZ

FIREBIRD - £24.99

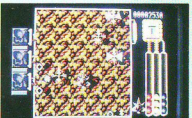


Different weapons can be purchased with your neutrino stock.

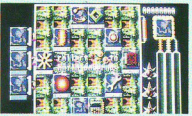
Down to the nitty gritty of nuclear annihilation.

Back into the sub-atomic void and this time it's a vertically scrolling shoot-'em-up.

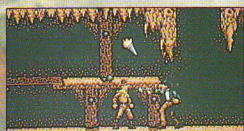
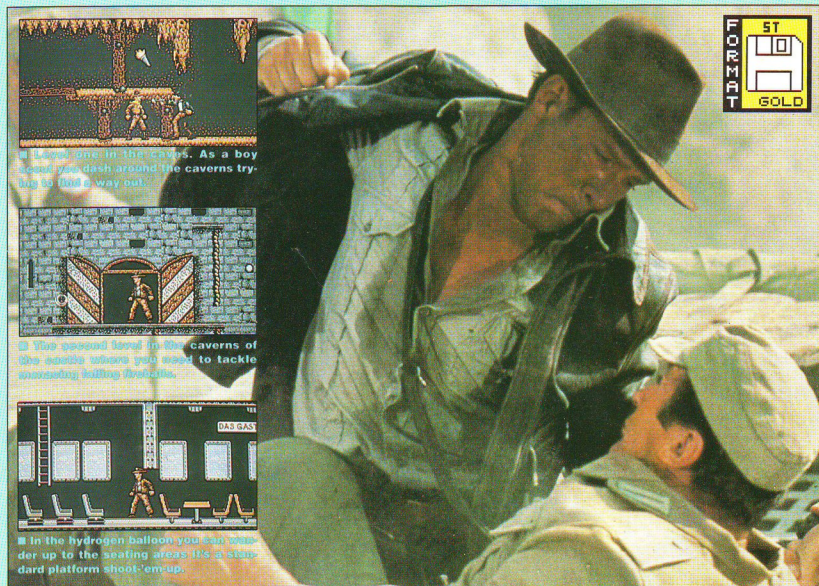
GRAPHICS	9
SOUNDTRACK	8
SHORT TERM INTEREST	8
LONG TERM INTEREST	6
OVERALL	75%



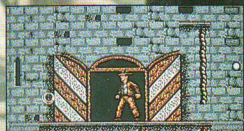
Blasting through the organic layer.



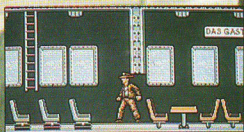
Many weapons can easily be fitted onto your ship.



■ In level one in the caverns. As a boy scout you dash around the caverns trying to find a way out.



■ This second level in the caverns of the movie where you need to tackle a menacing killing machine.



■ In the hydrogen balloon you can wander up to the seating areas in a standard platform shoot-'em-up.

Indy is back in US Gold's latest action movie licence. This is the first of two games based on the box office smash *The Last Crusade*, and has been programmed by Tiertex - the team responsible for *Thunderblade*. Lucasfilm Games are intending to release the adventure game in the next few weeks but this is the action version and it promises to beat the socks off of all the previous Indy games.

Simply, it's a platform shoot-'em-up but there's so much of the film plot involved that it is much more interesting than you might expect. Level one sees Indy as a young boy scout running through mysterious caves in an attempt to escape from a band of thieves, just as he did in the film. Ropes hang down from the roof of the caves and these are used to move around the different platforms. If you don't use the ropes to drop down a level then your energy is used up quickly.

Energy also suffers whenever

the roof starts to crumble and you get struck by falling rubble. If your energy level drops down to nothing then you lose a life, but this is not the only way to meet your death. Falling into underground streams of water or getting shot by the bad

guys will make you instantly lose a life but with five to play with you can survive the occasional disaster.

Ordinarily the joystick makes Indy jump up and down, walk forward or punch if the fire button is

pressed. If you're holding the whip at the time then pressing fire will cause Indy to lash it out.

The famous whip has been strategically positioned around the levels. If you find it then you're allowed five opportunities to test it out on your enemies.

Four levels will take Indy through caves, the mysterious underground dungeons of an old castle, a hydrogen balloon and finally the search for the Holy Grail - the whole purpose of the game. The Holy Grail will prevent anyone from dying but make a mistake on this final run and you'll perish instantly. Level four is the hardest



■ Every level opens with a digitised picture taken from the film.



■ The search for the Holy Grail starts here. Definitely the hardest level.

THE LAST CRUSADE

US GOLD - £19.99

one to complete, particularly since the controls suddenly change here. It's also the only one to look completely unlike a standard platform shoot-'em-up.

EFFECTS

The Last Crusade enjoys some great graphical effects. Scrolling takes place across four directions but what's really important is the size of the sprites. Indy and his foes are huge and have been very smoothly animated. Some of the scenes where you die occasionally look dubious but apart from that the graphics feel 'right' which isn't something you can say about too many games involving animated walking people. Most of the other effects are fairly realistic as well. The fireballs in particular are worth looking out for.

Although scrolling is smooth, Indy only performs a slow run on his way through the levels. Though speed isn't really a noticeable problem, the game might have benefited from being faster even if a smaller window had to be used.

Sound isn't sampled so bearing in mind the limitations of ST effects, it's seems reasonably similar to the film. During play the game tries to treat you to appropriate sound effects but they never quite come off.

CONCLUSION

My first impression when I played *The Last Crusade* was that it was just another platform shoot-'em-up similar to *Navy Moves* but with large sprites and the occasional clever effect like walking across collapsible bridges. However, by the time you get into level two you really begin to appreciate that there is a whole lot more involved. Most similar games offer little outside of the chance to puncture everyone with lead. But here there are so many clever animation effects and tests of your skill with

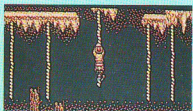
a joystick overcoming such obstacles as fireballs and ropes that you can get really excited by it. Indy fans particularly will find that it ties in well to the film.

The Last Crusade is one of the best US Gold games to date. The graphics are superb and although the game plan isn't original the twists and turns make it a brilliant challenge.

Mark Higham



■ You stand at the edge of the water and contemplate how you're going to get across.

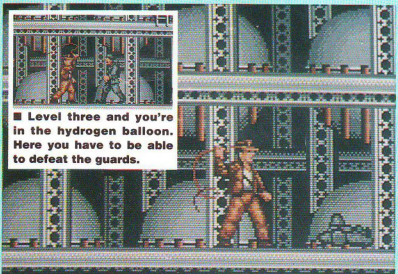


■ But if you're playing Indy you can't afford to be anything but smart.



■ Oh no, all that way and then you meet a gun-toting swine.

GRAPHICS	9
SOUNDTRACK	7
SHORT TERM INTEREST	9
LONG TERM INTEREST	7
OVERALL	90%



■ Level three and you're in the hydrogen balloon. Here you have to be able to defeat the guards.

■ These Nazi swine don't take much beating. A simple tap on the fire-button and you've inflicted a lethal injury.

CHARIOTS OF WRATH

IMPRESSIONS – £24.99



■ A shoot-out with monsters begins your quest for your princess.

Put yourself in Prince Agar's position, if your worst enemy, the Baron, had kidnapped your future wife you might be a little miffed, peeved even, so it's off across the country to rescue the fair maiden and give that Baron a stern talking to.

Thus begins your quest in Impression's latest offering. *Chariots of Wrath* is based around six different sub-games; a shooting gallery style blast the beasts as they appear game, an Arkanoid clone, an Asteroids clone, two vertically scrolling shooters and an infuriating platform jumper.

The shooting gallery is set in a dungeon corridor ending in a T-junction at which you stand and monsters can appear on either side of you or in the two doorways further down the corridor. It's just a matter of gunning them down as quickly as possible then on to the next sub-game.

The Arkanoid clone has you breaking through the castle battlements with the usual variety of

extra power pods dropping from the broken bricks until you have cleared a screens worth.

The scrolling shoot-'em-ups are very similar to each other with some smooth parallax scrolling, some wholesomely destructive extra weapons and large end-of-level guardians. The second one goes on far too long but they are otherwise one of the game's best features.

Rock dodging in your spaceship is a competent *Asteroids* clone and as such is entertaining in its own small (very small) way, which leaves only the platform sub-game.

CONCLUSION

A package of six games in one has to be worth a look from even the most jaded gamer and the overall quality of those in *Chariots of Wrath* is good though not exceptional. A good buy if your software collection or budget is a little on the small side but you would be hard put to find an ST owner without comparable games somewhere in their collection.

Dave Packer



■ The best stage by far is the scrolling shoot-'em-up, in which you can load yourself up with ridiculous firepower.

GRAPHICS	7
SOUNDTRACK	8
SHORT TERM INTEREST	7
LONG TERM INTEREST	5
OVERALL	59%

THE QUEST FOR THE TIME BIRD

INFOGRAMES – £24.95 Double-sided disks

All is peaceful in the land of Abkars but this tranquil mask hides the desperate crisis that now faces the humble people. The rebel god Ramor imprisoned within a conch will break free in nine days to bring his own particular brand of destruction, devastation and dark rule to the still beautiful country.

Only the Witch Princess Mara has the magical know-how to stop Ramor and she needs the conch and the mystical Time Bird to com-



■ Flying from place to place on your winged beasts.

plete her ritual, so, while she relaxes in a nice hot herbal bath, it's up to her beautiful daughter Roxanna to begin the quest for the Time Bird.

Based on a French comic book, *Quest For The Time Bird* is one of the new wave of icon-driven adventures and all the action takes

place over a picture of your current location on the game map. In most of these locations your gallant team of heroes is represented by a red circle that can be moved around the picture with the mouse. On arrival, with any luck, a window will pop up showing the scene along with any characters present.

Interaction with characters couldn't be simpler, just click on your right mouse button and a window appears showing all the members of your party. There can be up to four but the second two have to be found and recruited during the quest. Select the hero you wish to use and a set of action icons appears. Click on one of these and either you are presented with an appropriate menu, the food items inventory in the case of eat, or the mouse pointer changes to represent the action. Now move the pointer to the location window and click on the character you wish to interact with.

Talk first and only fight if you have to is a good rule of thumb with this game and it is in this way that you will recruit the two other player characters Bulrog and The Unknown Knight. Each character differs in their abilities; for example

Bargon is a hardy and valiant fighter but when it comes to charm the blatantly top heavy Roxanna (well she is a fantasy character) steals the show. Even in conversation your fingers are spared the strain of typing as each question or response is chosen from a menu window that appears whenever needed. Though this limits the need for much thought it does cut out all those tedious "I don't understand the word 'hello'"s that are the bane of every computer adventurer.

Movement from location to location around the land of Abkars takes place on a full screen map with the familiar red dot showing your current location. The same system of movement is used here as at a specific location except instead of the mouse pointer you control an old man complete with pointing stick.

EFFECTS

The digitised music (a single of which accompanies the game) and the odd digitised effect give this adventure a very polished feel but where the *Quest* really scores is in the graphics department. All the

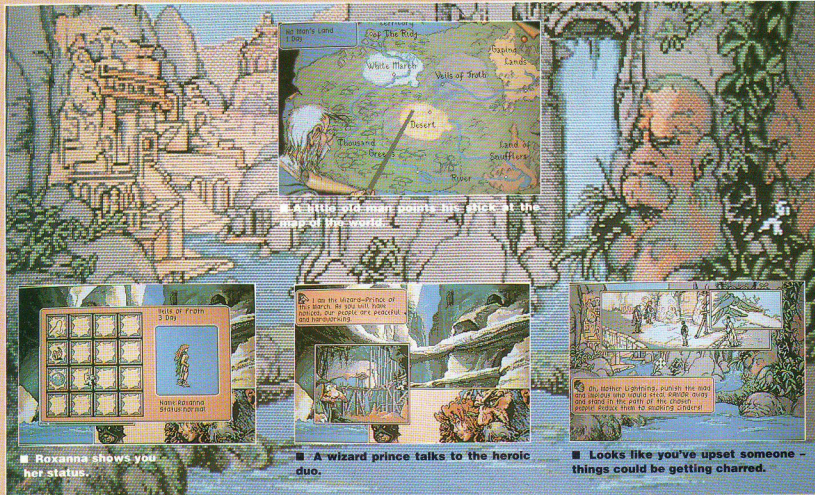
still screens and even the animated sequences are extremely colourful with the great attention to detail we have come to expect from the French. Every effort has obviously been made to make the computer version as close to a graphic novel as possible.

CONCLUSION

This type of icon-driven adventure is improving all the time and *Quest For The Time Bird* is one of the best yet. If you are an adventurer whose fingers are weary of endless tapping or even if you normally stay away from adventuring *Quest's* interaction system and great graphics make it well worth a trip to your local software shop, even if only to marvel at the artwork.

Dave Packer

GRAPHICS	8
SOUNDTRACK	6
SHORT TERM INTEREST	7
LONG TERM INTEREST	8
OVERALL	78%



■ A little old man points his stick at the map of the world.

■ Roxanna shows you her status.

■ A wizard prince talks to the heroic duo.

■ Looks like you've upset someone - things could be getting charred.

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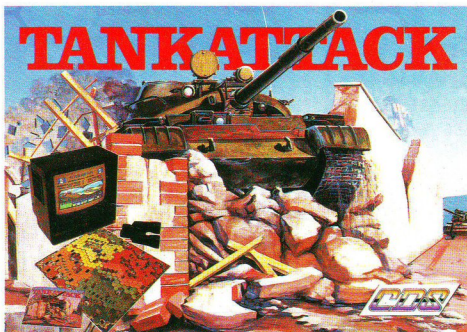
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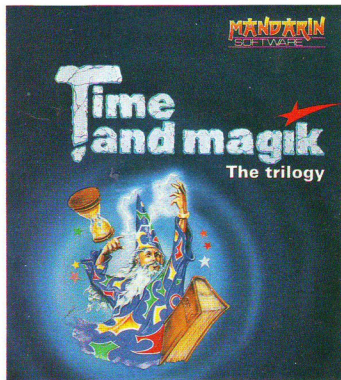
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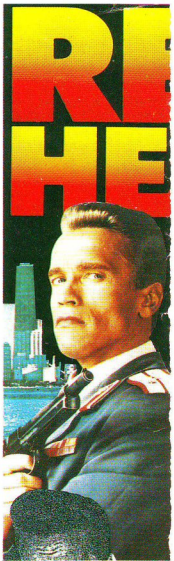
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G

2

Forgotten Worlds from US Gold

The cities have been destroyed by the evil Emperor Bios and his descendants. Two superior warriors have been assigned the task of cleaning up the mess and of fighting back. They have a hard job ahead of them.

The game is split into four levels each with its own perils. You must use whatever firepower you can accumulate along the way to win the battle.

