

POPULAR **NOW ONLY 55p!** COMPUTING INCORPORATING **JULY 6 1989** **WEEKLY**

GAUNTLET!

**NINTENDO'S POWER
GLOVE THROWS DOWN
CHALLENGE TO
JOYSTICKS, p.9**

EXCLUSIVE!



IN GAMESWEEK

WICKED

SPHERICAL

FIRE BRIGADE

**LIFE AND
DEATH**

**ADVENTURE
BRIDGE**

HARD AND FAST

NEW AMIGA HARD DISC REVIEWED, p.18

ON-AIR

**MAC AND AMIGA
GRAPHICS TAKE
TV BY STORM, p.15**

ATARI ST

- An amazing new flight simulator makes it debut on the Atari machine. It models radio control aircraft and you fly it with the usual radio control console. See news!

• Plus: Kenn Garroch



AMIGA

- The Impact A500 hard drive, all 40Mbytes of it, is reviewed. Professional computing at a professional price? Find out...



SPECTRUM

- A new routine increases the memory available to a program.



Commodore 64

- Norman Hart has written an input filtering routine which outlaws certain characters during run time.



PROGRAMMERS: THREE PAGES OF JOBS START ON PAGE 31!

New show springs up

A TASTE of the first 10 years in microcomputing is claimed to be a major attraction at the new all-formats Spring Computer Show, the latest event in the computing calendar.

The new show is aimed at home and educational users and will be launched next May by Focus Events, sister company of *Popular Computing Weekly* publisher Focus Magazines.

The Spring Computer Show will be a joint venture with ITP Exhibition Services and will take place at Olympia's National Hall from May 4-6.

The taste of history will come in the form of a central 120 square metre walk through exhibit in which all the seminal micros of the last ten years will be shown. Commodore machines, for instance, will be seen progressing, from the PET to the Amiga and, 10 years after it was launched, the ZX-81 will be shown progressing through to the Spectrum and all its variants. ITP boss Peter Brameld hopes to be able to obtain working examples of all machines.

As an all-formats event, The Spring Computer Show will provide a venue for shoppers six months after the Computer Shopper Show, the all-formats show by Database in November. Brameld claims the Spring Show will also answer what he calls the PC Show's "confusing mix" of business and leisure content.

Pop is part of the lifestyle

THE DAILY EXPRESS and Electronic Arts have teamed up with your favourite computer weekly to bring you a demonstration of the latest EA Amiga games, *Populous* and *Battle Chess*.

The show, called *Lifestyle 2000*, aims to show what life will be like at the turn of the century and runs from Saturday, July 8 to Sunday, July 16 at Olympia.

The Express reckons *Lifestyles* will showcase "how our lives up to the 21st Century will be influenced by technology and trends."

In *Populous*, you play a god who rules over a kingdom of animated characters, controlling earth, wind and fire like a true megalomaniac.

Battle Chess simulates how the pieces on a chess board would battle it out when they meet each other, in the most humorous possible way. Have a laugh and meet Pop and EA bods at the *Lifestyles* show - do not miss it.



RC Aerochopper on the ST: learn to control the simulation of the model of the real thing.

Radio control simulations

SMASHING up radio controlled planes with dodgy flying practice? Want to learn how to fly model aircraft before taking to the real skies? Well, a new Bristol company may just have the answer for you. RC Simulation, a new outfit, will soon be marketing the *RC Aerochopper*, a radio controlled aircraft simulator from Ambrosia Microcomputers of Willowbrook, Illinois.

The circa £175 *RC Aerochopper* runs on the Atari ST - soon on the Amiga - and has a real Futaba radio control unit as its control console. The software comes on a cartridge (for the ST version) and models the characteristics of radio controlled propeller driven aircraft, helicopters, ducted fan jets and gliders.

According to the makers - our review copy has yet to arrive - the package allows you to adjust weather and environmental parameters. One drawback is that the graphics are wireframe, but this lends itself to a much higher screen update rate. When you foul up, animated crash graphics leave you in doubt as to your total lack of skill/fuel/wings/engines.

The system is to be imported by Bob Sidwick, a radio control fan who has set up a company dedicated to the *Aerochopper* products. Interested? Call Bob on 0272 550900 for more information - and watch for a review on these pages soon.

Wang leaves Scotland

THE Scottish electronics industry suffered a setback with the announcement from the U.S. computer company Wang that it will be closing its personal computer manufacturing plant at Stirling.

Wang has been losing money in recent months because sales of mini-systems have declined sharply.

Having received about £4 million from the Government in grants to help set up the operation in 1982, production is moving to Limerick, Ireland.

Two hundred and forty jobs will be lost in the closure, which is part of a world-wide restructuring which will result in the company reducing its total workforce by 2,000 to 28,500. It is hoped a buyer will be found to take the plant as a going concern.

A spokesperson at the Scottish Office said there will be discussions between the Government and Wang regarding repaying of the grant assistance it received when setting up the Scottish factory.

This Week

JOYSTICK LIBERATION

p.9

How will you be manipulating the computer games of tomorrow? Has the joystick had its day? John Cook reports on the latest innovations.

LETTERS p.11

Looking forward to SAM but will there be enough software? ... Should bundles be standard equipment ... Sold on the C64 ... and lots more!

PUZZLE p.13

An alphamatic with a 'popular' title ...

TELEVISION GRAPHICS

p.15

The new technology allowing graphic output from micros to be converted to broadcast standards is changing the face of our TV screens.

HARD DISC REVIEW

p.18

Amiga A500 owners can get into the serious computing league with Impact, a 40MByte hard disc drive.

GAMESWEEK

HOTLINES p.21

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CAREERS PAGE p.30

Have you got what it takes to be a programmer?

BYTES & PIECES p.42

Input filtering for the C64 and memory space saver for the Spectrum 48K or Plus.

FEEDBACK p.46

Are comms overrated? This reader thinks so.

ROAD BATTLE ENSUES AFTER COMPUTER ROW

ROAD BLASTING games may be good clean fun but they came to life when a verbal battle between two groups of games programmers broke into a 100 M.P.H. motorway violence on the M74 outside Glasgow.

Two London based programmers claim their car was almost rammed off the road by two other vehicles, which were driven by two men that the programmers claim they recognised as those they had just been arguing with in the Glasgow area. The two allegedly aggressive drivers orchestrated their action via cellphone, ac-

cording to the London drivers.

The two cars overtook the London programmers – none of whose names we can yet reveal for legal reasons – and blocked their progress on the two lane motorway by overtaking and braking in front of them. The Londoners tried to escape by driving up onto the hard shoulder, but were rammed sideways by the other cars.

The drivers of the two Glasgow cars followed the Londoners for some time and, at a junction near Lockerbie, overtook and allegedly stopped to "throw rocks" at the London bound

car. The time was 2 a.m. and the Londoner's found the Lockerbie police station locked up and shut. They drove on to Gretna and reported the action of the Glasgow men to the police, who are allegedly to press charges for dangerous driving.

The row concerned the ownership of expensive development systems, which belonged to a London development house. The machines were retrieved – with police help – from the premises of a Scots development outfit, one of whose programmers had recently left the London firm.

Database "on the make" with school protest

FUN SCHOOL 2, the educational software package from Database, is the subject of a plea to the Minister for Education to over-rule an alleged bias against teaching aids which are based on the traditional 3Rs.

According to Database, some 'trendy' left-wing education authorities are vetoing the use of *Fun School 2* in their schools, claiming the teaching methods it employs are too conventional and too competitive.

One teacher, Shelly Gibson of Poplar Street Primary School, Audenshaw, Lancashire, is apparently so incensed by the treatment of her favourite teaching aid that she has written to the Minister for Education, Kenneth Baker. In her letter she requests that the package be included



Teacher Shelly Gibson: can't spell Kenneth! in the national curriculum.

A spokesman at the Department of Education and Science was emphatic that specific teaching aids, whether they be software or books, are not imposed at national level: "This looks like somebody on the make. The purpose of the national curriculum is not to detail teaching resources but to

provide a program of study for five- to 16-year-old children."

We asked Database which authorities had rejected *Fun School 2*. It told us it had received "unofficial feedback" but that at the regional level at least education authorities had the power to recommend which resources are used.

IN BRIEF

\$25 PC Network upgraded

EQ CONSULTANTS has announced an upgrade of budget-price network software for PCs. Version 2.3 remains at £28.75 for 5.25in. floppies, £29.90 for 3.5in. discs and with a £6 upgrade for existing users. The main enhancements claimed for the new network are an increase in speed of 37.5 per cent, the ability to handle large disc partitions created under DOS 3.X., faster server operation and the addition of a fix to permit the running of programs which used to kill it.

Hacking the American way

HACKERS have been busy again across the Atlantic in a variety of ways. A 35-year-old woman has been indicted on 17 computer fraud counts alleging that she led a team which defrauded telephone companies of \$1.6 million by using other people's credit card codes.

Meanwhile, a 14-year-old Apple user in a suburb of Kansas City has managed to get into an Air Force satellite base and look at the confidential files of more than 200 companies. Last, a PC user hacked Southern Bell telephone company central office and re-routed calls from a Florida State parole office to a New York sex line at Florida's expense.

BB monitors toxic waste

THE Environmental Protection Agency in the U.S. has set up a public access bulletin board containing the toxic emissions of 19,278 industrial plants. The EPA gained access to the information using the right-to-know law passed in 1986.

According to *Newsbytes* more than 22 billion pounds of toxic chemicals are released every year in the U.S. and although most of it is dispersed harmlessly, the new database will allow environmental activists to pinpoint danger areas.

Resurrection

THE ATARI SHOW is dead. Long live the Atari Show – for it is to be revived folks. Sources indicate that an exhibition space has already been bought somewhere in London for next year and that Atari will be in control of the event. As we go to press no dates or venue have been announced but Atari is believed to be attempting to create more of a "showcase" event for its machines, rather than the more "box shifting" events seen in the past. More when we have it.

Animated competition for Amiga users

ATTENTION, all budding Walt Disneys. Every year the Edinburgh Festival draws performers of all kinds to participate in one of the world's greatest arts events. For the second year The Amiga Centre Scotland will be participating in the festival in the form of a Computer Animation Competition and

Exhibition. Amiga users can submit their sequences on either disc or PAL VHS videotape.

The closing date for entries is August 24 and finalists' work will be on display at the exhibition.

For further details contact The Amiga Centre on 031 557 3260.

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WORD/SPREAD/BASES

- PC-WRITE Oulksot's Multi-function word Processor
- PC-TYPE II Brand new WP from Buttonware (HD). 4 DISCS
- PC-TYPE+ Fast Spelling Checker, Undo, Help, 4 DISCS
- SAIL Text editor with windowed multi-file mode
- GALAXY Uke Wordstar but with pull-down menus. 2 DISCS
- MINDREADER Brown Bags unique self-learning WP
- PC-OUTLINE Popular brain storming. Idea processor
- SPELLING CHECKER with updateable dictionary
- PC-CALC+ Powerful multi-feature spreadsheet. 3 DISCS
- AS EASY-AS Spreadsheet which is 123 compatible
- OUBECALC A novel 3-dimensional spreadsheet
- GOALSEEKER Timesaving utility helps create spreadsheets
- PC-FILE+ V2 Popular Database with mailmerge. 3 DISCS
- PC-FILE-dB dBase power at shareware prices (HD) 3 DISCS
- FILE EXPRESS Easy to use database. 2 DISCS
- INSTANT RECALL Memory-resident database
- 3XS CARD INDEX simulate manual system (limited sort)
- DREAM Amazing relational database system. 3 DISCS
- WAMPUM Popular, powerful implementation of the dBASE III database programming language (HD) 2 DISCS

FINANCE

- FREEWAY CASHBOOK UK home accounts & budget. 3 DISCS
- FAST BUCKS Comprehensive home accounts & budget. 2 DISCS
- HOME INVENTORY/HOME INSURANCE with report generator
- HOME LOAN Calculate interest, repayments, reports
- FREEWAY PAYROLL Latest up-to-date version. 3 DISCS
- FREEWAY ACCOUNTS PLUS Popular UK Package complete with Purchase, Sales & Nominal Ledgers. 3 DISCS
- MR BILL Customer billing and tracking. 2 DISCS
- TIME & MONEY Financial tracking with cash projection

APPLICATIONS

- LABEL MAKER Simple mailing label database & printing
- PC MAIL Mailing list system and label printer. 2 DISCS
- 100 STANDARD BUSINESS LETTERS to use and adapt
- EZ FORMS standard forms to edit and use
- BUSINESS GRAPHICS Une, Bar Graphs, Pie Charts. 2 DISCS
- STOCK CONTROL SYSTEM Powerful aid to any business
- AUTOMATED PLANNING Useful suite of planning aids
- PROJECT MANAGEMENT Critical Path Analysis, Gantt Charts
- THE FRONT OFFICE Sales tracking system. 2 DISCS
- BUSINESS CONTACTS MANAGER Multi-function suite. 3 DISCS
- ESIE Expert System Shell; Artificial intelligence
- PRO-COMM Menu-driven communications. 2 DISCS
- PC-DIAL Buttonware communications program
- EZ-UNK UK program with full Prestel/Viewdata. 2 DISCS
- WILDCAT Complete Bulletin Board system. 3 DISCS
- STD CODES IN NUMERICAL order with corresp exchanges
- DESK COMMANDO Menu System, DOS shell, Text Editor, Scientific Calculator, Calendar, Appointments Diary
- PC-DESKTEAM Handy calculator, notepad, diary, DOS access
- HOMEBASE Shareware Sidekick. Calculator, WP, Database, Calendar, Notepad, Communications. DOS access. 3 DISCS

EDUCATION

- AMANDA'S LETTER LOTTO (Age 2-4) Teaches keyboard and letter recognition and co-ordination
- ABC FUNKEYS (Age 2-5) Colourful way to learn letters
- AMY'S FIRST PRIMER (Age 3-6) Six games teaching basic letter and arithmetic skills
- CHILDREN'S GAMES (Age 5-8) Five educational games: Alphabet Animals, Clockgame, Hangman and Mosaic
- EDUCATIONAL SELECTION (Age 6-10) Hangman (word guessing), Funnels and Buckets (arithmetic), Polyglot (word matching) and Children's Word Processor
- ANDY'S WORD GAMES Opposites, Word Find, Jobs, Synonyms, Odd Word Out, Categories, Comparisons, Plurals, Verbs (Age 6 up)
- TED'S COMPENDIUM A variety of puzzles, anagrams etc
- PHRAZE CRAZE Learn word and phrase skills (Age 7-12)
- JOTTO Like Master mind only based on words not numbers
- WIZ QUIZ (Age 6-12) Quiz based maths tutorial
- MATHS TUTOR (6-Adult) Covers basic to advanced maths
- PC-TUTOR Well presented course on computers & DOS
- HELPDOS All you need to know about DOS
- FASTYPE Popular multi-option PC typing course
- GCSE PHYSICS REVISION Novel way to learn Physics
- GCSE COMPUTER SCIENCE REVISION Novel way to learn
- STATISTICS Over 20 stat analysis functions. 3 DISCS
- NIGHTSKY The latest computer planetarium. 2 DISCS
- TEST & TRAIN Build your own training program
- Foreign languages each on a single disc: FRENCH TUTOR, GERMAN TUTOR, ITALIAN TUTOR, SPANISH TUTOR

GAMES COMPENDIUMS

Advantage have collected many quality games, grouped by style, under various titles. Most games offer graphics and sound with a choice of keyboard or joystick gameplay.

- GLASSIC GAMES - Space Invaders, Pacman, Pacgirl, Ribit, Breakout, Donkey Kong O-Bert, Jumping Joe
- FUN & GAMES - Pango, Baby, Elevator, Centipede, Pyramid, Dragons, Pac, Osbit
- COME IN PEACE - Striker, Paratrooper, Round 42, Sopwith, Landmine, Hostages
- STAR WARRIORS - Quantoids, Rescue, Flightmare, Kamakaze, Space Wars, Emergency Mission
- KEEP THEM AMUSED Burger Blaster, Grime, Racer, Ninja, Caverns and Galaxy
- FACE THE ACTION Batalia, Tank, Moonbase, Blortill, Gemini
- BLOCK & TACKLE Neron, Oix Xonix, Blockade, Lazer, Berzerk
- GOOD SPORTS PC Tennis, Teed Off (Golf), Yachting in the Bermuda Triangle, Armchair Quarterback (Football)
- SEEK & DESTROY Galactic Conquest, Daleks, Depth Charge, Lazy Monday, Intercept
- SPY CATCHER Master Spy, Brimstone, Mad scientist, Raider
- LOST VEGAS - One Arm Bandit, Roulette, Backgammon, Wheel of Fortune and Biorhythms
- SKILL & STRATEGY - Frigate, Stock Exchange, Big Rig
- WIT YOUR PITS Brainstorm, battleships, 5-in-a-line, Rogue
- MAZING GAMES - Treasure Hunt, Polymaze, Amaze, 3-Demon, Castle, Chase
- PC CHALLENGE - Chess, Othello, Entrap, PCGolf, Hexplode, Air Traffic Controller
- JUNIOR CHALLENGE - 3D TicTatTo, Dotto, Willy The Worm, Labbits & Voldrons, Draughts, MasterMind

Join the Advantage Independent Computer User Group and choose ANY Shareware discs for just £2 each (3.5" format £3 each)

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SPECIAL INTEREST

- FAMILY HISTORY Reckoned to be best on genealogy. 2
- FAMILY TIES Easy to use Menu-driven Genealogy program
- WEIGHTWATCHER calorie charts, diet and weight planning
- ASTROLOG-95 Plot astrological charts and horoscopes. 2 DISCS
- BIORHYTHM MONTHLY Comprehensive plotter and printer
- VCR DATABASE for cataloguing videos, LPs etc.
- MICRO MENU Recipe system offers many useful recipes
- MATCH MAKER Now you can start your own dating agency!
- PC SPORT Useful league table generator
- WORLD Extensive gazetteer of places in the World
- CROSSWORD CREATOR all you need to make your own puzzles
- CROSSWORD SOLVER and anagram generator with dictionary
- COMPOSER Create, play and save tunes using on-screen stave
- PIANOMAN Turn your PC keyboard into a musical one
- BIBLE READER Compressed down with easy reader. 5 DISCS
- THE ENTIRE KING JAMES BIBLE in ASCII text. 11 DISCS

PROGRAMMING

- BASIC INTERPRETER Write and run standard GWBASIC
- PASCAL COMPILER A good introduction to Pascal
- MYSTIC PASCAL compiler and editor
- MODULO-2 COMPILER with editor and linker. 3 DISCS
- PROLOG The language for artificial intelligence
- LADYBUG LOGO - Ideal for teaching programming
- BASIC TUTOR Introductory tutorial on BASIC
- GETTING STARTED ON C Introductory lessons and examples
- GETTING STARTED ON ASSEMBLER Useful introduction
- C AND TURBO C TUTOR with source code examples
- CHASM Machine code assembler for the 8086 with Primer
- A86/D86 Powerful 8086 Assembler with debugger. 2 DISCS