A monster hit. The magazine reviewers loved it, and you will too.

"Across all formats *Forgotten Worlds* is an ace shoot-'em-up polished to sparkling perfection by its superb graphics."

The Games Machine.

"One of the best US Gold have produced...brilliantly addictive."

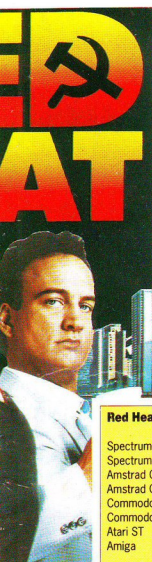
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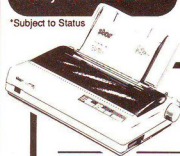
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Long ago there were some people called the Greeks. In those days they didn't make kebabs, but went around the world conquering people. As a pastime they used to compete against each other in races, javelin throwing and a multitude of other sporting activities. The rest of the world eventually caught on that sports could be fun and therefore Jimmy Hill was born (he doesn't look two thousand years old does he?).

With the invention of the microchip came a new medium in which to play sports: computers. One of the earliest arcade games was tennis which was basically two rectangular bats and a square ball. Many years have passed since those first sports games and now almost any popular sport can be found on computer.

ARCADE OR STRATEGY

There are two main sorts of sporting games: arcade and strategy. Strategy games normally put you in the position of manager or captain of a team and you plan tactics, buy players, balance the budget and watch the computer work out the results of events. Football is by far the most popular sport to be done in this style although rugby and American football have been done too.

With arcade style games you have direct control of the player or team with the joystick and have much greater control. Olympic sports are the most common in this genre although football again is very popular.

There's also a sub-set of arcade games, wagging games. Waggle games involve you moving your hand as fast as possible to build up the speed of the sporting superstar under your control, and they are probably the only form of sports games that provide you with any exercise. Admittedly it's only the hand that gets exercise, but it's something. The Daley Thompson games are the most famous in this category.

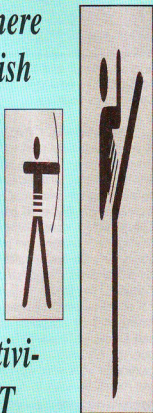
CLOSER AND CLOSER

In the beginning sports games bore little resemblance to the actual sport; graphics tended to be very simple, sound virtually non-existent and the game itself inaccurate in its representation. ▶



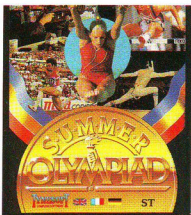
SPORT FOR ALL

Now that summer is here and the good old British weather is as good as ever it's time to sit down in front of your ST and consider some less energetic sporting activities. GARY BARRETT relaxes in front of his ST and thinks about exercising.



As computers gained in power and programmers in expertise the simulated sports started to look and feel more and more like the real thing, although some games stuck with the simplistic approach to help keep the gameplay rather than losing out to the tedious mechanics of accuracy.

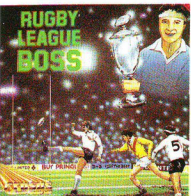
Strategy games have changed the least; though the algorithms used to calculate outcomes have become more complex, the general principles have hardly changed. Appearances have



altered though and they do look much better now than they did three or four years ago.

FOOTBALL CRAZY

A year doesn't go past without a football game of one sort or another being produced. Both types, strategy and arcade style, appear in roughly equal numbers. The strategy variety are of the management variety and two that spring to mind are *Football Director II* and *Brian Clough's Football Fortunes*. The former is fairly typical of management games with it having all four divisions, national and European trophies, transfers, injuries etc and it takes many months to work your way up from the fourth division to top of the



first. It doesn't have to stop there though because you can continue playing forever.

Brian Clough's Football Fortunes is unusual as far as strategy games go because it has a playing board too. The computer is used to handle the housekeeping and do the mundane tasks while the board is used for the main action.

Arcade action football games

BUFFALO BILL'S WILD WEST RODEO GAMES

TYNESOFT £24.95

The legendary character from the wild west, Colonel Bill Cody has gained computerised fame in Tynesoft's latest release. Buffalo Bill's Wild West show was famous for its demonstrations of skill with knife, gun, lasso and animals and people used to travel from miles around to see the western equivalent of a circus. Now you too can take part in that show and get hordes of relatives clustering around your ST.

There are six events in the show: knife throwing, trick shooting, bronco riding, stage coach rescue, calf roping and steer wrestling. The action begins with knife throwing where and Indian squaw is strapped (don't get excited!) to a large wheel which spins around. You throw knives at the wheel and unless you're particularly sadistic try to miss the squaw. Hit her, and the screen turns a bloody colour.

Trick shooting is played similarly only this time you're firing at cardboard cutouts which include little children, sheriffs, women and of course bad guys. You're only supposed to shoot the bad guys though, but an odd pot shot at a kid never does anyone any harm, apart from the kid of course.

Bronco riding is next up and this takes some serious joystick manipulation if you want to stay on for more than a second. The stage coach rescue involves galloping along on your horse trying to



■ Bronco busting Buffalo Bill style.

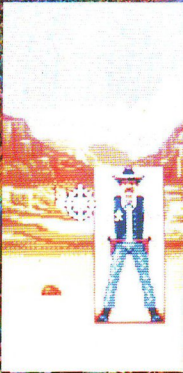
catch a naughty little Indian who has captured the stage. First of all you have to waggle

your way towards the coach avoiding luggage which the injun bungs at you and then you climb on board the coach. A fist fight ensues; all this action must be completed within a time limit.

Cruelty to cows comes next with your task being to lasso a calf in as short a time as possible and then bring it to a halt. Finally there's steer wrestling in which you chase the steer, jump on it, grab it by the horns and try to overbalance it using all your strength - or weight! Time is again of the essence.

The graphics are excellent with loads of colour and detail. They've got the space though because *Buffalo Bill* comes on three disks. Music and sound effects are good too and the overall impression is that a lot of time and effort went into the appearance, both visible and audible.

There's not really enough gameplay within to make for an exciting and long lasting game. It has initial novelty value and mastering the events will take both time and skill, but in the long term you'll find yourself becoming bored.



■ Don't hit that ill squaw or you'll see a bloody screen.

GRAPHICS	9
SOUNDTRACK	7
REALISM	7
LONG TERM INTEREST	5

OVERALL 83%

KICK OFF

ANCO £19.95

Occasionally out comes a game that might not be the most brilliantly executed piece of code but which has the essential characteristics which make an addictive game. In the Future Publishing offices in Bath *Kick Off* is the game of the moment - with a major league tournament taking place.

Kick Off is a change of approach for Anco who have in the past concentrated on strip poker games. It's played between two teams of 11 players on a vertically scrolling playing field. Your opponent can be either human or computer controlled, and as usual the player under your control is the one nearest to the ball.

Before the kick off you can choose a skill level for the players in each team which range from Sunday league to international, the latter having very tough opponents in the one player game. You can also choose the formation that your players play in out of: 4-2-4, 4-3-3, 4-4-2 or 5-3-2. This has a considerable affect on the action. Match length is also variable from 5 minutes to 45 minutes each way although not many people will play the full length match.

The number of things that you can do with your players is fairly limited: they kick, stand still with the ball, slide tackle, tackle and foul. Fouling is usually unintentional (unless your opponent is a certain R. Monteiro) and is a result of late tackles and the like. There are several referees and some are worse than others in their decisions as to whether or not something is a foul. Yellow cards and even red cards are awarded for repeated foulers



■ Anco's *Kick Off* leads the pack of football games.

(Monteiro got down to four men once - and still managed to win). Fouls in the penalty area will result in a penalty which are fairly easy to score from.

Throw-ins and corners are also included although corners are bit weird. A box appears with nine symbols in it to indicate the path that the ball will take. You choose one and the kick is taken.

One defect in the game is time. Although the computer keeps track of time well and even allows for injury time it sometimes does things wrong. In one match a penalty was awarded just before the final whistle and the referee blew the whistle for the end of the match before the kick was taken.

Graphically *Kick Off* is very simple with small players and little colour, but it makes up for it in play by being both fast and addictive. Sound is a mixture of simple effects and digitised sounds of the crowd to add to the atmosphere.

Comparison with other football games is inevitable and the two to consider are *Microprose Soccer* and *Microdeal Soccer*. *Microprose Soccer* is the most recent competitor and is viewed from overhead like *Kick Off*. It plays similarly - with the major difference being banana kicks and overhead kicks. Banana

kicks send the ball through a horizontal arc rather than just travelling in a straight line and they can be used effectively to confuse your opponent's keeper. Overhead kicks are spectacular shots that result in the ball being shot in the opposite direction to the one that the player is facing.

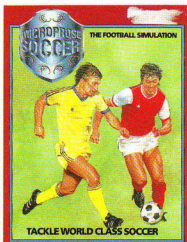
Microdeal Soccer is a much older game and uses the side on approach to the game. The action is viewed from the touchline with goals to the right and left. Like *Microprose Soccer* you can alter the weather conditions and match length is again variable. You can also choose whether to play at day or night, and alter wind direction and your players' strip.

Of the three *Kick Off* is most fun to play, but the other two games look better, and have extra features to alter difficulty like weather. *Kick Off* is still the one buy though. Anco have finally produced a cracker.

GRAPHICS	6
SOUNDTRACK	3
REALISM	9
LONG TERM INTEREST	8
OVERALL	88%

SUPPLIERS

GAME	COMPANY	ADDRESS	TELEPHONE
Buffalo Bill	Tynesoft	Addison Ind Estate, Blaydon, Tyne & Wear NE21 4TE	091 4144611
Daley Thompson	Ocean	6 Central Street, Manchester M2 5NS	061 832 6633
Football Director II	DBM Games	19 Melne Rd, Stevenage, Herts SG2 8LL	0438 728042
Goalball Fortunes	CDS	CDSHouse, Beckett Road, Doncaster DN2 4AD	0302 21134
Grand Monster Slam	Rainbow Arts	Hansaallee 201, D-4000 Dusseldorf 11, W. Germany	052 41 16898
Kick Off	Anco	Unit 10, Burnham Trading Estate, Lawson Rd, Dartford, Kent	0322 92513
Microdeal Soccer	Microdeal	PO Box 68, St Austell, Cornwall.	0726 68020
Microprose Soccer	Microprose	Unit 1, Hampton Rd Industrial Estate, Tetbury, Glos GL8 8LD	0666 504326
Microprose Soccer	Microprose	Unit 1, Hampton Rd Industrial Estate, Tetbury, Glos GL8 8LD	0666 504326
Zany Golf	Electronic Arts	11/49 Station Rd, Langley, Berks SL3 8YN	0753 49442



include *Kick Off*, *Microprose Soccer* and *Microdeal Soccer*.

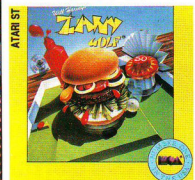
A KICK IN THE HEAD IS WORTH TWO IN THE GUT

Martial arts games are another popular area in sport and two or three arrive every year. All eight directions of the joystick and the fire button are combined to give 16 different blows or manoeuvres to knock your opponent flat on his face. Karate is most popular martial art to feature, because it's just pure killing machine.

Microprose are to release *Oriental Games* in the next few months which contains four different styles of martial art: kung fu, Hollywood rules, sumo wrestling and kendo. Kung fu lets you kick your way through opponent after opponent using the martial art which "Glasshopper" specialises in. Hollywood rules has no rules and sumo wrestling has you as a fat and ugly oriental trying to squash an equally fat and ugly opponent. Finally there's kendo where you try and pulp your opponent with a stick.

WEIRDNESS

Not all sports games are straight, there are some that take a silly approach to a serious sport and others are just silly subjects that



ELECTRONIC ARTS

aren't really sports at all. *Zany Golf* from Electronic Arts takes the former approach and *Grand Monster Slam* from Rainbow Arts takes the latter. *Buffalo Bill's Wild West Rodeo Games* from a Tynesoft is another unusual sporting game, taking a Western theme. ■

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COMING SOON

Myth is the new adventure game from Magnetic Scrolls. It's set in the typical adventure vein with dungeons and castles everywhere. The author is Paul Findley who was responsible for both *The Pawn* and *The Guild of Thieves*. Myth is not actually for general sale but comes free when you join the Official Secrets club. This is a club for adventurers which



■ *Myth* - an adventure for subscribers to *Official Secrets* - a bi-monthly magazine.

offers hints and types for virtually every adventure game on the market. You can get more information on the Official Secrets club by contacting 0279 726541.

On the *Dragon's Lair* front, Readysoft have confirmed that they will be releasing an ST version soon. David Foster, product manager, explained that they are hoping to make the game suitable for use on 520 STs with single- and double-sided drives. 'Obviously single-sided owners would only get half a game. We intend to keep it down to six disks and this is the only way it's possible.'

Dragon's Lair was the arcade hit which came out on the Amiga not long ago. Unfortunately the game would only run on machines with 1Mb of memory - Readysoft are saying that the same will not happen to the ST. However, Entertainment International, distributors for the game are saying that 1040STs may still be required. "It's hard to see how the game could be fitted into 520K," they explained. Demos are due in September so we'll be able to make up our own minds. ■



■ *Dragon's Lair* as it appeared on the Amiga.



■ Screen 7 didn't exactly impress the socks off of everyone with *Jaws* last month but they claim their latest game - *Crossbow: The Legend of William Tell* will be their most ambitious release yet. It features smooth animation, gothic backdrops and an icon-based method of interaction in an action game all about Bill Tell and his search for his son.



■ Another new release from Screen 7 due soon is *Fallen Angel*. It's a budget game retailing at £14.95 and sees you as a renegade travelling around wiping out the drug barons.



■ Domark are hoping to make the number one slot this Christmas with their conversion of the Atari coin-op hit *Hard Drivin'*. It's not a game which lends itself to conversion but they're trying to recapture the graphics and fast action response of the arcade. Judging by the screenshot it looks like they're getting there.

ACTIVISION POISED FOR ACTION

Activision have been fairly quiet over the last few months but that's only because they have been concentrating on getting a great bunch of games ready for the forthcoming PC Show and Christmas. This line-up includes some impressive games from the company which brought us *R-Type*.



■ Activision's new *Bomber* will be the first of the new set to appear on the ST. It's an aircraft simulator featuring 14 different craft.



■ *Super Wonderboy* is a four-way scrolling platform game due out towards Christmas. A lot of work has gone into the graphics but it still looks like a kind of *Wonderboy* in Pacland.



■ *Dynamite Dux* is a comical little arcade adventure game designed for two players. It claims to have some pretty effects but we haven't seen them yet.