ADVENTURES

- GOLDEN WOMBAT OF DESTINY Intriguing and unusual adventure
- JACARANDA JIM Offbeat and amusing UK adventure
- HACK (Amulet Of Yendor). Extensive role-playing adventure
- DUNGEONS & DRAGONS Fantasy role-playing adventure
- COLOSSAL CAVE ADVENTURE The one that started it
- CAVE QUEST sent to Earth to seek fame and fortune
- SUPERNOVA Complex game set in deep space
- INTERCEPT & MUTANT INVASION Two Sci-fi adventures
- DARK CONTINENT & NEBULA Two games by same author
- QUEST FOR KUKULKAN and UNDER THE ICE Two games

DISC ORGANISATION

- POWER MENU Brown Bag's easy to use hard disc menu system
- AUTO MENU Design your own menu for your hard disc
- STILL RIVER SHELL Better front-end than the DOS prompt
- DBS KAT Cataloguing system for hard disc
- DISKCAT Cataloguing system for flopping discs
- DISK COMMANDO Norton utilities at Shareware prices
- ULTRA UTILITIES 'Disc Doctor' with directory of erased files, unerase, sector and file editor
- PROFESSIONAL MASTER KEY New version of this powerful sector and file editor for hard or floppy disc
- PACKDISC Eliminates file fragmentation, economise & speed up your hard disc system
- ARCHIVE SYSTEM Save up to half your back-up discs
- HYPER-SHELL Menu text presentation and management system
- FLU SHOT Helps you deal with and avoid viruses

UTILITIES UNLIMITED

- ESSENTIAL UTILITIES Over 50 of the best available
- ADVANCED UTILITIES More specialised collection
- USEFUL UTILITIES A further set of over 30 programs
- BAKERS DOZEN Thirteen useful programs from Buttonware
- TEXT PROCESSING Printer Control, Spooler, Print Side-ways, Tally Word Counter, Filters, Fogfinder, Lister
- LASER PRINTER UTILITIES & FONTS. 3 DISCS
- LO Different printer fonts to enhance your Wp text
- FANTASTIC Introduction to DTP with font editor. 2 DISCS
- SIGNSMITH Create your own posters and letter heads

BOARD & CARD GAMES

- SCRABBLE Good implementation of the board game
- SLEUTH Exciting murder mystery solving game
- WORLD DOMINATION The classic game of risk and strategy
- PC-OPOLY Computer version of the well-known board game
- CHESS & CHECKERS Good quality full screen graphic versions
- CHINESE CHECKERS Unusual 6-sided version of draughts
- GAMBLERS DEN Three games - 21, Poker and Pontoon
- BLACKJACK Features excellent card pictures and game play
- PUB GAMES Dominoes and Cribbage
- PATIENCE APPLETNY 3 games - Solitaire, Pyramid and Sol
- CARD SCHOOL 3 games - Canasta, Gin Rummy & Heart
- MAH-JONG A fascinating taste of the Far East
- TWO BRIDGES Two versions of the card game
- QUIMBEE (YAHTZEE) and FIVE, Two dice-based games

PROJECTS & PASTIMES

- WHEEL OF MISFORTUNE Based on the TV word-guessing game
- OPUS 1 Extensive general knowledge quiz
- TRIVIA QUIZ Many questions, 5 categories. 2 DISCS
- TREK TRIVIA Fascinating quiz based on famous TV series
- BIBLE QUIZ Quiz game based on the Holy Bible
- MUSIC TRIVIA Quiz based on musical questions
- GET LUCKY Adult trivia Quiz and strip poker games
- ADULT HUMOUR Large collection of rather rude jokes
- GAME OF LIFE Fascinating animated graphics game
- PC JOKES A set of funny but harmless practical jokes
- ORIGAMI Study paper folding (needs BASIC interpreter)
- GREETINGWARE DIY computer greeting cards with demos
- SHOWING OFF YOUR EGA Demo screens, animated patterns
- MANDELBROT MAGIC Graphic demonstration and designer
- POPSTAR First in a series of unusual UK games
- SNARF High quality EGA game plus EGA Breakout
- TANK BATTLES A two-player challenge
- STAR TREK II The next generation featuring Morning Cloud
- STAR TREK The original classic game, text & graphics
- PINBALL WIZARD A choice of five different pinballs
- PINBALL FANATIC Five more different pinballs

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\$tateside

Steve Gold reports on the hot news in the U.S. computer world, courtesy of the on-line systems spanning the world.

★ Atari rolled out one of its first prototypes of Stacy, the ST lap-top, at the World of Atari Show in Detroit. Several thousand ST fans packed the Dearborn Hyatt-Regency Hotel to see Stacy, which almost failed to make it.

According to Ron Kovacs' Z-Mag ST newsletter, Atari officials dropped Stacy on the way to Detroit, with the result that the casing was shattered and the 3.5in. integral floppy disc failed to work.

Dave and Sandy Small, inventors of the Spectre 128 Mac emulation cartridge, were then called in at 1am on the morning of the show and spent the night sticking the ST lap-top together. The result was that Stacy was seen, and used, by many people at the show. As a reward, the Smalls were allowed to have Stacy on their stand for at least part of the show.

The event proved to be fortuitous, as Dave Small had taken with him a prototype Spectre GCR cartridge, the planned successor to the Spectre 128 cartridge. The GCR cartridge, like the A-Max Mac emulator for the Amiga I reported last week, does not require the Mac ROM BIOS chipset, meaning that you plug the GCR into the Atari ST cartridge port and fire up Mac programs.

Dave Small has yet to decide the pricing of the Spectre GCR cartridge but has announced he will offer a \$100 rebate on the unit to existing Spectre 128 cartridge owners.

★ Also shown was the Codehead Software *Code Utility* for the ST. The \$29-95 package contains a stack of utilities which are reported to make other utility packages look sick. The key module is Multifile, a multi-featured GEM-based file handling package which allows files to be re-named, dated and generally manipulated at will.

Other modules in Codehead Utilities include print spoolers, print utilities, a desk-top manager, to mention a few. Codehead is based in Los Angeles - Tel: 0101 213 386 5735 - and will ship the package to Europe for \$5 extra.

★ Dave Lockwood of the Meetpoint BBS in the U.S. - Fidonet 403 - has compiled a list of TOS 1.4 bugs and features. The list is based on industry

Feature

Flow control (RTS/CTS)
Famous Malloc bug
16 MEG HD partition bug
Wastes last two clusters bug
A: motor on after HD boot
Slow desk-top disc copy
'Twister' format from desk-top
Preserve file data on copy
Extended command line
Works with 68010/20
Installed in new Mega STs
Available to 520/1040 owners
Available to developers
Shipping in DTP systems

Status

Not fixed
Not fixed
Fixed
Not fixed
Fixed
Fixed
Fixed
Fixed
Not fixed
Not fixed
Yes
Not yet
Yes
Yes

Information source

Rumour
Confirmed by Atari
Rumour
Confirmed by Atari
Rumour
Rumour
Rumour
Rumour
Rumour
Rumour
Rumour
Confirmed by Atari
Confirmed by Atari

Pagereader for the Amiga can economise on memory usage.

The list of TOS 1.4 bugs and features.

rumours, since Atari has not released precise details of the forthcoming edition of the ST operating system.

With thanks to Lockwood and Frank Mariano of the ST Report on-line newsletter - Tel: 0101 904 783 3319:

★ Finally on the ST front, Regent Software has released a budget version of its *Word II* word processing package. *Word II*, the student edition, retails for \$24-95, yet includes a 40,000-word spell-checker and requires only 40K of RAM to run. The package is not copy-protected and runs on all STs, including the earliest 520 machines. Regent Software is on 0101 213 439 9664.

★ In parallel with the World of Atari Show, New Yorkers attended PC Expo, a three-day event which is almost as popular as Comdex, although on a

much smaller scale. Lotus announced that 1-2-3 Release 3.0 for 80286 and 386-based PCs is now shipping, while Samna Corporation unveiled *Ami Professional* for the Microsoft Windows environment.

1-2-3 Release 3.0 may be just another spreadsheet for most PC users but Lotus chief Jim Manzi had PC Expo visitors in a state of mirth when he revealed that Lotus had a problem with 1-2-3 pirates in Italy. The problem was so bad, he said, that Lotus representatives raided a number of Italian companies.

The amusing thing was that while they found several ripped-off copies of 1-2-3, no-one found copies of *Microsoft Excel*, the main rival to Lotus 1-2-3.



Microsoft officials were not impressed with Manzi's comments.

★ *Ami Professional*, a word processing package, will not run on anything less than an 80286-based PC. Despite that limitation, the \$495 package was well-received and will ship later this summer, complete with a 130,000-word spell-checker. The bad news is that files generated by *Ami Professional* cannot be edited or read directly by other versions of *Ami*.

★ Grid Systems, meanwhile, showed a new lap-top, the Gridline XL at PC Expo. The XL stands for Extra Light, which it is, because of the inclusion of a Paritek 20MB 2.5in. micro-hard disc. The 9.5lb. lap-top has a 12:1 contrast ratio LCD screen, about 50 percent better than most newspapers.

The display quality is the result of the use of a new reflective black and white LCD film which is reported to be streets ahead of even the latest supertwist LCD screens. Such technology is not cheap, however, as the Gridline XL retails for \$1,950.

★ Mindware International - Tel: 0101 705 737 5998 - has released *Pagereader* 3.0 for the Amiga. The \$159-95 package is a 3D animation program which supports stereo vision when using the supplied Haitex X-Specs and conventional red/blue spectacles.

Amazingly, the package requires only 512K of RAM in which to run, although really complex data files may need extra RAM. If run on the A500 Amiga, the program saves larger files to disc automatically, thereby economising on memory usage.



A mock-up of the ST lap-top, which has made its debut in Detroit.