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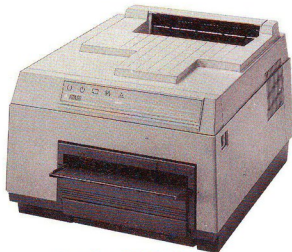
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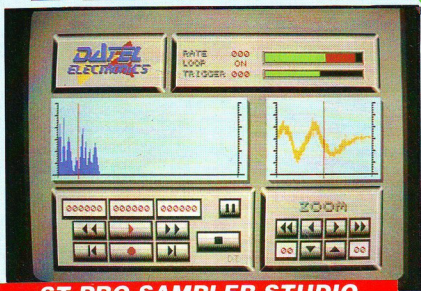
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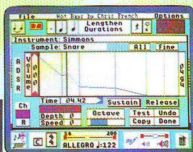
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ZAK MCKRACKEN

The Zak McKracken saga continues with more tips from the ever helpful Spiros Gaoutsis of Salisbury. This month you'll do a bit of globe trotting and even go to the toilet as you attempt to save the world from those unpleasant little green men.

We left you at the airport last month talking to that bald headed Devotee. Give your cashcard to him and he will sell you a book, a most interesting tome. Go to the plane and after take off go to the toilet. Be a naughty boy and use the toilet paper in the sink to clog it up. Turn on the sink and press the call button. Leave the loo and while that cute little stewardess is tidying up after you walk to the front seat and pick up the seat cushion and lighter.

Go back to your seat and when the stewardess has finished do the toilet roll trick again. Go to the front of the plane and use the egg in the microwave. Turn on the microwave and go back to your seat.

That poor stewardess must be getting very cross by now, because now she has to clean up the kitchen. While she's doing it go from bin to bin until you come across the oxygen tank and pick it up. Don't waste

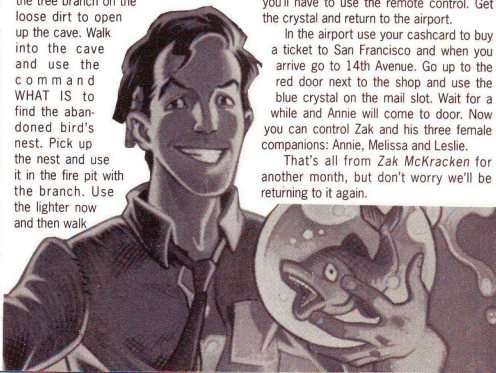
time because she's a fast cleaner. When the plane lands leave it and go to the tree. Get the branch and give the peanuts to the two headed squirrel. Use the tree branch on the loose dirt to open up the cave. Walk into the cave and use the c o m m a n d WHAT IS to find the abandoned bird's nest. Pick up the nest and use it in the fire pit with the branch. Use the lighter now and then walk

until you find the strange marking.

Use the yellow crayon on the markings and walk through the door when it opens. To release the clamp on the blue crystal you'll have to use the remote control. Get the crystal and return to the airport.

In the airport use your cashcard to buy a ticket to San Francisco and when you arrive go to 14th Avenue. Go up to the red door next to the shop and use the blue crystal on the mail slot. Wait for a while and Annie will come to door. Now you can control Zak and his three female companions: Annie, Melissa and Leslie.

That's all from Zak McKracken for another month, but don't worry we'll be returning to it again.



GAMEBUSTERS

STREET FIGHTER

It's tough on the streets, but with some help from J. Atha you'll soon be skipping your way through levels. To skip a level you have to first type STREET CHEAT when the title screen appears and now when you play the game just press [Help] to go to the next level.

ROLLING THUNDER

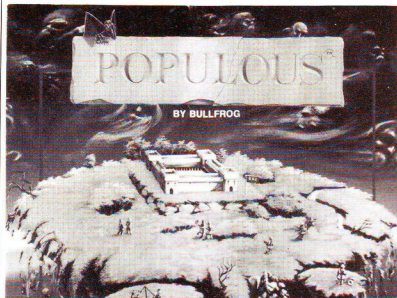
Blasting your way into the heart of the enemy headquarters is a demanding task and if you need help then simply follow J. Atha's tips and you'll defeat those bad guys. As soon as the digitised laugh has been played type JIMBBY and a message will appear saying cheat mode on. Infinite lives are now at your disposal and you can skip levels by pressing I.

POPULOUS

There are many people out there having divine problems with that poor hoofed gentleman the devil (he gets a lot of bad publicity, but at least he'll let anyone into his domain). Peter Hutchinson of Halifax has supplied a few tips to help you oppress the little guy some more.

First of all you need to boost your population and the best method is to create lots of flat land. Build it at various levels so

Stuck on that tricky game? Here are two pages of things the manual never told you.



that you don't lose everyone to flooding. Your followers can get busy building settlements.

Castles are well worth building because they boost your mana which helps to defeat the evil guys. Walkers are generated more slowly however. When you've got a big population you can start building towards enemy land and start settling on it.

Don't put your papal magnate too near to enemy land as it's difficult to create new leaders if he

gets killed. It's also a good idea to make your leader strong by using the Gather Together icon. When you enter an enemy's territory, use earthquakes and swamps to weaken him, and always go straight for his castles and large settlements.

If you have a leader, move your papal magnate further to encourage your people to populate further into enemy land, but not too far in!

Peter also recommends using

the divine intervention icons as follows:

■ Earthquake – Useful for destroying castles and heavily populated land. Land can be easily renewed afterwards though.

■ Swamp – Useful for killing a few enemy people and down grading buildings. Easy to remove swamps by building land on it and removing it.

■ Knight – Best used in later stages of the game to destroy remaining enemy settlements and evil followers. They die quickly early in the game.

■ Volcano – Useful for creating land quickly but takes time to be made flat enough to populate. Can make enemy land unsteppable.

■ Flood – This should be used with care! If you want to use it, make sure all your settlements are on high land then when used it will destroy everything that is one level higher than sea level – very effective!

■ Armageddon – A last resort, best used when you have a larger population than the enemy and you're at a later stage in the game to be able to win it!

MARIA'S CHRISTMAS BOX

Douglas Price from Peacehaven (what a nice sounding place to live!) has a tip for all you pervies out there trying to get Maria Whit-

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EDUCATION AND GOVERNMENT ORDERS WELCOME

taker's knickers off. First of all make a backup of the Maria disk. ONLY do the following on the copy of the disk. Rename the file MARIA8 to MARIA8.BAK using SHOW INFO from the file menu. Also rename MARIA1 to MARIA8. Poor old Maria will then begin the game in the altogether.

OUTRUN

Paul Warner of London has sent in a tip for Ocean's *Outrun*. The racing game that dragged racing games down to an all time new low. To activate the built in cheat



■ Break all the rules in *Outrun*.

mode all you have to do is type in STARION when playing the game. If you then press the following keys during the game useful things will start happening.

- B Extended play
- S Next screen
- T Extra 10 seconds
- X Quit
- D Save screen in Degas format
- Q Program info

WICKED

Just in case there are some of you out there having trouble working out what the Tarot cards mean in *Wicked* here's a list of them along with and explanation.

- SUN Arms you with eight-way auto-fire.
- STAR A little star joins you and fires when you do.
- DEATH Gives you an extra life.
- HANGED MAN Eats away at your time limit.
- MOON

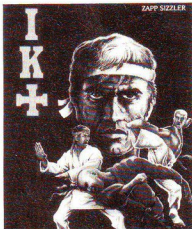
The forces of evil home in on you. WHEEL OF FORTUNE Either gives you energy or takes it away.

- TOWER OF DESTRUCTION Evil portals spread their evil very rapidly.
- LION Shields you from the evil forces.

RETURN TO GENESIS

There's help on the way for *Genesis* fans (the game not the band or fictional tale in the Bible) from the land of Norwood, home to Darren King.

Darren says that you should type in WASPASM at any time and you can have invulnerability from there onwards by simply typing [F4].



INTERNATIONAL KARATE

Paul Warner also has a tip for the the kick-em-up *International Karate Plus*. Type in the following for

some very strange happenings:

- FISH
- PERI
- FREZ
- WICK
- PAC
- BIRDS
- TOTO
- SHAH

Don't type in the next two though (you'll have to fill in the missing letters yourselves).

F***

Charming these programmers don't you think?

■ *Aunt Judy* has been sacked because of her appalling dress sense.

AU REVOIR

Yet again we must close the mail bag for another month. Don't cry though because *Gamebusters* will be here again next month: same time, same place and ready to save the souls of millions of readers. Recently there haven't been any pokes on the cover disk, but there's a good reason for that, no one has sent any. Come on out you little haekers and get coding, save the weak and feeble from death and destruction with a well-aimed poke. It's worth while because any pokes used on the disk earn a prize.

That doesn't mean that all you tipsters get let off though, we need your passwords and playing guides. A poke may save a thousand lives, but have you ever poked an adventure? The best tip of the month wins a prize.

Send those tips and pokes to: *Gamebusters*, ST Format, 4 Queen Street, Bath, Avon BA1 1EJ.

This month's prize goes to Peter Hutchinson for his divine tips for *Populous*. Some goodies are heading his way.

KULT: THE WAY TO THE SKULLS

Infragrams little cult of a game has been causing many people problems so here are the solutions to four of the problems in the first part of the game.

DE PROFUNDIS

Click on wait from the column of icons to the right and the platform will sink a little. A vertical column will also come down from the ceiling.

Select the rope from your possessions and lasso the vertical column. Wait twice and the granite monster will appear again. Click on him and choose jump on. Wait again and he'll take you to the exit and you'll receive a skull as you leave.

THE NOOSE

Activate the psi power of solar eyes so that you can see what you're doing. Click on the left rope beneath the poormouth and grab hold of it (the right rope is slippery).

Push the lever to bring the poormouth's life to an abrupt end. Click on the rope that is supporting him and choose to take it.

In the platform there's a hollow which you must click on. Inspect it and you'll find another skull. Leave the room and continue your quest.

THE WALL

Click on the third arrow on the floor and the

panels will slide across halfway. Click on the left door and the panels will slide fully across to close off the centre of the room.

Inside the door you'll find a panel. Click on the step and choose climb on (if you don't you'll end up very dead). Select the dagger and put it in the slot in the figure to the left.

There will be two passages visible: left and straight on. Click on the left passage and then click on the deep cavity in the floor. Stick in your hand to find yet another skull.

Click on the floor when the word 'passage' is visible and you'll again have a choice of left or straight on. This time go straight on.

THE TWINS

Click on each of the serpents in turn and open their mouths. Enter the source room by clicking on the relevant door and inspect the fountain.

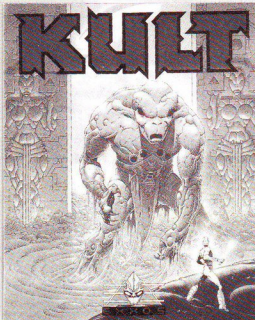
Press the eye in the fountain and water will fill up the bath. Select the goblet from your possessions and choose fill goblet. Go back into the twins room.

Click on the goblet and choose empty. Position the mouse pointer over the left serpent and click the button. A die will float to the top and you must take it immediately or it will sink down the serpents throat again.

Put the die into the right serpent and the door "Who shall be saved?" can now be opened. Go through the door for the final stage of the problem.

Click on each hand, lift them all and then click on the serpent's head. Choose press and there will be a sound from the source room. Enter it and stand on cube two. Click on cube two and lift it to obtain the fourth skull.

■ As an extra bonus here's a very useful tip to make playing the game more fun. Turn the volume down on your monitor, it stops you from going mad listening to those awful sound effects.



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Welcome to *ST Format's* new music section. Every month MIDI expert **CHRIS JENKINS** will be teaching you how to get the best from your kit and keeping you up to date with the state of the art in sound processing. We'll also be looking at the ST's own sound chip and how to program it. And we'll be printing any musical hints and tips you have – send them to *ST Format*, 4 Queen Street, Bath BA1 1EJ.

Probably the most popular musical use for the ST is the sequencer. Sequencer packages are available from £50 to £500, with all sorts of features from the most simple record and playback level to the incredible complexities of professional standard studio packages.

As an example, we're using C-Lab's *Creator*. This is probably the second best-known pro-standard sequencer package, after Steinberg's *Pro-24*, but it suits our purposes better because it has a more comprehensive main screen, and in some ways a more logical method of operation.

Let's start by reminding ourselves what a sequencer is meant to do. The sequencer is a "note recorder" which can cope with

USING SEQUENCERS

The start of a regular monthly tutorial.

entire songs. The advent of MIDI and personal computers has opened up new possibilities, and software sequencers like Steinberg's *Pro-24* were designed to imitate multi-track tape recorders. The aim was to allow you to record any keyboard performance with complete accuracy, then edit it in software as you would a word-processed document.

C-Lab's *Creator* then has many of the features of a multi-track tape recorder: START, STOP, RECORD, FAST FORWARD and so on. The computer's memory is treated like a long piece of tape.

But, unlike a tape recorder, *Creator* doesn't force you to record one entire track. Like most sequencers, *Creator* is "pattern-based" – it allows you to construct

each section of a piece of music separately. The intro, verse, chorus, bridge, middle eight, and outro can be constructed separately and copied, arranged and chained into the complete song.

A pattern is made up of separate tracks – *Creator* has 64 per pattern. Each separate track can hold a different piece of music, assigned to a different MIDI channel, to play a different instrument (if you have enough equipment!). Theoretically, with enough synthesisers, samplers and drum machines, you could sequence your entire song live, then just overdub the vocals and acoustic instruments on tape. More and more musicians are working in this way, abandoning conventional multi-tracking. ■

Why, you may ask, should I learn music theory, in these days when everything is computerised, MIDIified and electronicised? Well, for one thing, sitting alone in your home studio with your ST bashing out tunes can be very satisfying – but when you want to work with other musicians, especially ones who play acoustic instruments, you need a common language to work with. It's no good saying "play MIDI note value 68 at a velocity of 125" to a guitarist, is it?

The other good reason is that although you can compose "by ear", a sound knowledge of music theory will make it easier for you

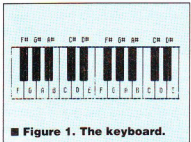


Figure 1. The keyboard.

to work in different styles and understand how to achieve different effects. Also, if you can read conventional music notation, you can work from published sheet music, or a non-MIDI musician's written notes.

Let's get right back to basics. What is sound? It's a vibration in the air, which the mechanism of our ear perceives when it impacts

MUSIC THEORY

If you thought quavers were a brand of crisps and bars just bring to mind chocolate then our regular music theory column is for you.

on the eardrum. The nervous system and the brain interprets the vibration according to its frequency – the number of "cycles per second" – and its amplitude – the changing volume.