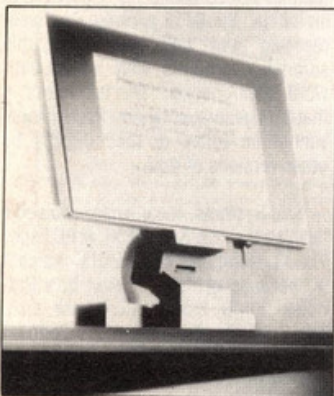
Radiation-free flat monitors

PHILIPS Personal Office Systems has launched its first radiation-free LCD monitor to compete with the large CRT-style monitors. LCDs are not new but marketed as a standard display. Philips probably have a first.

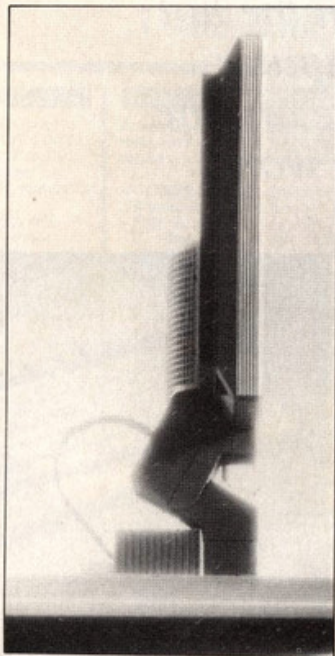
The PM 11211 has a flat screen display and is only 450mm. deep with a screen area of 211 x 132mm. Emphasis seems to be placed on the importance of radiation emissions as Tony Reilley, product manager for Philips, comments: "If people are concerned about green issues and radiation emissions, why buy low-radiation CRT monitors when you have the option to buy LCD monitors which are radiation-free?"

Philips commands more than 40 percent of the monitor market and is looking to extend the figure with the new designer, slimline LCD display, as Ken Firth, marketing manager at Philips POS, comments: "Few business professionals want large CRT displays on their desks and the LCD monitor provides a far more attractive alternative."

Working on a double supernematic



The radiation-free LCD monitor claims to eliminate static, image breathing, tilt and jitter.



The ultimate in user-friendly...

principle, the monitor is apparently free from all static, magnetic and rontgen radiation, and eliminates jitter, image breathing and tilt.

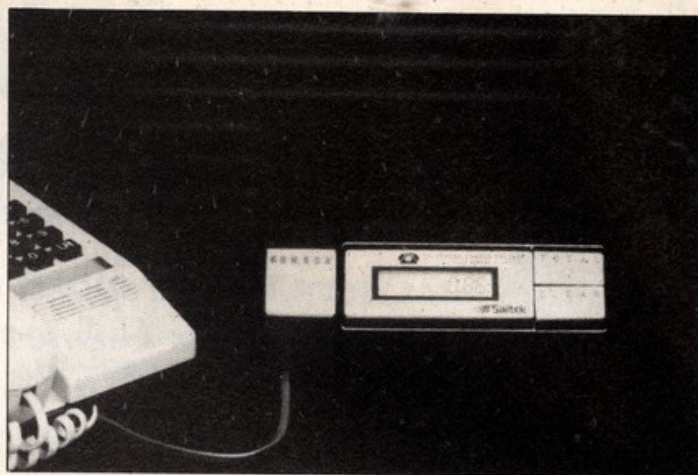
Sander Peeters, senior European area manager for Philips, mentioned future plans for larger screens although, at present, Philips is to test the market with the PM 11211. Costing £699.99, which includes an interface card and cables, the LCD display is due to appear this month. The arrival on the scene of an environmentally-aware monitor echoes the original impetus made by Taxan with the introduction of low radiation monitors at the Which Computer Show but Philips will be looking to take some of the market from Taxan with the accent on radiation-free.

POPULAR COMMENT

The future of the software industry. There have been many words and ideas expounded on this subject, most of them shining with hope and glowing in praise for the new technologies which will revolutionise the entertainment industry; computers with massive amounts of RAM, CD data storage, millions of colours and ultra high resolution displays. All programmed to film quality imagery. Is the future that bright though?

Programmable, and controllable computer systems will become the province of the enthusiast, and the poor who cannot afford the entertainment systems which will become mass market. These entertainment systems will not be computers or consoles as we know them, but rather video/CD units packaged and marketed to appeal to the family, in which film footage and music scores are arranged and controlled by computer, allowing the ignorant user to take the part of film characters.

The thought that hundreds of programmers will spend thousand of man years, producing gigabytes of code for Cray-powered computers is totally unfeasible. The costs would heavily outstrip the returns from sales to computer formats whose pricing accelerated as fast as their performance, out of the reach of everyone bar the rich executive.



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When I'm calling you

IF YOU are horrified at the telephone bills which inevitably follow hours spent logging on to your favourite bulletin board, a new electronic gadget could allow you at least to keep track of the charges. Charge Checker from Saitek gives an LCD readout showing your line charges as they mount and

also keeps a running total.

On request, British Telecom will send electronic pulses down your telephone line. Charge Checker uses them to register each unit used. BT charges £17 for setting up the service and an extra £2.50 a quarter for maintaining it, although installation of the machine is easy; it plugs into the telephone socket.

For further details of Charge Checker, which retails at £39.95, contact Saitek on 01-731 7596.

Dreamscape draws computer gamers

COMPUTER games enthusiasts were able to play the latest Sega games in a nightclub atmosphere at an event last week staged at London's Town and Country Club, called Dreamscape. The idea is reported to have proved a winner with those seeking a different form of evening entertainment.

While a selection of DJs spun the latest sounds, skateboarders gave a continuous street-style show, pinball machines whirled and huge screen-shots from games were projected overhead. A bank of five Sega games consoles with extra large screens was in-

stalled, alongside the *Thunderblade Deluxe* fully-moving games module. In addition, the car racing game *Powerdrift* was running on an upright machine.

Leslie Bunder, the ex-*Popular Computer Weekly* writer who organised the event, said: "The evening was a taster for how I foresee the mingling of video games and night-time entertainment. The queue of people waiting to play games shows the potential Dreamscape has to offer." Bunder will be reducing the entry fee from £12 to £10 for future events.

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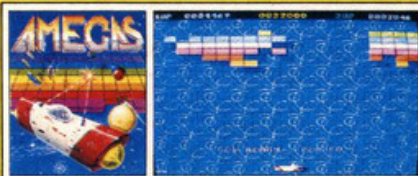
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Popular Computing Weekly, Greencoat House, Francis Street, London SW1P 1DG. Telephone 01-834 1717. FAX 01-630 6165.

© PCW 1989. ISSN 0265-0509.

Typeset by Hamilton Press. Printed by Southern Print. Distributed by SM Distribution, Streatham, London SW16. Telephone 677 8111. Subscription rates: UK £35 per year. Overseas £49.95 per year.

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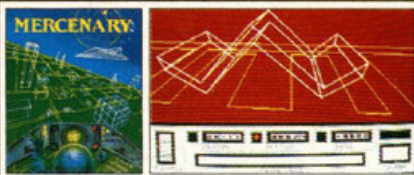
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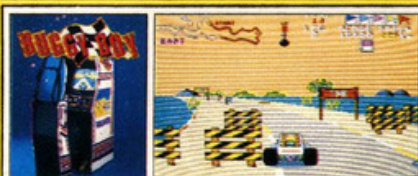
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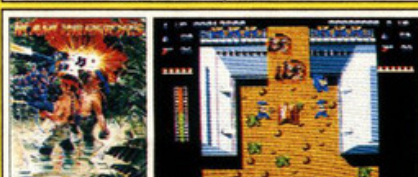
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For years the user interfaces available to the computer game-player have been a little on the dull side. With the original Spectrums we all had to make do with the keyboard, not the most responsive of platforms.

Joysticks started appearing – the coin-op industry standard. They are satisfactory for relatively unsophisticated games but are not analogue devices, meaning you have a simple on/off switching system rather than a system which produces an effect proportional to the speed/strength of your movements.

Mice and their dead companions Trakballs bring a little more variety to the arena but, by and large, that is all. I mean, of what other game controllers could you possibly think?

Necessity, they say, is the mother of invention. When the necessity is a slice of a \$1.7 billion market – the Nintendo Entertainment System in the U.S. – that adds up

to one hell of a mother.

In the U.S. N.I.N.T.E.N.D.O. spells M.O.N.E.Y. and many clever people have put on their thinking caps to search for that elusive peripheral to make them rich beyond their wildest dreams.

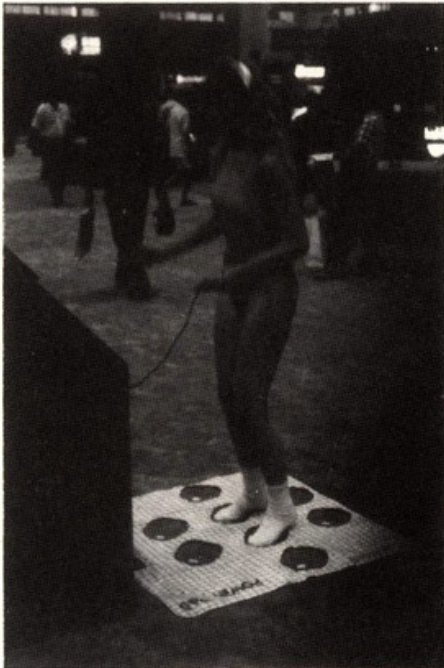
The first to make a splash a short time ago was the controller mat for the Nintendo. Mat? I do not know if you have seen a board game called *Twister* but that involved spreading a mat on the floor with coloured circles printed on it. The controller mat,



Commanding thin air – U-Force with no strings attached.

Joystick liberation

New game controllers are set to liberate players from being joystick-bound, with important breakthroughs for the disabled, too, writes John Cook.



Playing footsie – The Power Pad puts new energy into your games.

called the Power Pad, looks a little like that. It is a white plastic mat, connected to the unit by a cord, around 3ft. square. Contacts are embedded in coloured plastic circles on the mat which correspond to controls on a joy-pad. You play the games with your feet.

Special games are written to utilise the mat, running/jumping games mostly, where your movements on the mat correspond to the movements of a central sprite on the screen. Who said computer games made you unfit? There is a special cartridge, too, for prospective keep-fit fanatics, where the program monitors your aerobic activities on the mat – nothing if not different. The Power Pad retails at about \$70, including one game.

Then there is the newer Power Glove. It really is different. It is a futuristic-looking glove which you slide over your hand. Your hand movements will control what is happening on-screen. It is possible for the machine to pick up not only your general hand movements but the flexing of individual fingers. Compatible with existing NES games, it will come

into its own when software is written specifically for it – it looks hunky.

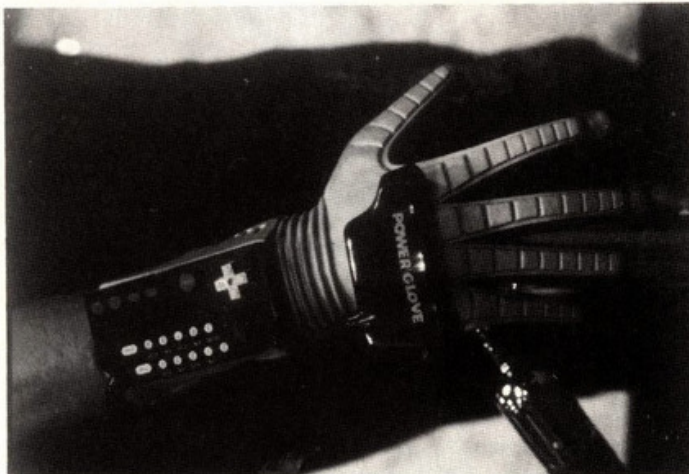
There is a more serious side to add-on interfaces. Severely disabled children can now use the NES through the Hands Free unit. It is hooked on to the chest and the movements of the central sprite are controlled by movements of the chin pressing on a positioned, touch-sensitive pad. The firing is controlled via a suck and blow tube system.

That handicapped people can now play computer games is a great achievement and goes a long way to integrate them into a major leisure activity and to compete on level terms with their friends. It is sold at cost price by Nintendo at \$120 or so.

The spookiest of the new range of interfaces is the U-Force, developed by Broderbund. You set up a kind of folding mirror which is attached to the unit. Wave your hands in front of the U-Force and you control the action, with no connection between you and machine.

If you are playing a boxing game – none of this joystick business – throw a jab in front of the U-Force and you throw a punch on-screen. Weird or what, it will be selling for about \$70.

All the new controllers could be adapted, theoretically, for any machine – not just the Nintendo – hence opening new areas for the potential gamer and games designer. Are you listening, Alan Sugar? Watch this space – the one just to the left of the joystick port. □



Macho magic – the Power Glove makes mincemeat of your mouse.


Failed attempt

The failure of the Z80-based Sam micro will depend largely on its price. That is to say, if it is too expensive there is no more chance that anyone will risk buying an 8-bit machine about which they know nothing, than a 16-bit machine from a company known to be reputable, and is known to have a large software base for its machine.

What the makers of Sam need to do is build a large software base, like Atari has done for its yet-to-be released portable games console. The importance of games software is that a greater percentage of buyers of the machine will play games on it, with a view to program or use applications programs with it later. If there is no software, no-one will want the machine and no software houses will be willing to produce software for a machine no-one buys.

In my opinion, there is room for another 8-bit machine, but unless it is seen to be successful by software companies the companies will bring about a self-fulfilling prophecy, by not producing software for it. If this machine had arrived six or seven years earlier it would have grossed more sales than I think it will now but you can never tell. Alan Sugar says that there have been increased sales for the CPC's this year. Perhaps there is life in the old dog yet.

By the way, while I am writing, I think I must comment on your new direction in computing. I am not saying that computing should be



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deadpan and serious but I think you should make a little more of an effort. I am commenting on Vincent Wong - comedy journalist. I've seen more comedy on *Terry and June*. He is the kind of person who still goes round with a red nose on his car. Just break it to him lightly. Explain that he could be prosecuted under the Trades Description Act. The man is obviously talentless and his comedy talent is the best of a bad bunch.

*Richard Shepard (Atari ST owner),
Chaddle Hulme, Cheshire.*

Know what you mean John...

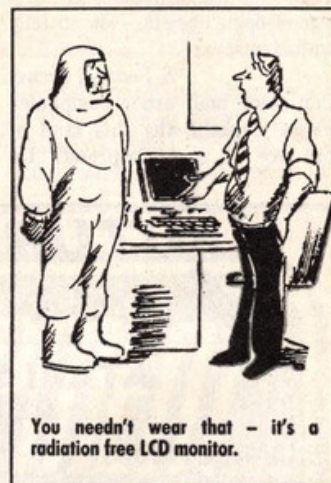
In *Popular Computing Weekly* on June 8 1989, it was revealed that most computer owners do not possess more than three bought games. The software producers blamed bundling, which provides a number of games included in the price of the computer.

One possible reason for this is that although in theory there could be an infinite number of types of game that could be played on a computer, in reality there are only very few. There is the adventure game, platform and ladders game, and aerial combat game. There are subdivisions of these to be sure - the adventure game can include a combat element, and platforms and ladders could include adventure type puzzles. Many games require a great deal of time to be spent learning them before one can get any enjoyment from them, and the computer is often relegated to the cupboard in favour of *Dallas*, *Dynasty*, *Neighbours* or *Brookside*.

Therefore I would suggest that the sort of game that may interest people and may sell in large numbers would be a sort of soap opera that runs on without intervention by the user, but which can be influenced by the user who plays the part of "God". In addition, the user could select which areas of the soap opera he watches, and indeed could have several windows open at once. In the most basic form, the output would be text, but in more advanced

versions could be interspersed with graphics.

Such a program would require a lot of memory to run, but a crude system should work on a 640K PC. When optical CD-ROMs become commonplace, extremely elaborate soap opera simulations could be run. The plots of soap operas usually run along similar lines each week, just involving different groupings of characters and their personal interactions. There are no totally new events, in a science fiction epic or historical drama, although many of the plots in a sci-fi soap, like *Dr Who* are sufficiently similar for some form of simulation to be conceived. If enough rules of personal interaction are introduced into the computer program, together with enough starting characters and the possibility of introducing more by random creation at logically suitable opportunities, the possible combinations could be sufficiently large for no two users ever to see the same interaction.



The user could "play God" either by being one of the characters subject to the above restriction, or more likely by replacing the random number generator in influencing the outcome of events.

If this idea really caught on, I can imagine small hand held interactive soaps, that run for years on lithium batteries and are built into watches, calculators or organisers being carried around by people who would like a peek at their "pocket universes" and see what was happening, and perhaps the "Hand of God" would occasionally press a key to tip the balance one way or the other.

John De Rivaz, Truro.

Sounds like if someone merged *Populous* with *Little Computer People* and got it running on Atari's new colour handheld console you'd be mighty chuffed. Anyone out there planning such a game?

Skimping and saving

I had never thought about it particularly, but the survey you quoted was very accurate. The last piece of full price software I bought was *Uridium* for the Spectrum in November '86 (and I do not pirate software either).

I can understand people not buying software; you skimp and save £400 for an ST, and then it costs £30 to write a letter, £30 to draw a picture, £30 to use a spreadsheet, £30 to fly an aircraft and £70 to write a program. Also, if you give someone 10 reasonable games they are likely to have one from each of the games genres: such as flight simulation and platforms and ladders. Since the software houses only manage three original games a year, sales are unlikely to be huge.

Perhaps software should be partly developed and funded by the computer manufacturer, so that re-

asonable games and utilities are in the public domain. As computers all acquire standard abilities only the software will set them apart.

This is probably wishful thinking, even with a bundle - the old one at least - all the ST can do is play games, the organiser is as user-friendly as a hari-kari sword.

It would be good for the dealers if computers came with nothing at all, but so what? What about the users? We pay for the computers, we pay the dealers, we pay the manufacturers. A computer should come as *standard* with some games, a word processor and an integrated package.

Stuart MacGlashan, Liverpool.

Where will it stop though? Why not throw in a modem, printer, flight control yoke and a screen filter and put more firms out of business? This idea takes consumerism too far in expecting companies to be run like charities.

Would you credit it?

Further to H. Gardner's letter in *Popular Computing Weekly* June 1st issue regarding mail order credit card transactions, I write to relate a similar problem I am experiencing with a software distributor. I placed an order with one company in March for two items quoting my credit card number as payment. The full amount was charged to my account and two weeks later only one of the items arrived - I am still trying to get the other one from them and numerous letters - both polite and otherwise - have failed to prompt the courtesy of a reply.

The attractively priced software is no longer quite so attractive after months of interest payments on my account and the ever mounting cost in stamps!

I am now at a loss as to what steps I should take but am considering legal action. As Gardner states in his letter, to quote one's credit card number is tantamount to giving a signed open cheque - do so only with utmost care.

S. Pennell, Crewe.

Can some mail order companies please explain why this kind of practice is so widespread? Do

some of you have safeguards to prevent payment before delivery? I think we should be told.

Sincerest sympathies . . .

Having read your article on the possible cessation of Atari ST bundles, I found myself breaking out in an attack of sympathy, something to which I am by no means accustomed.

I felt so sorry for the dealers being forced to go along with Big Brother (Atari) that I very nearly shed tears.