In the Western musical tradition, we work using a musical scale based around a note A which is at 440Hz (cycles per sec-

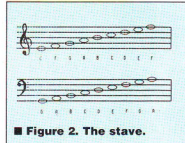


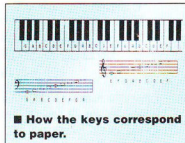
Figure 2. The staff.

ond). Different notes derived from this frequency are assigned letters of the alphabet, and the whole musical scale is divided into octaves, so named because every eighth note starts a new cycle; A, B, C, D, E, F, G, A, B, C, D, ... and so on. Between notes (or "tones") we have half-notes (or "semi-

tones"). These can be regarded as being above (sharp) or below (flat) a whole tone.

The MIDI standard supports a seven-octave range in which notes are numbered from C0 (24) to G8 (127). Of course, some acoustic instruments can play outside this range.

The keyboard (we'll use a keyboard for all out music theory work, since most MIDI equipment



How the keys correspond to paper.

is keyboard-based) is laid out as in figure 1.

But how does this correspond to written music? Although music manuscript can seem completely indecipherable, it's actually quite straightforward. Only the Italian-

based musical jargon tends to make things sound complicated; learn the jargon and you can decipher the music!

Written music is displayed on a standard "stave". Usually, two staves are shown; the treble (high) and bass (low) staves. To differentiate between the two, each has its own "clef" sign.

Each line or space on a stave corresponds to a note of the musical scale, though the two staves aren't the same. You'll notice that the treble (or "G") clef loops around the position of the G, on the second line; while the bass (or "F") clef has a big dot on the fourth line, which is F.

So how do the notes of the bass and treble staves correspond to keys on the keyboard? In the diagram you'll notice that there are some keys left adrift in the middle, including "middle C" – we'll explain why next month, when we'll also discuss how different note lengths are indicated by different shapes. ■



This little black box, the Studiomaster MA36, ought to be standard equipment in every MIDI studio. In fact, it's such an obvious idea, I'm amazed that it's taken this long for anyone to produce it – the Japanese will probably start imitating it any minute now.

As you probably know, MIDI is a digital communications standard for electronic instruments and computers. It transmits data in a serial manner, like the RS-232 standard for printers. This data, giving information for notes, modu-

GADGET CORNER

Each month we'll be looking at an affordable gadget for your ST MIDI setup, starting this month with the Studiomaster MA36.

lation, patch changes, and so on, is transmitted in discrete "packets".

If you have a MIDI setup of any complexity, you'll probably have come across situations where something doesn't work, and you just can't figure out why. There are so many variables to consider; is all the equipment set to the correct MIDI channel, is your

sequencer transmitting the correct timing signals, are the velocity values matched, is a synth receiving modulation information? You can spend hours plugging in and unplugging cables and reprogramming pieces of equipment to try to solve the problem.

The MA36 will probably solve any MIDI problem in a matter of seconds. Just plug it in to any

equipment which is giving you problems, and it displays the nature of all MIDI data transmitted through it by analysing the "packets" of data and flashing them up on a series of LCDs. Powered by a mains adaptor or an internal battery, the MA36 has MIDI IN and THRU sockets, and can be left in a MIDI chain even when it's switched off – it won't block thru data.

Among other things, the MA36 will tell you which MIDI channels, 1-16, are active; when note on and off data is being transmitted; whether a MIDI clock is running; whether patch change, pitch bend, modulation or system exclusive data is being transmitted; and even when system exclusive or song position pointer information is running.

It's absolutely invaluable, and helped to sort out three tricky problems in the first couple of days I had it! At an eminently reasonable £50, the MA36 should sell in thousands. ■

Studiomaster: Tel. 0582 570370

TWEETY BOARD

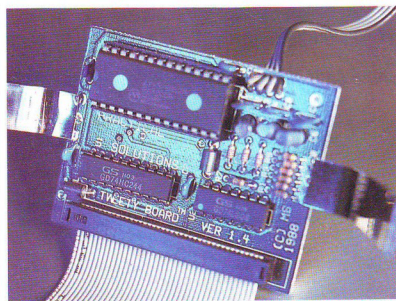
The ST has a feeble YM2149-F sound chip sitting on its circuit board. Feeble it may be, but it does have three channels. Unfortunately the signal sent to your monitor or TV is in mono and so you don't get the full effect. The Tweety Board is here to save the day by mating with your sound chip to produce those elusive sounds.

Most software does use all three channels of the sound chip, but they're mixed back together again before being output through the speaker normally. All Tweety does is keep those signals separate to give you better sound.

INSTALLATION

Before you can get those sound effects though you'll have to fit Tweety to your ST. Since it sits inside the case you're going to have to do some unscrewing, bending and sticking. Of course this will invalidate any guarantee that you have remaining, but life's like that. Don't forget to unplug your ST first, we don't want any electrocuted readers.

Idiot proof is probably the best way to describe the installation instructions because they tell exactly where everything is, how many screws there are and things



Super stereo sound from your ST?

GARY BARRETT listens in.

to watch out for so as to minimise risk to your machine.

Eventually you'll reach the main circuit board where you just have to track down the elusive sound chip, YM2149-F to his friends. Peel off the sticky strip on the bottom of the Tweety Board connector and put Tweety on top of the YM2149-F. After making sure that they've been introduced to each other properly (pushed

together firmly) you just have to find somewhere to put the Tweety Board itself and stick that firmly in place. Re-assemble your ST and plug everything back in again. Dig out those phono cables, or go out and buy some if you haven't already got some.

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SOUND CHECKS

Unless you have an amplifier with three input channels then you'll

have to link two of them together using the short cable supplied. Connect Tweety to your amplifier with the phono cables, switch on the amp and ST and find something that makes lots of sound.

The quality of the sound is improved a little and provided you've connected Tweety to a stereo amp you'll get stereo sound. The best way to experience Tweety is through headphones, those helicopters will fly right on through your head and explosions will sound much better. Most music is programmed to go through all three channels so you'll get stereophonic music which sounds much better.

Even the most incompetent wielder of a screwdriver (me) will be able to fit Tweety Board in under an hour and you'll have no problems provided you follow the instructions. Thankfully there's no soldering either so you can't melt any chips (that reminds me, I'm hungry).

The only disadvantage to Tweety Board is the rather steep price of 50 quid and unless you're really desperate for stereo sound from your machine think carefully before investing in it. ■

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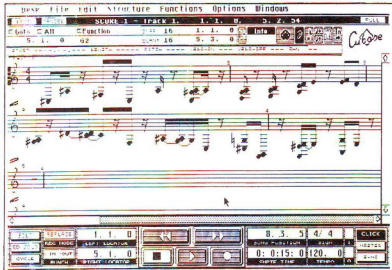
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There can't be many ST-owning musicians who have not come across Steinberg's Pro-24, the first and consequently the best-established professional MIDI sequencer package. Now, after updating Pro-24 a number of times, Steinberg has bowed to the inevitable and produced a completely new successor - Cubase.

Before we go any further, you ought to know that Cubase costs £500. This puts it out of reach of most amateurs - so why is it worth reviewing here? For a start it is the state-of-the-art in ST sequencing, but more to the point Cubase is Pro-24 compatible. If you are using Pro-24 or Twelve, you will be able to prepare sequences at home and take them into a professional studio equipped with Cubase to do your recordings.

Cubase is a brand new pro-



■ Cubase's powerful note editing facility.

gram which overcomes all the problems of Pro-24 and learns a lot from rival packages like C-Lab's Creator/Notator and Passport's Master Tracks Pro. It features two innovations - VISP (Visual Song Processing) and MROS (MIDI Real-Time Operating System).

VISP simply means that whatever music is playing, you can see a graphic display of it on your screen. Obvious really - and one of the major failings of Pro-24, where the main display gave away practically nothing about what was happening as your music played. The structure of Cubase involves horizontally-scrolling data displays and multiple windows - GEM hasn't been used (too slow) but a similar operating system has taken its place. You won't have any difficulty figuring out how to pull down menus, resize windows, call up dialog boxes and so on.

MROS is a more esoteric concept. It's an operating system which allows the ST to act as a multi-tasking workstation. You can, for instance, have several MROS

STEINBERG CUBASE

The pricey successor to the Pro 24 sequencer is here.

compatible programs running at the same time in your ST under the control of a program switching accessory; you can exchange data between these programs; and you can even exchange data via MIDI with other MROS compatible computers such as Macintoshes and PCs.

simultaneously. Your track data appears as blocks in the arrange window when you stop recording.

Having laid down some tracks you can edit them in four ways; Key, Score, Grid and Drum. None of these are unfamiliar, but the implementations are remarkably clear and workable. In Key Edit a graphic keyboard appears on the left-hand side of the screen, and your music as blocks of data in a window. You can click on any note of a particular track to highlight all the data for that track, then resize, move, insert or delete blocks as you wish. A window at the bottom of the Key Edit display shows controller data such as pitchbends in the form of curves, which you can redraw with the mouse.

In Score Edit the music appears as conventional musical notation; the program includes various intelligent routines to decide how best to represent your music; at the moment full music notation editing isn't implemented, but it will be with the first free software update.

In Grid Edit your data appears in alphanumeric form; if you want a particular note to sound louder, just scroll through the data, find the velocity reading and hike it up.

In Drum Edit the data appears as "hits" on a bar pattern; four redefinable velocity values are sup-

ported, and you can create and file your own drum set-ups for later use.

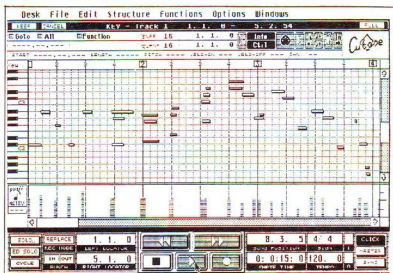
Quantisation options up to 192 parts per quarter note allow you to set up a very metronomic feel, or a very human one using the programmable "groove" parameters. Quantisation is non-destructive; if you overquantise a part, you can return it to its original resolution instantly.

Like Pro-24, Cubase allows you to create songs by linking separate "parts" into "groups" and chaining them in an arrange window, using a software toolbox with cut-copy-paste facilities; the tempo can be varied by a master tempo track which can be SMPTE-locked.

Obviously we've only discussed a fraction of Cubase's facilities, which include a desk accessory patch-passing program, Satellite; Logical Edit, a mathematical editing procedure; optional multiple MIDI output hardware; and the MIDI effects processor which can be used to create MIDI delays and repeats.

At the price, Cubase obviously isn't going to be everyone's cup of tea, and it certainly doesn't introduce any radically new concepts. But it's very well integrated and works marvelously, so if you get a chance to use it, don't hesitate. ■

Evenlode Soundworks:
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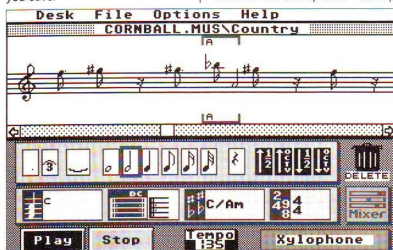


■ The Key Edit screen gives you comprehensive control.

Super Librarian isn't the latest comic-book hero, fighting crime among the bookshelves; it's an impressive patch archiving program from Pixel Publishing, distributed over here by MCM.

Editing sounds on a modern synth with digital access control can be a pain – patch editor packages help you to do this more quickly and easily. But what if you have several different synths, all using different sound cartridges, ROM cards, data cassettes, RAM cards... how do you sort out all your sounds?

The answer is a generic patch librarian program. Although it won't allow you to edit your sounds, it will allow you to sort, rearrange and store them much more efficiently – and the more synths it covers, the more money you save!



■ Editing the score with Music Maker.

SOFTWARE NEWS

A roundup of new ST music software products heading your way.

Super Librarian, at £109, could actually save you money, if the alternative is buying a separate patch librarian for each synth. It operates in colour or mono on any ST, and supports a staggering list of over 60 instruments, including all the Yamaha DX six-op and four-op

synths, and RX series drum machines; Roland D, JX and MKS series synths; Roland U110; TR707, 727, R8 and PAD 80 drum machines; Korg M1, DWs and EXs; Ensoniq ESQ1/M and SQ80; Casio CZs, Oberheim Matrix 6/100P, Kawai K1/3/5, and many other synths, effects units and drum machines, some of which you're highly unlikely to encounter in this country!

Super Librarian includes a desk accessory which can be used with most GEM-based sequencers to pass patches without dumping your sequencer, and if you know a bit about MIDI programming, you can write your own "instrument profiles" to deal with new instruments.

MCMXCIX: Tel. 01-258 3454

POWER COMING SOON

Music Maker is currently being given away as part of the ST

Power Pack games bundle. It's an unpretentious little program which allows you to arrange notes on a stove, or record them from a MIDI controller, and play the resulting tune either over MIDI, or using the ST's built-in sound chip.

Now, if that was all there was to it, it wouldn't be much to get excited about. But apparently a vastly upgraded version of the program is going to be available in October, together with a plug-in MIDI-compatible FM sound cartridge for the ST.

Using the same technology as Yamaha's massively successful DX synths, the sound cartridge will



■ Controlling MIDI instruments with Music Maker.

sell for around £70. The design is currently being completed by Hybrid Arts UK, who promise 78 preset voices with velocity response, full programmability, 16 accompaniment patterns, multi-timbral operation, on-screen voice mixing, built-in FM drum voices, and sophisticated pattern arranging and sequencing. Sounds great!

■ **Hybrid Arts UK: 01 444 9126**

GET TECHNICAL

Getting the most from the ST's sound chip with JAS. C. BROOKE

Discussion of music on the ST tends to be dominated by MIDI. This is not surprising as it isn't often that a micro has such facilities built in. However, the most common use of the sound facilities on the majority of home computers must be for playing music and sound effects to accompany games.

In this column, I will be concerned with the output of sounds directly from the ST, be it for inclusion in your own programs or simply for your entertainment. I will be discussing the subject from the creative side of the sound as well as the technical means by which it can be produced.

When it comes to producing sounds using only the ST's sound chip, you find that the machine has

not been blessed with any state of the art technology in this area. The sound chip has three channels, each able to produce tone, noise or both at once. The chip has fairly limited hardware features. This means that in order to produce the quality of sounds required these days, more features should be added using software. You will probably find that the best approach is to write what is commonly termed a sound module.

MODULAR APPROACH

A sound module is a routine which is written to allow the user to simplify creation of music on a computer. Users will have different requirements of their sound drivers and may wish to add new

features to enhance the sounds it can produce. Hence it is rather important that the user has access to the driver source code. This is one of the reasons why music utilities of this sort are not readily available. Anyone wanting a driver who knows, or is willing to learn, how to program in a suitable language would be advised to write their own. Getting the basic routine working is not too difficult and doesn't take too long. You can then extend the program as and when you like.

A sound module can often be a combination of two or more independent modules. Common modules which are often integrated at a later date include music routines, sound FX players, sample players and engine sound

players. The latter is often written separately to the sound FX player. This is the sort of addition you can make if you have written the source code yourself. A sound FX module is quite an easy starting point. To a large extent the principles behind creating an FX player are the same as for a music player.