Seriously though, in respectable businesses, the parties concerned agreed to do something, in this case, produce and sell a bundled computer package. This means they are either moaning because they were unable to get a game into the Powerpack, or they want to have their cake and eat it.

A. Phillips-Godfrey, Herne, Kent.
Like Atari's boss said, a balance will have to be struck to appeal to dealers, software houses and we consumers - one that does not flog the software business down the river. And what do you mean "respectable businesses"? Are you inferring that the micro games biz

is a bit, er, Arfur Daley-like? Come come now, we members of Her Majesty's Press would never put up with that . . . mind you, this crisp tennet that I've just found attached to a preview screenshot will help no end.

64 Smash

I am writing to compliment you on the inclusion in the June 22 issue of your excellent *Commodore 64 Supplement*. I have had my C64 for nearly five years now.

The only bad thing about it is Commodore should have marketed the C64 with the 1541 disc drive in the package, instead of the cassette unit, as this is too slow.

Had they done this when the C64 first appeared, then I am sure there would now be far more people sold on the C64, like myself.

Finally, could you please tell me the address of Financial Systems Software Ltd. as I have tried to find a shop which stocked either the Print Shop program, or the Award Maker/Certificate Maker programs, but unfortunately none of the shops in Brighton seem to stock them.

D.J. Burton, Brighton.
FSSL is at 18, High Street, Per-shore, Worcs WR10 1BG. Tel: (0386) 553153.

Driving a Coupé

Re: Your article of M.I.G's Sam Coupé. Yes, I'll buy a Sam. I've had one on order since December last. Why?

I'll be able to use 80 percent of my present programmes on Sam. Programs written for Sam will have no colour clash and better graphics and sound than my present Spectrum +2 and +3. Sam has more memory than my Spectrums and more screen modes.

Built in disc drives will take up less room on my desk. I'll be able to use one built-in drive (and my present +D and drive) until I can afford to add a second (built-in) drive. Sam is cheap compared to the Atari ST and Amiga.

Last but not least, I've bought from M.G.T a +D and 3.5 drives, a printer, a twister and a Pick-Poke-It. The service I've received from M.G.T has been fantastic; no problem seems too much trouble to M.G.T and it's very friendly - other companies please note and helpful staff know exactly what they are selling and how it works. Long live the 8 bit, long live M.G.T and long live *Popular Computing Weekly*.

P. Probert, Cumbria.

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By Gordon Lee

The other day I noticed that the cover of my issue of *Popular Computing Weekly* had become torn and parts of the title appeared as shown.

POPUL COMPU WEEKLY

The two horizontal lines I drew in later when I realised that the letters as they appeared would make a simple alphametic sum. In other words the letters form an addition in which the original digits have been replaced by let-

ters. As with all puzzles of this type the same letter indicates the same digit whenever it appears and different letters indicate different digits.

Can you replace the letters to find the original sum?

SOLUTION TO PUZZLE OF JUNE 29

Answer: The probability that a Thursday taken at random will have a date which can be suffixed with 'th' is 0.783709 or 1,145 out of 1,461.

Solution: The Gregorian calendar works on a complete cycle of 28 years – excluding minor leap-year variations, the next of which is not due until the year 2100. The factors which will affect the placement of dates within a given year are the day on which the 1st January falls – 7 possibilities – together with the leap-year cycle of seven years. Thus, the 7 times 4 results in 28 four year 'layouts'. The program sets one such 28-year cycle from January 1st 1989 to December 31st 2016. It evaluates the date of each successive Thursday and counts the number of times that this date can be suffixed by 'th'. First the number of days in each month are read into the array

from the DATA lines. February is treated as having 28 days unless a leap year is being counted. In this case line 210 increases this to 29. The variables used are Y to indicate the year, D to indicate the date of the first Thursday in January and C to keep check of the date of each Thursday throughout the year. Variable G keeps a tally of the number of Thursdays which pass the test.

Initially Y is set to 1989 and D to 5 – as the 5th is the first Thursday in January 1989. Each successive Thursday is found by adding 7 to the date, an adjustment being made when this value exceeds the number of days in the current month – lines 160 and 170. The date is checked simply in line 140. After each year has been assessed Y is incremented and D is decreased by 1. This is because if, for example, the first Thursday of a year fell on the 5th it would fall on the 4th the following

```
100 DIM M(12)
110 FOR M=1 TO 12:READ Z:M(M)=Z:NEXT
120 Y=1989:D=5:N=0:G=0
130 M=1:C=D
140 IF C>3 AND C<21 OR C>23 AND C<31 THEN G=G+1
150 N=N+1:C=C+7
160 IF C=M(M) THEN 140
170 C=C-M(M):M=M+1
180 IF M<12 THEN 140
190 PRINT"Year: ";Y
200 D=D-1:Y=Y+1
210 IF Y/4=INT(Y/4) THEN M(2)=29 ELSE M(2)=28
220 IF Y/4-INT(Y/4)=.25 THEN D=D-1
230 IF D<1 THEN D=D+7
240 IF Y=2017 THEN 260
250 GOTO 130
260 PRINT:PRINT"Expectation: ";G;" out of ";N
270 PRINT:PRINT"Probability: ";G/N
280 END
1000 DATA 31,28,31,30,31,30,31,31,30,31,30,31
```

year. The only exceptions are after leap years when an extra step needs to be subtracted but this does not apply until the year after leap year –

line 220. The results indicate that in a 28-year period there are 1,461 Thursdays in all, 1,145 of which have dates which can be followed by 'th'.

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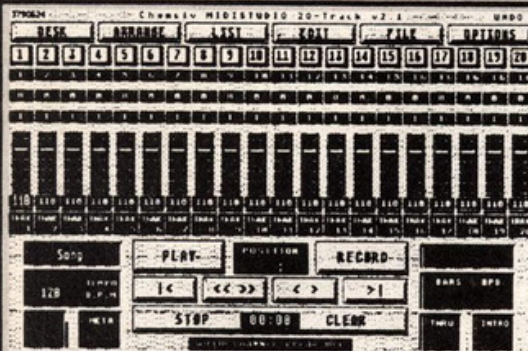
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ST WORLD March 89



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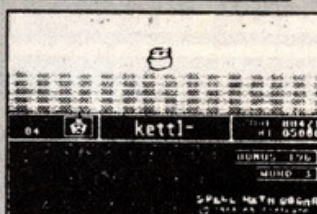
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EDUCATIONAL SOFTWARE



Spell With Oscar £12.99

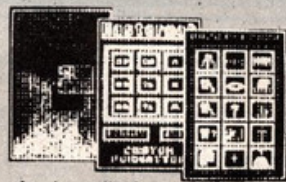
Spell with Oscar is a game which teaches spelling, keyboard skills and motor coordination. Pictures of objects move smoothly across the screen and the pupil should spell the name of the object while Oscar checks for mistakes. Spell also incorporates selectable difficulty levels and a Hi-score table. Extra data disks £6.99

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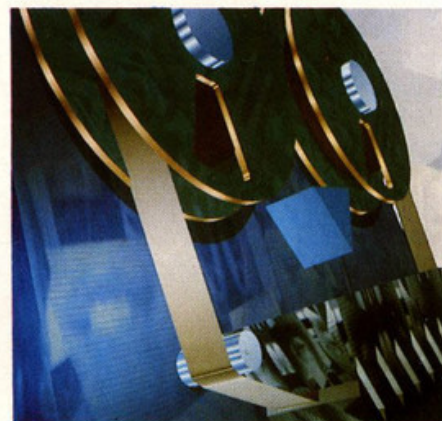
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On Air

Are you sitting comfortably? Television is set to stun your senses with the use of computer graphics, produced on home computer scale systems, writes Nick Masters.



Broadcast graphics hit the headlines six years ago with the launch of Channel 4 and its distinctive tumbling blocks logo. Since then its popularity as a communicator has ebbed and flowed but station logos, called idents, and program titles in particular have become a mainstay.

Only recently *Popular Computing Weekly* used the 3D model developed by CAL Video Graphics on the introduction to Morris Minor's Magic Motors, while some may remember the furore which surrounds the recently-revamped graphics for the BBC Nine O'Clock News. Criticisms ranged from accusations of fascistic imagery to its being too complicated. From the same stable as the Channel 4 ident, what the Nine O'Clock News title had was the use of a Mac for part of the 2D artwork.

Foundations

While visual and technological trends have largely dictated content and quality constraints, in the last 12 months there has been a dramatic turn in the range of equipment being employed. Without doubt the core of the change has coincided with the rising profile of the Commodore Amiga in broadcast circles. Although not exactly a major force yet, the Amiga has a number of enthusiasts laying the foundations of its success. Among them, south London-based Triangle Television must rate fairly high. Relying almost exclusively on commer-

cially-available software like the *DPaint* packages, Triangle has notched a number of jobs, including a title sequence for the recent Software Show.

Obviously some custom hardware is required to convert 512-line RGB output into broadcast-compatible 625-line PAL but this is becoming more readily available. A hardware manufacturer, G2 Systems, now offers the VideoCenter, combining video-mixer, Genlock and PAL encoder with professional-quality VHS output for less than £600. This type of facility has enabled Cardiff-based production company Stylus Television to provide S4C - Welsh Channel 4 - with its weather bulletins.

Initial artwork is prepared on a BBC Master computer before being loaded via an RS232 port on to *Quantel Graphic Paintbox*. Using the custom interface through a G2 converter the coloured maps and charts are reproduced faithfully while facilities not previously available on the Paintbox, like curved splines and 3D lines, have been introduced.

Not all designers and broadcasters believe such a conversion is even necessary. Another weather graphics service, this time provided by the Weather Department for Central Television, takes Amiga images live to air. First, the 2000s are connected to a satellite dish aimed at the weather satellite MeteoSat, where the information is stored and enhanced digitally. The stills are then coloured and animated properly by the

Weather Department designers who then transmit them to the studios via a modem. Local control of each bulletin is completed with a small, custom-built four-button keypad operated as dictated by a cue sheet. The Amiga however, falls down in text capabilities and a separate caption generator is used for titling.

Realism

Counter-balancing this reliance on patching low-end hardware to broadcast standards are the systems which have to be reigned in and tied down to protect the television. Possibly the most powerful commercially-available graphics supercomputer is the AT&T Pixel machine with 820Mflops of animating power behind it.

So far, two U.K. animation companies have invested in the Pixel machine and although much startling work has been produced by both, special mention must go to Infynity Computer Animation for the Anglia TV spring promotion based on the Anglia original blue and yellow 'A'. It features many types of butterfly fluttering around, which briefly form the logo in a stone niche. In pursuit of realism Infynity researched the flight patterns of butterflies to represent wing movements accurately, using footage from the Oxford Scientific as a source. In addition, the piece incorporates more than 60 texture maps using coloured powder to re-create the fragility of the butterflies' wings.

continued on page 16 ▶

Kosh! Animation storyboards can now be created on the Amiga.



◀ continued from page 15

Another system which seems to be capturing the imagination of computer graphics artists is Symbolics; custom hardware has full modelling and animation software support and it has increased its U.K. installation from 2 to 13 in six months. One convert is Matt 'Wired' Forrest who, after using it to produce an advertisement for MacEwans LA lager, has helped set up a company which immediately bought three of its own.

All this seems reasonable enough, reflecting a diverse use of computing technology for a variety of jobs with differing constraints. So what is the problem with deregulation?

Legislation

There are two pieces of legislation at differing stages in two sections of Government which are linked by their effect on the future use or even misuse of computer graphics. Both have been covered extensively in the media since the first details became available about their respective effects in the U.K. as a whole but little analysis of specifics has been undertaken. The Bills are on deregulation in the broadcasting industry and the relaxing of European trade barriers in 1992, courtesy of the European Parliament.

On the surface, neither Bill seems to have any distinctly computer graphics clauses or sections but its rise as a major international broadcast and presentation medium cannot be overlooked. That is where confusion arises.



And the BBC Micro could not quite manage the title graphics for *The Software Show* – produced on an Amiga.

The Government is legislating to allow many more channels of television to be transmitted into people's homes than the previous four. BBC apart, all the new channels like ITV before them will have to make their money by charging advertisers for air time.

The only problem facing broadcasters stems from the fact that there is only a finite amount of money available for advertising and, instead of being shared between ITV and Channel 4, all the new

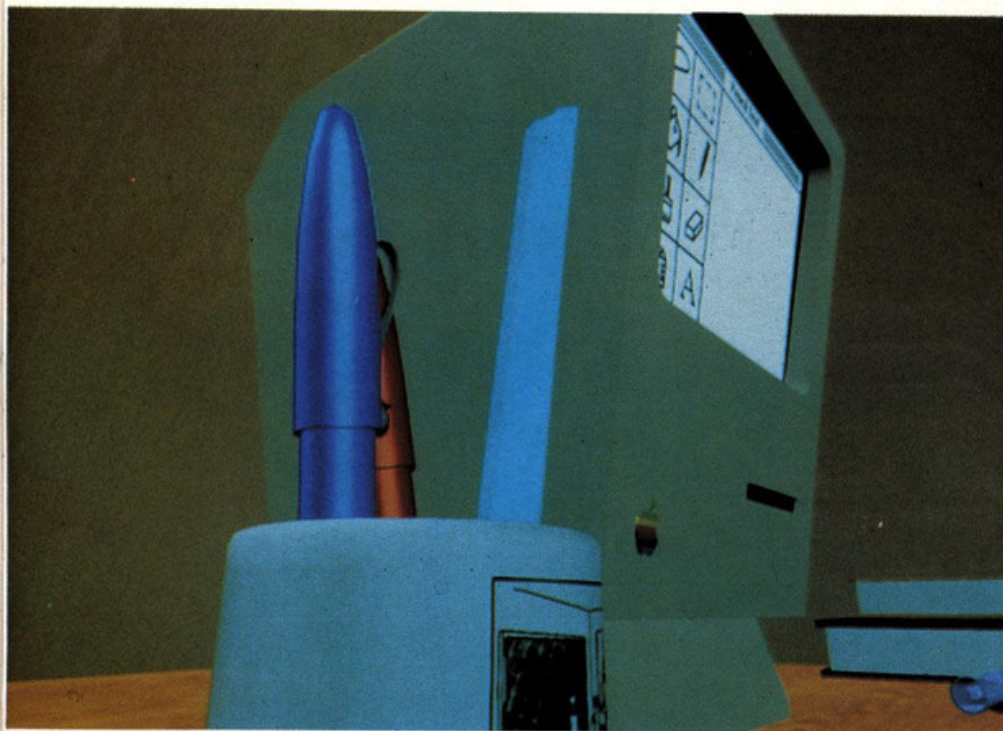
channels introduced by Sky and British Satellite Broadcasting will want their share. Consequently each station will have less money to make and buy the programmes necessary to pad out each day's viewing. Already the backlog of American game shows is starting to pile up.

If budgets for programmes start to fall the first thing to go will be the so-called luxuries like expensive graphics sequences. Not everybody is so sceptical, arguing that no company starts with a budget and then works out what they can produce with that much money. Instead, designers start with an idea and then see what best can be achieved. Also more programmes must mean more work.

Opportunities

Even so, the opportunities at the high end will be tighter and costs will become increasingly important, which suggests that anybody who can provide the best work at what is optimistically called the best price.

Therein lies a contradiction of sorts but the fun really starts when the European angle is included. We have all heard about 1992 but what does it mean? In 1992 the artificial trade barriers which restrict the movement of goods between separate nations in Europe are to be removed; they are known as import duties and are relaxed for small quantities of goods, hence resulting in duty-free shops on ships and aircraft. The intention of the European Parliament in passing this law is to make it easier for a company from one country to trade with



Apple Mac by Apple Mac. Nancy Tague recreates her fellow artist, titled *Pencil Test*.

continued on page 19 ▶

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PALACE SOFTWARE

Hard and fast rules

Mark Luckham takes a hard drive into data storage city and makes an Impact to his liking.

Has your patience almost run out? Does the ever so slow Amiga disc drive drive you to distraction? Is file handling becoming seriously tiresome? If so, it is time to upgrade from your basic A500 set-up to the ranks of the professionals with a hard disc.

The advantages of using a hard disc with your system are many but that kind of heavyweight power is not cheap. The latest entrant to the market from Great Valley Products is designed specifically for the A500 but is not for those on a shoestring budget.

The Impact A500-HD/RAM controller offers an ANSI X3T9 2-compatible SCSI controller and 3.5in. hard disc drive and also an empty internal 2MB RAM board. Needless to say, GVP also supplies 2MB fast RAM/Autoboot modules as well.

The first impression the Impact A500 gives is one of stylish professionalism.

Looking sleek and professional, the hard disc lives up to its name.

Considering the price of £680 for the 40MB unit that is to be expected.

I was less satisfied with the external power supply which, despite being very light, is the same size as the A500 supply. It runs warm while the hard disc remains cool, because of the adequately quiet fan.

Installing the Impact is straightforward but slightly fiddly, as it plugs into the A500 expansion slot which is slightly obscured by a ridge. A few heaves and shoves and it will be sitting pretty.

Double-clicking

The next stage is to create a boot disc and format the hard disc. The disc provided by GVP boots with an icon on the *Workbench*. Double-clicking on this offers a choice of three programs, the one you want being Install. Once under way you are offered the GVP default partitioning of two

20MB partitions. If that is not acceptable you can enter a number between one – 40MB – and eight. Assuming you did not accept the default you can assign as much of your 40MB to each partition as you like.

The manual is confusing on that point because it says that if you do not want the default you have to edit the entries in the DEVS/MOUNLIST file, which can be done with the Microemac editor in the Tools drawer of DH0: and the GVP Installation disc. I installed three partitions successfully consisting of 20MB, 10MB and 10MB.

Full information, if necessarily technical, is given in the manual for altering the file to provide any weird and wonderful numbers of partitions with odd-sized capacities, so you cannot really lose.

Once the hard disc has been formatted and all files installed on it, you need to create a hard disc boot disc using an ordinary floppy. That is because you cannot



boot directly from a hard disc using version 1.2 of Kickstart.

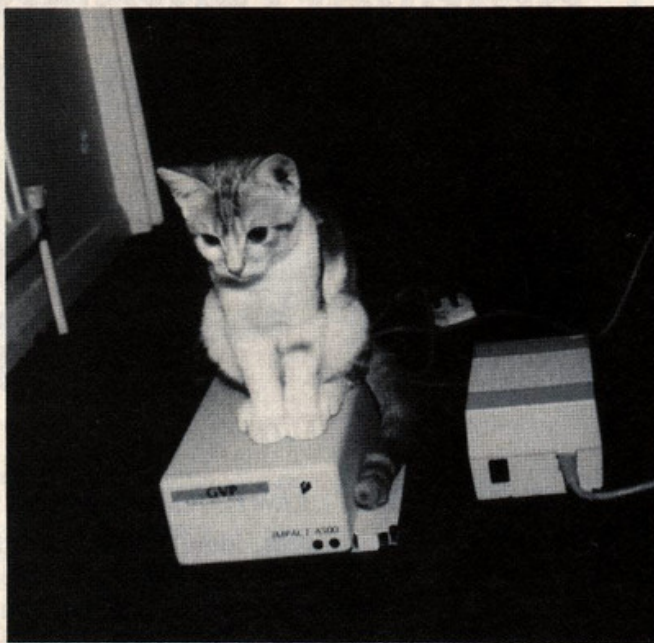
Commodore has announced that version 1.3 of Kickstart will allow autobooting from a hard disc but only if your device has auto-booting driver ROMs. The Impact A500 does, so when Kickstart 1.3 is available you can dispense with the boot disc.