OLD HAT

The ST sound chip is almost exactly the same as the ones used in many of the earlier eight-bit machines, including the Spectrum 128K, Amstrad CPC, MSX, Einstein and Oric. I first encountered a chip like these in 1983 when I purchased an add-on sound box for the Spectrum. At the time, even the simplest of effects such as those included in Oric BASIC seemed impressive. Getting the chip to play music was unheard of.

Next month I will be explaining exactly what the ST sound chip hardware capabilities are. ■ **Jas Brooke has programmed the sound for literally dozens of games on the ST.**

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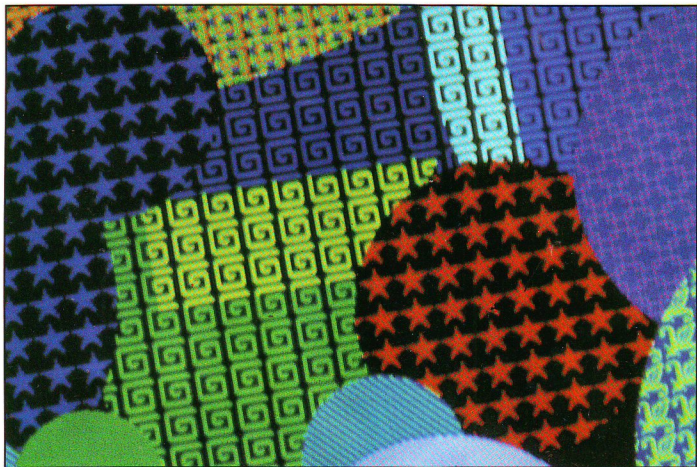
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ANY COLOUR YOU LIKE...

As long as it's one of the 16,777,216 hues the ParSec board from Elmtch will let you use. SIMON WILLIAMS went to have a look at a few of them.

Atari have made a lot of ST sales on the strength of the machine's graphics resolution and colour palette. Rightly so, but the ParSec board from Elmtch Research lends strength to the old adage 'you ain't seen nothing, yet'. Due for release by the time you read this, the £918 graphics board, labelled ParSec 4768, will offer 4,096 colours on screen at the same time, with up to 16 colours per line. Screen resolution winds up to 1,024 x 768 pixels and the custom graphics chip from Texas Instruments can shift these around at up to 12.5 million pixels per second. The basic board will support four independent colour planes and sports sockets for scanners, digitisers, cameras and videos.

With all this high-tech wizardry flying around, you might expect the ParSec board to come from one of the world's mega corporations. In fact, it started life as the pipedream of one person, and the whole of Elmtch Research can still sit

happily in a couple of settees - not that they're spending much time sitting around at the moment.

Based in the house of one of their directors, David Encill, Elmtch is a great example of how a high-technology product can be brought to market by extensive use of sub-contractors. While the basic circuit and board design are totally Elmtch's, they use third party programmers for the majority of the product's software and have the boards and cases sub-contracted. From a small start-up, they expect to make substantial sales from the ParSec board when it goes on sale in September.

THOSE WERE THE DAYS

The ParSec board started life as a circuit design in the head of designer Ian Law. As with many good products, the idea took off as a series of chance encounters, chats and phone calls. Ian was based in Portsmouth at the time, but was buying computer kit in general, and

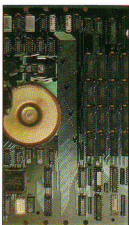
STs in particular, from a company in Birmingham, run by David Encill. He put the idea of a high-resolution graphics board to David, with specific reference to the ST as the most likely computer to do it justice.

David was convinced of its viability and started to work with Ian on a prototype. It was at about this time, around a year ago, that news of the product got out and the 'wonder board for £400' stories reverberated through the computer press. Things are never as simple as they appear at the prototype stage, though. Hardware timing problems and the cost of RAM caused a delay in release and the price hike that the board has undergone. Although the RAM is comparatively slow at 150ns, the shortcomings of last year would have made the board prohibitively expensive if it had been released then.

At the time of writing, the ParSec is at pre-production stage, with the circuit design finished and really only final

OTHER VERSIONS

The ParSec board will be released first in its ST version, but Elmtch are looking at several others. A PC expansion card is a definite possibility, as is a Mac board. The most interesting one, at least as far as Commodore is concerned, is an add-on for the Amiga. It looks as if the 'My ST's better than your Amiga' story will continue to run.



DUMB BOARD

The ST, when attached to the ParSec board, is used solely as a dumb terminal. The keyboard and mouse are used as input devices while the ST's disk drive (or hard drive if connected) is used for data storage.

details of case and marketing to be decided. If you want one, you should be able to buy it off the shelf from the beginning of September.

GIVE IT THE WORKS

The ParSec board interfaces to the ST through the D port on the sides of 1040 or Mega machines. You can also run it with a 520, but some of the graphics applications can be very memory hungry, so an upgrade is recommended. Once running a ParSec application, the ST acts very much as a terminal. It handles the I/O side of things, like the keyboard and mouse, but the screen and graphics processing is obviously handled by the board itself.

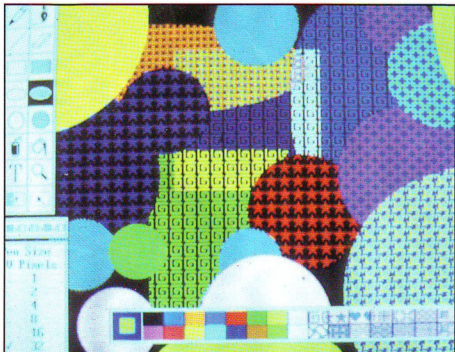
The ST version of the board (there will be others) has its own independent power supply and is a completely self-contained unit. It can connect to a variety of other peripherals via built-in SCSI and RS232 ports. With these two ports there are few digitisers, genlocks and graphics tablets that can't feed their input in and few printers and plotters that can't take it out again.

EXTRA, EXTRA

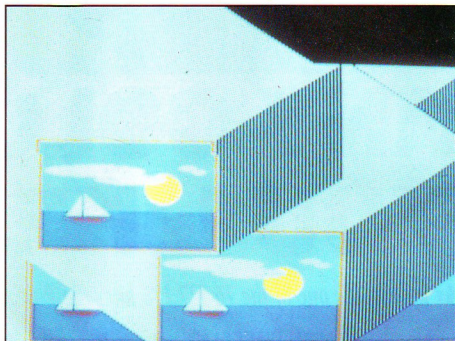
The development work which has gone into ParSec is not going to leave Elmtech as a one-product company. They have a number of other projects to extend and support the board, some of which are already well into development. The most obvious area of support is in software, and there are several programs of interest, most being developed by third parties.

As well as *Da Vinci*, detailed elsewhere in these pages and being written by an ex-RAF technician in West Germany, there's a professional paint package well on the way. This will probably be one of the first independent programs for the board to go on sale.

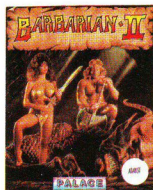
The program is being put together



■ Shapes with any pattern fill or colour can be created instantly. There is no slowing down no matter how big the shape being created.



■ A powerful brush feature in the *Da Vinci* paint package given away with ParSec makes it possible to paste blocks at incredible speeds.



MEGA-BARBARIAN

Although not intended as a games machine, ParSec's graphics do make it attractive to the games programmer. There is rumoured to be a keen gamerster scurrying away on a high-quality *Barbarian*-style game for the board, but despite prolonged investigations, he refused to let us in on any further details.

Da Vinci is the Elmtech paint package supplied with the 4768 ParSec board. It is based on a PD paint program called *PC Paint*, released by TI to support their graphics chips, but has been ported across to the ST and greatly enhanced for use with the ParSec.

At start up, *Da Vinci* looks much like any other paint package, with a menu bar along the top of the screen and a toolkit down one side. Like most ST packages, you can turn these menus off to work on the full screen - in fact the program switches between command mode, with the menus on, and point mode, where you work. Most of the standard tools are available, though there was no sprite-based paint-brush on the pre-production version. This will be added by the time the package is brought to market.

The main power of the package is in its block manipulation and pixel processing, which is handled almost exclusively by the TMS 34010. As such, all processing is lightning fast and

PAINTALONGA DA VINCI

block manipulation, either to move or copy a defined area, is extremely smooth. The program lets you mask out certain colours to operate on, so it's quite possible to extract all the areas of a specific colour from a picture. You can also 'munge' a colour picture to convert it to a mono bitmap. The size of a file is also drastically reduced.

Pixel processing is provided via 11 logical operators which change elements of a picture. The operators include OR, AND, XOR and NAND. Judicious use of area mark and pixel processing together can produce some weird and wonderful effects.

The magnify mode again looks normal, until you realise you can still use many of the main graphics tools when your image is enlarged by four or eight times. Thus, you can fill or copy an

image while it's magnified. You can also pan around the image in real time, with the graphics chip showing its pace by keeping the movement silky-smooth.

The finished product should be able to load and save *Neochrome*, *Degas* and *GEM*.IMG files, though because of the high resolution of the ParSec screen, they'll only fill a small part of the display. Rotation is provided in the current version, but only in 90 degree steps. The finished product is expected to be able to rotate in steps as small as one degree. A selection of fonts will be supplied with *Da Vinci*, but these are also courtesy of TI and demonstrate the size of the company's typography department - and he's just a trainee.

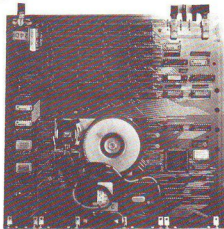
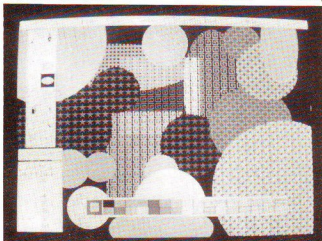
On the down side of *Da Vinci* (veering towards Mondrian?) it will only support 16 colours on the screen at once, though from a palette of 4,096 (or 16,777,216 on the 8768). This is due to its ancestry as a PC package and is not easy to change. The professional paint

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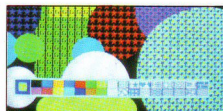


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HANG ON A PARSEC

A parsec is an astronomical unit, used for measuring interstellar distances. The term is derived from PARallax and SECond, and dates back to 1913.

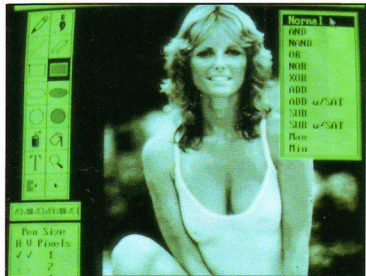


■ **Sadly the freebie Da Vinci art package only operates in the 4,096 colour mode. Even worse is the fact only 16 colours can be used.**

as a true artist's computer paint package, and will offer textured backgrounds, and watercolour, oil and chalk emulations.

BLENDED COLOURS

The authors have had a good look at the Quantel Paintbox and reckon they can better most of the facilities offered by that doyen of TV screen makeup. The Elmtch product will even offer a full Rowney-compatible palette, where mixing two colours produces an accurate colour blend, just as you'd get with real paints. David Encill is no mean painter in his own right, as his living room wall tes-



■ **To give you some idea of the power of the ParSec board, imagine how long it takes to magnify a section of drawing using a traditional paint package on the ST - *Degas* or *Neechrome*, say - not exactly blinding is it? With the ParSec board things happen instantly. Similarly, the whole screen can be picked up and shifted around; movement is so smooth and fast that it defies belief. Try doing that on a standard ST. Still not impressed? Imagine being able to draw lines at the rate of 1.25 million pixels per seconds or filling rectangles at 12.5 million pixels per second!**

tifies, so it'll be interesting to see what he can do with the finished product.

Scheduled for an early release is a GEM driver. This will immediately give access to a large range of existing software and should add extra dimensions to products such as desktop publishers. Elmtch were originally going to produce their own DTP package, but the time estimates were unworkable, so instead they're thinking of modifying *Calamus* to work with the board. On a multisync monitor you should be able to view almost a full A4 page at a time, and think of the colour possibilities.

Also well under way is a CAD package which will make use of the Parsec's phenomenal graphics speed to manipulate technical drawings on screen. The initial product will cope with two dimensional drawings only, but add-on modules are planned to offer 3D capability, solid modelling and animation.

On the hardware side, although there are many genlocks and digitisers compatible with the board, there will also be Elmtch products available. They are intended to be to full broadcast standard and will be available by the end of the year. A multisync monitor which can show the full 1,024 x 768 non-interlaced display of the board will also be marketed.

WHERE TO, GUV?

So it all seems suitably whizzo, but which application areas are Elmtch aiming at? Dave Encill sees several main applications. Video/TV work is obviously high on the list, taking input from a camera or tape and using the board to manipulate the image. Martin Lockhart, the third of the four Elmtch directors, tells the story of one of the major television companies who were considering buying ParSecs on a 'one per desk' basis, rather than purchasing two Quantel Paintboxes. Unfortunately for Elmtch, the ParSec was not sufficiently advanced to meet the order at that stage.

Elmtch have had a lot of interest from education, particularly polytechnics and universities, where applications range from the teaching of video engineering to graphic design and some branches of fine art. They've also had a lot of interest from other computer manufacturing companies, presumably with thoughts of add-on versions for their own kit.

There are several specialist areas where the ParSec could make inroads, as well. The London Weather Centre has been in contact, so we may yet see ParSec-based weather maps or satellite pictures on our TV screens. The MOD, as always, has ideas of its own, based around simulations and shooting things. An interesting vertical market already being investigated is an architect's package, but the kind of processing power afforded by ParSec lends it to any application which needs high-power graphics

ROSE TINTED SPECS

There are two models of ParSec board, the lesser of which can be upgraded to the greater. Both take the form of a large square circuit board, slightly smaller than the dimensions of a Mega ST. The 4768 version (the basic model) holds the TMS 34010-50 FNL graphics processor, 768k of 150ns video DRAM, a well-engineered toroidal power supply, switch gear and LED indicators on its front edge, and assorted socketry along its rear.

The board is housed in an extruded aluminium case, custom designed to dissipate heat without needing to resemble a sieve. The corrugated surface acts as one big heatsink for the warm circuitry inside. The board can be slid out for addition of a daughter board, which makes up the difference between the 4768 and 8768 Parsecs.

The 8768 upgrade fits to a 4768 and provides an extra 768k of memory taking the total up to 1.5 Mb. This can be further increased on the upgrade board to a maximum of 5.5 Mb. The extra memory increases the Parsec's capabilities still further, providing eight colour planes and a choice of 196,608 colours per screen from a palette of 16,777,216, with up to 256 colours per line. It will also provide two extra video outputs, so you can take advantage of the extra colour planes the 8768 can generate. Elmtch expect to sell a lot more of the 8768 than the 4768 - they've obviously learned from the first months of BBC Micro sales!

All this flash graphics stuff requires more than an Atari colour monitor to display it, and Elmtch are looking to provide a suitable multisync monitor for under \$750. The 4768 board with come in at £919 and the 8768 upgrade will cost a further £574. Products also scheduled for release include a digitiser, genlock and GEM driver.

functions and colour reproduction on screen.

The ParSec board is the first fast high-resolution graphics system available for under £1,000. It stands to fill the same kind of gaps that more expensive products have fitted, but may also open up new areas of computer use - areas which have previously been unavailable through cost of equipment.

It needn't now cost upwards of £50,000 to move into graphic processing - a Parsec board, Mega ST, hard disk and laser could be the basis of all kinds of graphics based operations. ■

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DESKTOP

Desktop has expanded this month to give you yet more tips for your ST. MARK HIGHAM has been sorting through them to bring you this selection of the best.

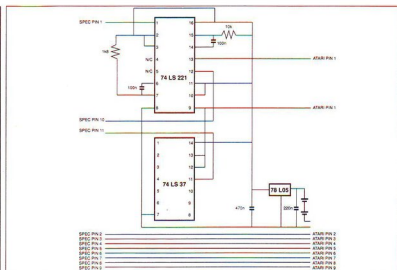
David Guest from Harlow is attempting to link his Spectrum to his ST, using the parallel port as an input device for receiving text files from the 48K Spectrum. Unfortunately the ST's manual is not as accurate as it should be. On the ST parallel port the handshaking lines are listed inaccurately, both in function and polarity, ie the Atari strobe (pin 1) is really the inverted busy line and the Atari busy (pin 11) is monitored as a strobe line. The easiest way of using the parallel port as an input device is to build a hardware adaptor which changes the faulty function and inverts the signals. The required circuit is shown in the diagram.

Construction can be carried out on a small piece of Veroboard. A regulated five volt supply is required. This can be obtained from a PP3 battery and a 78L05 regulator on the Veroboard. David has built his unit into a small case with a 25-way D-connector at each end and he uses the 0-volt lines on the Atari end to switch the battery negative line. The unit is therefore switched on when it is plugged into the ST and switched off when it is removed.

The software requirement is minimal and only involves reading the parallel port. The FastBASIC program used is included. The data transfer is simply a matter of running the ST program and then printing from the Spectrum with a suitable end-of-file character.

ASSAULT ON THE COVER DISK

Norma Wrangham from Essex submits this tip for people who organise their disks by the program resolution as well as program type. It is easy as well as



■ For the technically minded the main chip is a dual monostable. One part will trigger on the negative edge of the Spectrum strobe signal to give a positive pulse of about 0.7ms to the Atari busy line. The other triggers on the negative edge of the Atari strobe line and gives a negative pulse of about 0.125ms to the Spectrum acknowledge line. The Atari strobe line is inverted by the other IC to give the Spectrum a busy signal. The Atari busy line needs to be held positive for about 0.7ms to allow for those occasions when the Atari processor wanders off to execute an interrupt when polling the busy line. If this pulse length is reduced then the ST can miss the strobe signal and data transfer will stop.

very useful to alter the *Format Label Expert* program from *ST Amiga Format* cover disk 2 to print the resolution on the disk label. Then all disks with high resolution programs, for example, can be stored together.

First copy the whole of the EXPERT folder (from the cover-disk) and TINYTOOL.ACC (also from STA cover disk 2) to an empty formatted disk. Don't alter the original EXPERT program just in case of errors.

Next, load the *Tinytool* Desk-top accessory and select it. Click on the 'File' button and choose to load EXPERT.PRG. When the 'File offset' message comes up, enter SAA40.

The third line down should

start 0000AA50. On this line, click on the last byte number (44). Enter \$52 and hit [Return]. The 0 in the last column should now have changed to R. Click on the 'Write' button.

In the same way next replace all the numbers in line SAA58. Click on each number and enter numbers from the following list, remembering to hit return and 'Write' after each new entry. The new numbers for line SAA58 are \$65, \$73, \$6F, \$6C, \$75, \$74, \$69, and \$6F.

On the fifth line down change only the first two numbers (74 and 79). Replace the first with \$6E and the second with \$73. The third column of the screen should now read 'Resolutions' followed by a space, instead of 'Diskquality' - you have made this change by altering the codes.

On the bottom line, click on the last number (31), and enter \$48 instead. When 'Done' comes up, click once on the down arrow button, second from the left. Now replace the first number on the first line of the new screen (44) with \$49. On the fourth row down, (AA98), replace the sixth and seventh numbers (32 and 44) with \$4C and \$4F, remembering [Return] and Write between each.

Now move down until you get

```
CLEAR 48000
INPUT 'End of file code'endcode
PATH$='B:\'
INPUT'Filename for saving?'name$
A$=' '
B=0
REPEAT
B=INP(0)AND$FF
IF B>9 THEN A$=A$+CHR$(B)
UNTIL B=endcode
handle%=OPENOUT name$
PRINT# handle%,A$
CLOSE# handle%
```

■ File transfer program using the parallel port.

a screen starting with line 0000AC00. On the next line down replace the last two numbers (31 and 44) with \$48 and \$49. On the second from last line (AC30) change the last two numbers (32 and 64) to \$4C and \$4F.

Click the down arrow until the top line reads AE40. On the fifth line down (AE60) change the last four numbers (44, 49, 53, 4B) to \$52, \$45, \$53, and \$4F respectively. Change all eight numbers on the sixth line down (AE68). The new numbers are \$4C, \$55, \$54, \$49, \$4F, \$4E, \$20 and \$20.

The right hand column should now read RESOLUTION.

Exit from *Tinytool* and open the EXPERT folder. Select to Show Info about EXPERT.PRG then change the file name of EXPERT.PRG to EXPLOW.PRG. Now drag EXPLOW.PRG into the root drive A window to get a copy to work on while avoiding name conflicts.

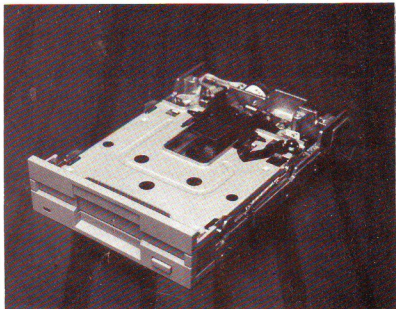
Reset the computer (or *Tinytool* may be confused) and access *Tinytool*. Click on the 'File' button and select EXPLOW.PRG. Enter file offset as \$AA80. On line AA98, the fourth down, change the sixth and seventh numbers (4C and 4F) to

which can give a colour printer dump. This is a common enough problem with the ST printer drivers and there's no way at all that colour dumps can be obtained using the standard [Alt]-[Help] function. The COLOUR icon is presented in the setup menu purely as something of a joke - there is no way that Alt-Help can produce colour output. Even Atari don't know what it's there for; the Okimate 20 they think, but they've never tried it out.

The solution however, is not that bleak. Some packages on the ST do give a colour output and *Degas Elite* is one such example of this. One of the printer drivers supplied with the *Degas Elite* disk can be used to give a colour dump for the LC10.

SHOWING WHAT YOU'VE GOT

The SHOW file option which is presented when you double-click on a non-program file responds to more keystrokes than you might think. Pressing [Return] will display the file a line at a time. [Space] will show a file screen by screen and [Control]-C aborts back to the Desktop.



Take your life and your disk drive in your hands with our extended format tip.

Elite using the 'Load pic' menu option and press the right mouse button to view the picture.

Press the [Esc] key to obtain the block creation cross-hairs and move the mouse to point to the top left of the screen.

Press the left mouse button, hold it down and capture the entire area of the screen.

Press the right mouse button to get back to the menu screen.

Select the block menu from the drop-down menus and choose the 'Block File' format option.

Select 'Save' from the BLOCK menu and save the file out to disk.

If you now leave *Degas Elite*, you will find that your file has been saved with a file extension of .BL?. Change this to .JFF using the 'Show Info' option in the Desktop Files menu. You now have your screen converted to Amiga .JFF format.

SLOWING DOWN YOUR DRIVE

Peter Slater from Lancashire has noticed the problems that you get if you try to format a disk with more than nine sectors per track and he has come up with his own novel solution which probably isn't advisable for anyone with heart problems. The difficulty arises because the disk is moving too fast to write the other sectors, so how do you solve it? If you have nerves of steel you mend it by modifying your drive, the process runs as follows.

Unplug your ST from everything and remove the case and disk drive. Now unscrew your disk drive and turn it upside down.

Locate a large rotating wheel and a small one, and put the disk drive on a clean flat surface with the large wheel positioned furthest away from you. You should now be able to see two variable resistors - one on the left of the large wheel

and one on the right of the wheel.

Swallow hard.

Plug the disk drive back in and connect the computer to a TV or monitor. While holding the disk drive place, put a disk with an extended formatting program on it into the drive and switch the computer on. The disk drive will start to whirl, don't panic.

When the disk has stopped moving place another disk in the drive that you want to format, then select to use an extended format.

When the disk begins to whirl slightly turn the right variable resistor until the disk slows down slightly. Keep doing this until the disk will format with no trouble, but be careful not to bend the interface PCB at the rear of the disk drive.

Breathe a sigh of relief, and put it all back together.

This task necessitates opening up your ST and will invalidate the guarantee. Do not try it unless you know what you're doing.

NEOCHROME NUISANCES

Neochrome is a curious graphics package. No one is sure if it belongs to the PD or not but one thing everyone knows is that it doesn't come with a manual. Hence, finding out how to use it is

WIN LOADSA DOSH

If you're having trouble with your ST or if you have any hints or tips which you think other ST owners will drool over then send them immediately to: Desktop, ST Format, 4 Queen Street, Bath BA1 1EJ. Each month we give away £30 for our favourite tip so if you're looking for some extra dosh, get writing. Adrian Thompson from West Yorkshire wins this month's coveted prize for his GST-C Assembler tactics.



The Star LC10: down in the dumps.

\$4D and \$44. Move down until you get to line SAC30 and then change the last two numbers (4C and 4F) to \$4D and \$44.

Exit from *Tinytool* and change the name of EXPLOW.PRG to EXPMED.PRG. Then drag EXPMED.PRG into the EXPERT folder and delete the copy outside the folder.

You now have two disk labelling programs, one for low resolution disks and one for medium resolution. Either program will also print high resolution labels.

COLOUR FOR THE MASSES

D. Laxton from Birmingham owns an Star LC10 colour printer but is having trouble finding anything

WELCOME BACK AMIGA

Philip Taglione from Bradford has found a way for converting ST *Degas* and *Neochrome* pictures to the Amiga norm of .JFF format. *Degas Elite* saves out the .BL? files as ILBM (InterLeave Bit Map) format which is identical to the Amiga .JFF file format. Using the *Pic-switch 7* program (from ST *Amiga Format* cover disk 11) you can convert other picture file formats to *Degas* which will then allow you to convert them to .JFF format.

The following procedure should for .P1?, .PC? and .NEO to .JFF picture file conversions:

- Load *Degas Elite* into memory.
- Select picture screen page 1 (necessary in order to load the palette info as well).
- Load your picture into *Degas*

not easy. Saving files has caused some problems for people. *Neochrome* files may be saved to disk by clicking on the left button when you are over the disk icon. Files may be loaded by clicking on the right mouse button. If anyone has other *Neochrome* tips then pass them on and we'll try and print a more definitive guide to the quirks of this popular program.

ASSEMBLER PROGRAMMING

Adrian Thompson from West Yorkshire has this advice for Adam Connors (Desktop, *ST Amiga Format* issue 13) and other people who are having trouble programming assembler using the GST C compiler.

At the beginning of your file include the lines:

```
GPT ABS
SECTION S.CCODE
Your program...
```

These options are documented in the GST assembler manual for a fuller description of what's going on.

Once the program has been written and saved, select 'Assemble' (not 'Assemble and Link') from the Assembler menu and then click on the file to be assembled.

If there are no errors select 'Link' from the Link menu but instead of clicking on the filename to link, press [Esc] to clear the filename line on the file selector and then press [Return].

Once the linker has loaded, type the filename of your program. For a program called *NUKE*, type *NUKE_nolist*. The program then links very quickly and leaves you with an executable program on your disk.

There is a minor problem which can surface. The assembler appears not to like .L or .W extenders on some commands but apart from that it works just like *Devpac*, although it is more cumbersome. Of course you could use the copy of *Devpac* supplied on the cover disk of *ST Amiga Format* issue 10.

ZAPP IT

A recent cover disk included a utility by the name of *ZapST*. Applying this program to *ST BASIC* revealed three undocumented commands which were found by Zapping the main .PRG file. These commands are: *APPEND*, *HELP*, *INVERSE*.

Andrew Kennedy from Dunblane found them and wants to know what they do and how they work. The only way of finding this out is to play around with them so if anyone discovers what they're all about, drop us a line.

STICKS AND STONES

Paul Galloway from Manchester has been having some problems with his *ST* and recounts his tale in the hope that others will be a little more intelligent. After purchasing his machine he found a recurrent problem which meant that he could not resize or move *GEM* windows using either the mouse the [Alt]+cursor keys combination. Some programs also suffered while others couldn't be made to run at all. He unplugged all the leads and took his machine back to Dixons but it worked perfectly so he was forced to put up with these problems for almost a year.

Finally he took the machine



■ That auto-fire switch can mess up your micro

apart, determined to test everything in an attempt to locate the problem. In the end he realised that it was the joystick which was causing all his difficulties. The problem: he'd left the auto-fire button on all the time and this had consequently affected the operation of the mouse and fire buttons.

THE STAR OF THE SHOW

The whole range of Star printers are a popular bunch. The manual which comes with them documents the vast number of Epson-compatible codes as well as a few commands specific only to the Star range. One command which is not documented in the manual was discovered by Stephen Gardner from Cumbria recently.

The command will produce a printout of the dip switch settings and seems to work on most Star printers. To obtain this result you must send the codes *ESC NUL* (Chr\$(27);Chr\$(0)); to the printer which results in the following output:

```
SW1: 10011100 SW2: 11110011
SW1 and SW2 are the two sets of dip switches. A one indicates that the switch is on while zero means the switch is set to off.
```

In the case of Star printers

which don't have two sets of eight switches, this output will still be produced although in a shorter form.

Star say that they were aware of this instruction but that there are no more undocumented commands.

TEXT IS HARD ON THE EYES

R. Gardner from Bristol is seeking advice about which monitor to use for text work since he is finding that he is suffering from eye strain a lot.

There are compatibility difficulties associated with using monitors designed for use on PCs although you can usually track down leads for these. Probably the best monitor for wordprocessing has to be the Atari high-resolution monitor which retails for £120. This is capable of output of a higher resolution than a Macintosh SE and, to top it all, has a past history of being particularly good for not offending the eyes.

Other monitors can, of course, be linked to your *ST* and if you're in need of advice about which cable will suit which monitor then contact Lightwave Leisure on 051-639 5050. They have a number of leads available for connecting *ST*s to most monitors.

COMMS AWAY

A. Gane from Manchester has written to Desktop to ask why *ST* comms software finds it difficult to emulate split baud rates and how can he contact split baud systems. Split baud rates are when your machine can receive data at one speed and transmit at another.

1200/75 is the standard baud rate used by viewtext systems such as *Micronet*.

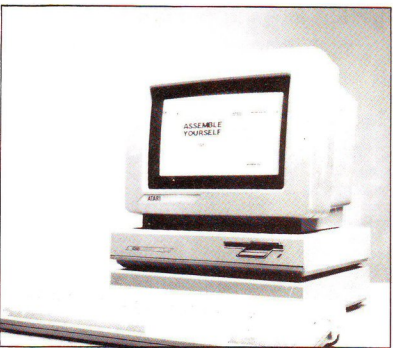
It takes a lot of clever programming to reproduce split baud rates so it isn't implemented very often. Atari's *FaSTcom* will give you access to split rate systems providing you have a modem which can operate on 1200/75 baud. But there are still a lot of good *ST* comms packages which don't employ this feature.

However, there is a way around this problem. Some modems, such as Hi-Tech's EC 2400 (see Telephone Lines, page 24) allow speed-buffering which means that the modem will contact a system on a split baud rate and transfer the data back to your machine at whatever speed you want. Nifty eh?

OPERATING SYSTEMS

There seems to be some confusion among *ST* owners about when *TOS 1.4* will be installed into new *ST*s. To date no versions of *TOS 1.4* have been placed into any *ST* and Atari do not have any plans at the moment to install it into the *ST* range. *TOS 1.4* has been designed to fit into the Stacy laptop machine, available soon. There are also some indications that an extended version will be placed inside the *TTP* machines which incorporate an '030 chip and need a new operating system. For the time being all these versions of *TOS* will be programmed on *EPROM* since Atari are having trouble getting hold of the right chips.

Atari may decide to install *TOS 1.4* into new *ST*s soon - we'll keep you informed. ■



■ The Atari high-res. monitor is great on the eyes, great for text work and great for producing low-electromagnetic fields so where are the bad points? Unfortunately it cannot be used for playing games or for executing other software which makes use of colour displays.

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"To sum up, Protex is probably the most powerful word processor on the Atari ST and is quite likely to become the best selling too"... ST USER 4/88

"...At last one that seems to fit most of what I call essential in a word processor" PAGE 6 #34

"...Extremely good for manipulating and merging large text files". "Wins hands down as the all round package". ST USER 8/88

A brief summary of some of Protex's features ...

Background printing edit/create further files while printer is busy
Box manipulation move, copy, or delete any box as well as blocks
Configuration set over 60 options to your own preferences using our menu driven configuration program
Dictionaries add/delete words to/from supplied 70000 word English dictionary. Create your own dictionaries
Disc utilities copy files, erase, rename, type, create directory, change directory, remove directory, catalogue files
Exec files store sequences of commands in files for easy use
File conversion flexible file conversion utility for other WP files
Find & replace very powerful and fast with many options.
Foreign languages 10 built in keyboard languages. Easy to use accented letters: ä å ø ö ü é ê ë ã ù ð ñ etc.
Formatting auto-reformat; reformat para, block or whole text.
Headers & footers up to 9 lines of text, different even/odd headers and footers, auto page numbering, footnotes
Help edit and command help available on-screen
Keyboard macros string any sequence of letters together on a single key e.g. "Yours sincerely". Load and save macro key files. Special recording mode as you type.
Line spacing variable in half lines, including 0, 1/2, 1, 1 1/2, 2, 2 1/2, 3
Printer support works with any parallel or serial printer. Wide range of printer drivers supplied, incl. lasers and 24-pin printers; or create your own drivers or edit ours.
Printing styles bold, condensed, double strike, elite, italics, enlarged, pica, NLQ, subscript, superscript, microspacing, proportional spacing, any other printer fonts

Program mode suppresses formatting; auto-indent; set tab stops
Proportional text will print proportionally spaced, right justified text
Quick dictionary dictionary held in memory is very fast
Ruler lines any number of ruler lines to define document layout, left/right margins and normal/decimal tab stops
Spelling checker check whole text from disc or memory, or as you type. Suggests alternative spellings. Works with foreign languages
Symbol Screen character symbols may be redefined
Time and date set time and date, use within document
Tutorial files help you to start using Protex
Two file editing two documents in memory, copy text between them
Typewriter mode direct printing for envelopes etc.
Undelete retrieve text deleted in error
Word count quick count at any time, whole text or just a block
Word puzzles anagram and crossword solving features
Wysiwyg on-screen bold, underline, italics, sub/superscript
Mail merge

The most comprehensive mail merge program available. Use it for labels, personalised "standard letters", club membership lists, and much more:
* read data from files from any database or spreadsheet program
* ask for variables from keyboard * display message whilst printing
* include file for printing * reformat whilst printing
* conditional printing and repeat-until loop constructs
* numeric calculations and string expressions including substrings
* commands to record information to a separate file
* operators +, -, *, /, <, >, =, >=, <=, <, >, !N, NOTIN

Protex is a professional word processor

If you want a fast efficient program for processing words, get PROTEXT

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Version 4.2 is now available. Enhancements include:-

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- * New improved conversion program now includes conversion to (as well as from) First Word files.
- * Soroll Lock function pauses after displaying a screenfull of text
- * Clock display on status line

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German Dictionary	£19.95	£19.95	£19.95

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STE'D OFF

I read with great interest in *New Computer Express* that Atari plan to replace the 520STFM with the far superior STE model. This is great news for anyone who has not yet taken the plunge and splashed out on an Atari 16 bit.

Unfortunately for me, three days prior to learning the above I posted off a cash filled, registered envelope, with my order for a 520 TFM Power Pack and an SM124 monitor.

I can't help feeling that I've sent off my hard-earned cash in order to receive a dinosaur. When are we going to find out if an upgrade to the new specifications is possible, and if so at what cost? Also, isn't it likely that the SM124 monitor could be redundant as it can only handle mono sound?

If future games are to contain additional code for the new machines then no doubt that some software houses will increase the price of ST software to that of the Amiga, eg from £19.95 to £24.95. Of course, the poor chap with the older ST will be shelling out for something that is of no benefit to him.

Please try and settle my very worried mind, as I'm slowly becoming convinced that I've been short-changed by Atari, ie. ripped off.

Good luck with the new mag.

Andy Singleton
Holmfirth, West Yorkshire

Atari's reasons for letting the imminent release of the STE slip out mystify me totally. Announcing a new product to supercede a current one before it is ready will instantly kill sales of the old model. The current flurry of rumours

ST
FORMAT

LETTERS

Every month the postbag bulges with bills, library reminders, Readers' Digest offers and, just occasionally, a letter. Send more at once to ST Format Letters, 4 Queen Street, Bath BA1 1EJ.

about new RISC-based machines is equally strange; it appears that Atari are trying to create an image of a company striving forward with radical new releases. I think that we don't fully comprehend the Atari game plan; perhaps a buy out is in the offing and Atari are attempting to push up their share price, who knows?

WHO ME?

The remarks of the letters editor are too cynical and sometimes rude. If a reader asks some (serious) questions just answer them instead of being funny. Be serious where seriousness is concerned. Be funny where fun is concerned. OK?

Jay Lee
Capelle a/d yssel, The Netherlands

Cynical? Well I would be, wouldn't I?

FLASH GIT

Well, what can I say but typical, absolutely typical of the kind of rip off that Joe Public has to put up with.

I am of course referring to the letter from Mr Brian Watson, in

your June issue. If the programmer knows that the game is sub-standard, then why does he allow it to be published with his name on it? Does he take any pride in his work? Obviously not! Well, if any of your readers read your sister magazine NCE, then they will know my views on being ripped off by the software industry. So while people knowingly publish this kind of crap, then I will not buy it. I will pirate it. But until good games come out at fair prices, (*Dungeon Master, Elite and Flight Simulator II* spring to mind, and I have originals of all three), then I will have to get my software any way I can.

Jumping Jack Flash

But if the software's crap, why pirate it at all? Just don't buy it. Don't try to use the quality of the software as an excuse for your stealing.

HERO WORSHIP

I would firstly like to thank you all for producing such a wondrous and totally amazing magazine. I say this on behalf of all of us. We read it thoroughly and completely in order to benefit most from the

deeply philosophical, underlying meaning.

Some nights, a few friends and I get together and play a little game based on *Format*. The personage precipitating sits in the centre and reads aloud a short passage or indeed sentence from that month's magazine, and the first person to correctly name the page from which the said remark was taken wins the £5 and then becomes the personage precipitating the following month. This may all sound rather complicated, but really is great fun. Everyone admits how their lives have been greatly fulfilled after becoming the person precipitating. I recommend that everyone sets up small 'societies' based on *Format*. This encourages one to read the mag thoroughly and completely and has the advantage of the possible £5, not to mention the social aspect and excitement.

Thanks once again from all of us for saving our lives.

Andrew Haughton
Bolton, Lancs

PS There is no need to go on about computers so much. Why not have world wide month or something important?

BIG ONES

Concerning your cover disk, I was amazed to see that you are only producing 800K worth of programs for it. I am not plugging this company but Evesham Micros can fit about 920K (double-sided) and 460K (single-sided) on a disk although it does run 30% slower. Perhaps you do not have enough programs to fill this, but it would make a lot of people even happier.

Bret Hart
Guildford, Surrey

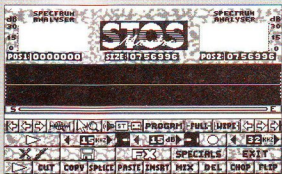
Disk formats using vast numbers of sectors per track and ridiculous quantities of tracks per disk are hideously unreliable, and will not work in many older machines. As it is our 10-sector format gives you the largest disk of any ST magazine, so be happy.

Sound of confusion

Recently I read your review of *Replay 4* (issue 10, April '89) and I am now considering buying it, but the problem is that I do not as yet have any MIDI units connected to my computer. Could you advise me what to look for when buying a MIDI bearing in mind that I want to use it for sound sampling and the fact that I have a low budget. Would a separate tape deck or maybe a ghetto-blasters suffice? Also, would *Replay 4* work better on a 1040STFM as opposed to using it on my current 520STFM?

Stuart Halliday
Northwich, Cheshire

You seem to be a little confused over the difference between MIDI and sound sampling. MIDI is a system for controlling synthesisers via a micro. You can program sequences of notes to be played and define volume, voice, chords and so on. Sound sampling on the other hand is the conversion of sounds into a digital form to be manipulated and replayed.



■ *Maestro*, a powerful sound sampler.

You do not need a MIDI instrument to use a sound sampler.

What you do need is a sampling device, which normally fits into the cartridge port, and some software, such as *Replay*. Several packages such as *MasterSound* and *Maestro Plus* contain all the hardware and software you need. A tape deck or ghetto blaster would be perfectly suitable as a sound source, either using the headphone socket or line out pins. Using a 1040 will give you larger sound samples.

It's better on PD

In the last issue of *ST Amiga Format* there was an article on software piracy. In this, there was an interview with David Crothley, a 'typical' 12 year old. I am also 12 years old, but (according to your magazine), I must be a very 'untypical' ST owner. I believe that programmers should get their money from every person that has their game. If anybody makes a copy for anyone else, they should be told to take a long walk on a short pier (anyone who pirates must be an idiot!). I do not 'adore' software pirates, I scorn them. They are just people who want to make a quick buck from other people's very hard work.

If people like David want scrolling messages and digitised graphics, they should look in the public domain. The catalogues are now swarming with new demos like the BIG Demo, the Union Demo and the Amiga Demo (to name but a few). I thrive on public domain disks. They are worth their weight in 68000s. I buy PD disks, but I also make PD programs using STOS. It's very rewarding to see your name in a PD catalogue! Remember, PD covers all subjects eg graphics, games, demos, music to name just some. It is also pounds cheaper. Commercial games and utilities are over £25, but you can buy a PD disk for (at maximum) £4. Pirates read this: Go jump off a cliff!

Chris Heathcote
Chelmsford, Essex

HAMMING IT UP

I have in the past manufactured communication terminals for most of the usual computers for the ham radio market.

However, I have drawn a blank at getting a RTTY or AMTOR program for the Atari. There are some programs around for these modes but they require a rather expensive intelligent terminal costing between £200-£300. This uses the computer as a dumb terminal which is a waste.

Could you ask through your pages if anyone has written or knows where I can purchase the required programs or indeed anyone who is prepared to write one?

I would also like to hear from anyone who is interested in either of the modes mentioned as well as SSVT.

J Melvin
2 Salters Court, Gosforth
Newcastle NE3 5BH

BASIC TASK

You are probably sick of getting letters like this one! However, one must try. I am an ancient (?) 40-year-old, who has now owned an ST for virtually a year. At present it is mainly used for my two teenage sons to play games upon, though I do sneak on and do the same when no one is looking, but I do use it for some spreadsheet work and some minor WP tasks.

Enough of the background. The reason for my letter is that I would like to get into the programming side of the ST and would like you to recommend a BASIC program, which while letting me mess about will also enable my sons to enter the cheats that are published.

Having been a regular reader of your magazine since I got my ST I was very glad to read this month of the new 'split' magazines. Hopefully we will not have to put up

with any more of the ST versus Amiga battle.

Peter Harris
Gosport, Hants

Last month's issue of *Format* contained the perfect program - GFA BASIC. If you missed it, turn to page 112 for back issue ordering info.

NOT FIXED

I have had an ST for over a year and I borrowed my friend's *Garfield: Big Fat Hairy Deal*, but it was damaged (not by me though), so I was pleased to see *Fixdisk* on the cover disk. But, to my dismay, when I tried it it wiped *Garfield* and itself. So now I have two blank disks and a very angry friend. I know I didn't format it because I know what I'm doing where computers are concerned. Can you please help me?

Emma Appleton
Mirfield, West Yorkshire

The catalogue of disasters over *Fixdisk* continues. The program is in fact a piece of commercial software which we put on the disk having been misled into thinking it was a reader program. Mucho fuss ensued. Now we find that if used on a disk with a weird disk format it wipes the disk.

As most software and all games use strange formats DO NOT ATTEMPT TO FIX GAMES DISKS WITH FIXDISK.

PC PORN: THE DEBATE CONTINUES

As a female 16-bit owner, I can only say that I agree wholeheartedly with the comments voiced in the final issue of *ST Amiga Format* about the content of issue 12. The only reason that I haven't written until now is that, quite simply, I was too shocked to even think of putting pen to paper.

The pictures used in the contents page and in the article itself would have been bad enough but the cover was the worst. The combination of the picture and the words 'SEX MACHINE' (bigger than even the title, of course) were particularly offensive and caused great embarrassment to me and other members of my family. It is not even as if the article came to any great conclusion about how computer pornography could be eliminated and it certainly didn't need all those pictures to explain its point.

We female computer users have had to get used to the (mis)use of women in game advertisements but I would never have expected a magazine as good as

ST Amiga Format to stoop as low as this.

Vivienne Moore
Hawick, Roxburghshire

Having read the letters in the recent issue of *Format*, re the article 'Sex Machine' in issue 12, I thought that you may be interested to hear my point of view.

I am 22 years old, nearly married with two children, and personally found nothing even remotely offensive in the article. As for the software in question - well, I've seen some of it and, as my main interest is in graphics, looked at it from an artistic point of view. Apart from this I consider it to be a blatant waste of valuable disk space.

I don't see what all the fuss is about as any kid lucky enough to own either an ST or Amiga would quickly become bored with this stuff anyway.

Obviously, it should be up to the parents to keep an eye on the kid's usage of software but whereas it's impossible to insure that they don't see any of it it'd also be impossible to prevent them from looking at any 'girlie' mags that will make the rounds of virtually any school.

The thing that I find most offensive in the whole matter is the male opinion that all women will be offended by anything of this nature. There's already far too much censorship in this country. Material of this nature should be available for whoever would find it interesting. The official viewpoint seems to be that we are all too stupid to be able to make the choice of what we do or do not want to see for ourselves. I for one am not so stupid and see no reason to take the freedom of choice away from anyone else.

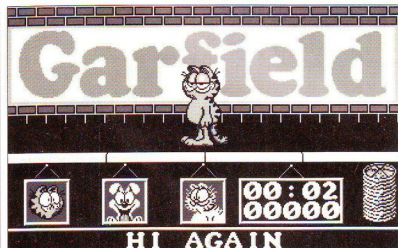
Debi Scott
Stoke on Trent, Staffs

EM RULES

I do dislike being pedantic but I feel I must point out that the preview of *Pagestream* in issue 13 contains a mistake.

In the small section on page 54 headed 'Times are a-change-able' Mr Sargent states that an em is a 72nd of an inch. In fact the em measurement is variable as it refers to the width of the widest character in any font. (Usually the 'm').

The measurement he should have used is a point which is one 72nd of an inch. Also I think the kerning rate stated is a bit exaggerated, one tenth of a thousandth of a 72nd of an inch is tiny! Such a movement in letter positioning would be pointless, probably even



■ Garfield - not fixed.

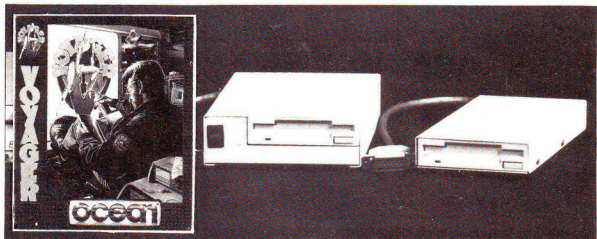
a Linotronic with output resolutions of 2,540 lines per inch would be unable to show a move of just one 720,000th of an inch as this is smaller than its smallest printable dot.

**Greg Shackelford
Ruislip, Middlesex**

Right, if you're going to be pedantic, so am I! Correct, we meant point not em, but a point is not exactly a 72th of an inch, that's just the nearest approximation, and while an em does depend on the type size you use, in common printer's parlance it's short for pica em, which is 12 points. And an em isn't the widest character, it's the width of a square character the height of the point size - ie, it's equal to the point size of the type. I went to printing school too.

DRIVING ON

The reasons for this letter are twofold. Firstly, I would like to say (and I think I speak for most 16-bit users) how gratifying it is to see software houses responding to the growing pressure from users for reduced software prices. Wholehearted thanks to the contributors and to *Format* for providing a



■ Voyager's copy protection runs the disk continuously. Can that be good for the drive?

forum for discussion.

Secondly, a problem which all 16-bit users should be made aware of, and I might say a very worrying one - one which as a result could shorten the effective life of your computer's disk drive motor.

After purchasing a copy of Ocean's *Voyager*, I eagerly returned home to blast the day-lights out of the aliens. Once loaded everything seemed fine apart from the disk drive, the motor was whirring round and did not stop. After contacting Ocean to find out if my disk was faulty, and being told that the protection sys-

tem required the disk motor to be running continually throughout the game, I was horrified.

Surely the motor unit in the disk drive cannot remain unaffected by prolonged usage of games with this type of software protection. When we consider the type of software protection where you are required to type in a word from a novella, which requires photocopying of a complete set of the software's documentation to pirate the game, any other type of protection is in my opinion, like waving a red rag in front of a bull where pirates are concerned.

When are the software companies who utilise this type of protection going to realise that their obligation to its users also involves not producing software that may damage our machines through over-use of the drive.

**Craig Dunn
Glasgow, Scotland**

There is no perfect copy protection system, but one which wears out the machine unnecessarily is clearly not a good idea.

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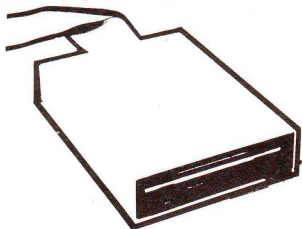
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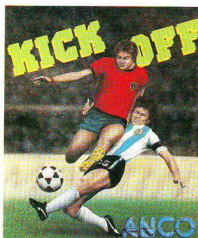
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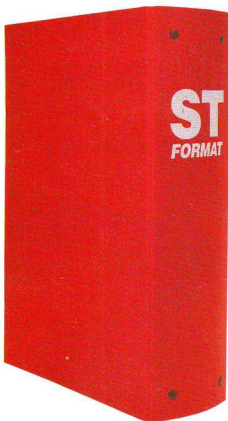
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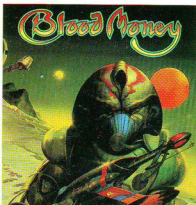
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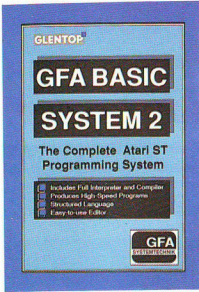
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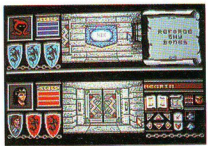
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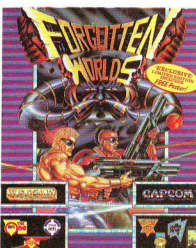
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Cover Disk: Amiga: Interceptor demo, Virus Killer, Othello game.

ST: Oids demo, Virus Killer.
Magazine: Wordprocessors evaluated, Graphics packages compared, Pro-sound, Superbase benchmarked.

Issues 2-6 ■ SOLD OUT! SORRY!

Issue 7 ■ Order Code AM207

Cover Disk: Amiga: Cosmoroids, play the game, MCAD design for your Amiga.

ST: Play Level One of Flying Shark, HiStart, high quality ST art.

Magazine: Full review of Flair Paint, Colour Printers, Shoot 'em up Construction Kit, Learn BASIC.

Issue 8 ■ Order Code AM208

Cover Disk: Amiga: Stunning scenery generator, Purple Saturn Day demo.

ST: Purple Saturn Day demo, Database construction set.
Magazine: Autoroute (the computer journey planner), Sculpt 4D, a modelling package, Protext (THE word processor for your Amiga then), Cameron's Handy Scanner reviewed.

Issue 9 ■ Order Code AM209

Cover Disk: Amiga: Yelp, fully playable addictive game. **ST:** Jitterbug, a wonderful multi-player maze game.

Magazine: Buy a modem from our suggestions, Cel Animator for the Amiga put through its paces, Organise your day with Day by Day or Daatafax.

Issue 10 ■ Order Code AM210

Cover Disk: Amiga: Cybernoid II (playable demo), Learn Devpac 1.

ST: Zak McCracken (playable demo), Learn Devpac 1.
Magazine: Upgrade your machine with extra megabytes, Daatascan handheld scanner from Kempston Samplers.

Issue 11 ■ Order Code AM211

Cover Disk: Amiga: Blood Money (playable demo), File requester, add requests to programs.

ST: Archipelagos, playable demo, Fastmouse, speed up mouse operation.
Magazine: Make yourself a sound sampler, Deluxe Paint III, Animation tutorial, Why not invest in a better screen? Here's the choice...

Issue 12 ■ Order Code AM212

Cover Disk: Amiga: Colossus Chess, playable demo, VirusX V3.1 protect your disks against viral infection, Boot intro, add scrolling messages to your disks.

ST: Flair Paint, usable demo of this brilliant art package.
Magazine: Video digitising, Attach a

MIDI system to your machine and make music. The best available joysticks.

Issue 13 ■ Order Code AM213

Cover Disk: Amiga: Wicked, playable demo of this totally addictive game, Mandelshow, create infinitely complex pictures with this Mandelbrot generator. **ST:** Spherical, an excellent playable demo of this strategy game.

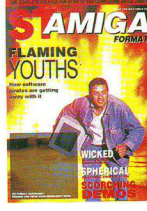
Magazine: Pagestream, a brilliant DTP, Animation techniques, the reasons why, The choice of hard drives.

ST FORMAT

Issue 1 ■ Order Code STF01

Cover Disk: Bloodyvch and the fabulous GFS BASIC 2, the full working version.

Magazine: Mastersound, a new sound sampler reviewed, Hisoft C Interpreter, Atari, the past, present and future. Have machines a will of their own? Are there ghosts in your ST?



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CHAPTER ONE: THE PATH OF THE JUST??

PART TWO

PICTURE SECURITY REPORT
00.098.

SEQUENCE CONTINUES...

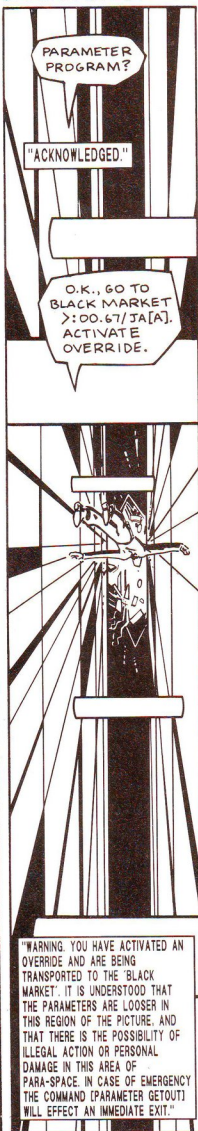
HOW LONG DID
PICTURE
SECURITY
KEEP CARROLL
UNDER
SURVEILLANCE?

"24 DAYS SIR, CARROLL'S
LAST EXPLOIT UPSET
SOME RATHER
INFLUENTIAL PEOPLE
WHO..."

NEVER MIND
THAT; I'M NOT
INTERESTED
IN CARROLL.
RUN NEXT
SEQUENCE.

"NOTE: ALL SOUND
WITHIN THE PICTURE IS
RECONSTRUCTED FROM
PULSE DATA, AND CANNOT
BE USED, AS EVIDENCE
WITHIN A COURT OF
CORPORATE LAW."

13 [SET] GRAD



PARAMETER
PROGRAM?

"ACKNOWLEDGED."

O.K., GO TO
BLACK MARKET
>:00.67/JA[A].
ACTIVATE
OVERRIDE.

"WARNING: YOU HAVE ACTIVATED AN
OVERRIDE AND ARE BEING
TRANSPORTED TO THE 'BLACK
MARKET'. IT IS UNDERSTOOD THAT
THE PARAMETERS ARE LOOSER IN
THIS REGION OF THE PICTURE, AND
THAT THERE IS THE POSSIBILITY OF
ILLEGAL ACTION OR PERSONAL
DAMAGE IN THIS AREA OF
PARA-SPACE. IN CASE OF EMERGENCY
THE COMMAND (PARAMETER GETOUT)
WILL EFFECT AN IMMEDIATE EXIT."

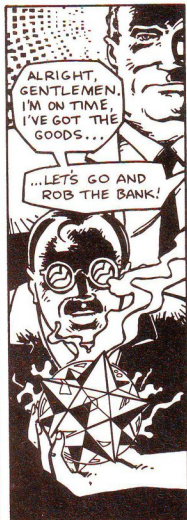


"SONDEGAARD PITT (38)
AND HARLAN KEMBLE (31)."

"FOR FURTHER DETAILS,
PLEASE CONSULT THE
BIOGRAPHY SUB-MENU."

HE'S HERE
MR. KEMBLE.

INDEED. HOW
PERCEPTIVE OF
YOU, MR. PITT.



ALRIGHT,
GENTLEMEN.
I'M ON TIME,
I'VE GOT THE
GOODS...

...LET'S GO AND
ROB THE BANK!



HAVE YOU EVER HEARD OF
ANYONE GETTING HOLD OF
SUCH A RARE PIECE OF
MILITARY SOFTWARE,
MR. KEMBLE?

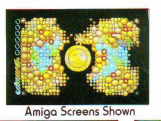
I HAVE NOT,
MR. PITT. OUR
MR. CARROLL
HAS ONCE AGAIN
PROVED HIMSELF
TO BE A WORTHY
ASSOCIATE.

That's it! I don't
care how difficult
the job is - next
time I work alone!

CONTINUED...



It's silent,
it's cunning,
it's spreading
it's . . .

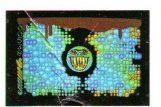


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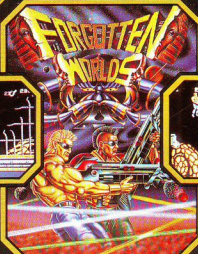


The GOLD STANDARD



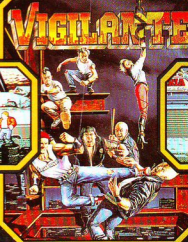
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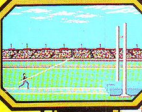
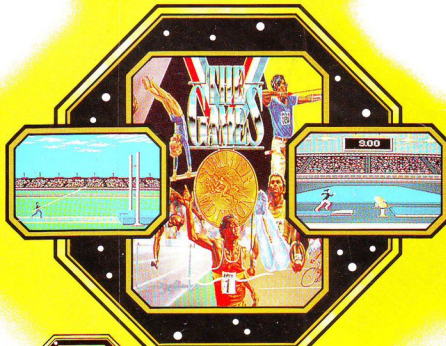


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SETTING THE STANDARDS...

Screen shots from various systems.