Impressive

Re-boot the system and you have your hard disc and are ready to roll. At that point a significant problem becomes apparent. When the system is booted, depending on how many partitions there are, Workbench informs you that there is around 213K of free RAM, which starts to disappear as soon as you open windows. The more partitions there are the worse the memory consumption. If you have a large application you may be able to copy it to the hard disc with no difficulty but you might not be able to run it.

That is caused by the amount of buffers used by AmigaDOS. The more you have the better the performance of your hard drive, which is impressive as it is. The access times is 11ms - 19ms average - and my 168K application loaded in approximately three seconds, with files for it loading instantaneously.

The drive utilises the new Amiga Fast Filing System which speeds hard disc



Small and cute. And the hard disc isn't bad either.

operations. If you find you need to down-grade performance to allow your favourite application to run you can either edit to DEVS/MOUNLIST file, or buy a memory upgrade. For anyone who could afford only an A500 Amiga initially I wonder whether they could afford the hard disc or a memory upgrade.

The Impact unit also contains two other

little features - a disable switch, so that any games software which will not run specifically with a hard drive connected can be fooled into behaving and an external SCSI connector for connecting up to seven external SCSI devices.

The Impact A500 is a stylish and sturdy high-performance hard drive, has a one-year guarantee, and will put an Amiga A500 into the serious computing league but I would advise the use of a memory expansion with it. □

CONTACTS

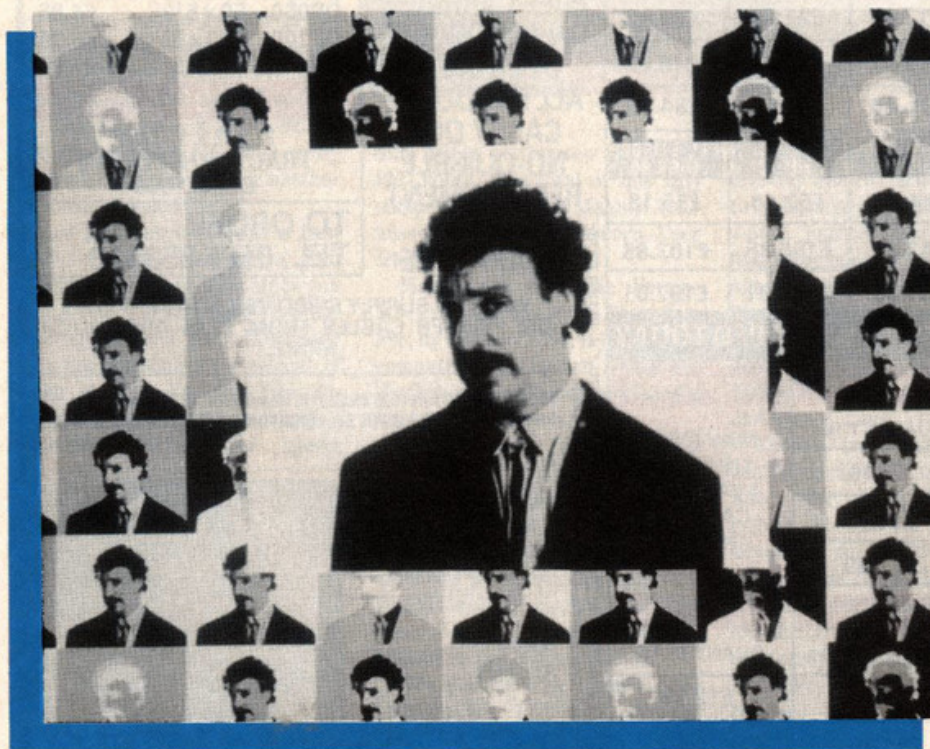
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TV GRAPHICS

On air

4 continued from page 16

Richard Purdham from CAL Video Graphics produced this Warhol-like advertisement for the Liverpool Tate.



and in another. It is stretching the point to say it will change the face of computer graphics but it could be responsible for shifting emphasis towards those places where the discipline is best employed.

Although the U.K. probably has the best television graphics at present, it is still surpassed in many ways by the French enthusiasm as a subject in itself. In the last year France has staged Pixim, Micad, Faust, Imagina and, most recently, Parigraph - all exhibitions solely or mainly devoted to computer graphics.

The feeling from visiting the shows is an undoubted commitment to and enthusiasm for developing a strong industry based on technological understanding and aesthetic perception.

Commitment

The most outstanding exponent is Michel Bret, who won the critics' award at Imagina in Monte Carlo. A mark of his personal commitment to computer graphics is demonstrated by the fact that he wrote his Ikolight software in night-time sessions on a Vietnamese hospital computer while teaching during the day. He has devised a new matrix-based algorithm for 3D imaging and interfaces for architectural broadcast and business graphics.

The proliferation of small, innovative entrepreneurs like Bret is not in itself a threat to a major industry like that in the U.K. but, as Bret and all those exhibitors with their Macs may one day prove, biggest is not always best. □

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Computer GAMESWEEK

HOTLINES

Transport strikes, don't you just love them. How long will it be before some enterprising outfit produces *Chaos Simulator*, or *Channon Foot Shooter*? While we're waiting for that, you can always pretend you're in Dallas with the latest offering from RELINE.

Oil Imperium offers buying, selling, trading, spying, merging, sabotaging, and investigation – just like the software industry. With arcade sequences for drilling and fire fighting, and free shoulder pads in every package, the only option missing is the one to sleep with your rival's wife. Release will be in September on the C64 (£9.99), ST, Amiga, and PC (all £19.99).

One of this week's best games was *Life & Death*, which comes with a pair of rubber gloves and a face mask, just to get you in the spirit. Being a crusading tome we decided to test the authenticity of the program, with myself operating on Marc Jones of Which PC. As you can see below, it is quite messy so don't try it out on your brother or sister at home.

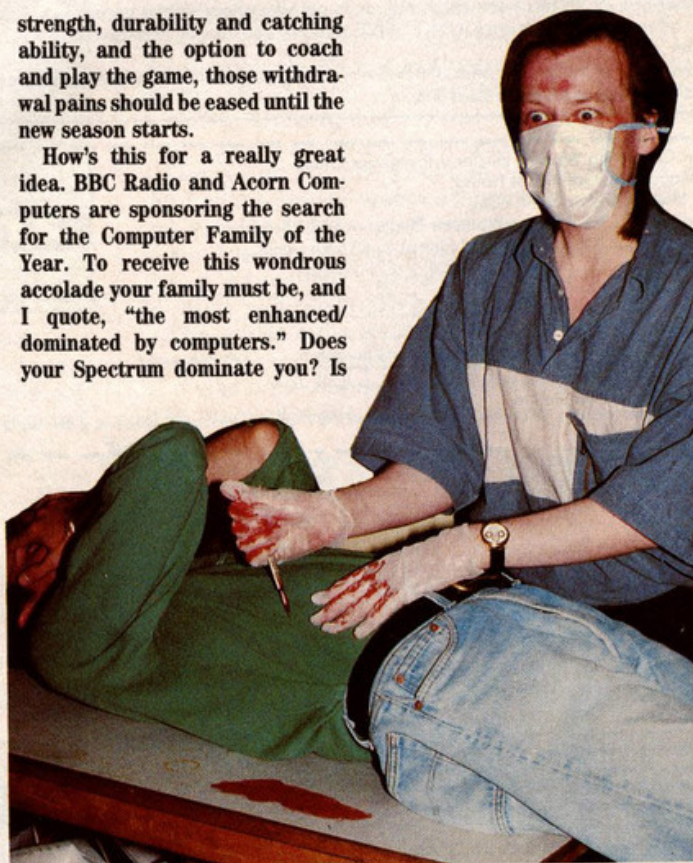
Are you desperate for a first down? Do you long for a Hail Mary? Has it been ages since you had a really good punt? Fear not football starved fan, Electronic Arts has announced the release of *John Madden Football* (for the PC) for July. With players having individual ratings for speed,



• Where's Sue Ellen then?

strength, durability and catching ability, and the option to coach and play the game, those withdrawal pains should be eased until the new season starts.

How's this for a really great idea. BBC Radio and Acorn Computers are sponsoring the search for the Computer Family of the Year. To receive this wondrous accolade your family must be, and I quote, "the most enhanced/dominated by computers." Does your Spectrum dominate you? Is



that Amiga getting too big for its PVC boots? The final of this silly competition involves Magnus Magnusson at the BBC Acorn User Show.

More news from the Empire label, the warfare novel *Team Yankee*, by Harold Coyle, is going to be computerised. Game Designer's Workshop has already produced a board game version.

It's all about a tank division at the start of World War III and sounds quite promising. Unfortunately, the programmers responsible for producing a good game are the same ones at Oxford Digital Integration that made *The Hunt For Red October* software's answer to the Reliant Robin.

Not content with *Team Yankee* (Amiga, ST, PC) and *Sleeping Gods Lie*, Oxford Digital is also

working on another game. Appropriately named *Time* – where are they finding it? – this is an animated journey through history, featuring famous bods from each age, and ten major playing areas, incorporating ten horizontally scrolling sections. Well, it sounds good on paper, but then so did *Xybots*, so roll on the screenshots, and even a game.

There's two budget releases coming up that BBC owners should watch for, from Blue Ribbon (CDS). *Spooksville* is an arcade adventure for £2.99 while *Code-name Droid* maps the continuing adventures of John Stryker. Actually the latter is a re-release, being previously available from Superior Software, and is well worth the readies.

Duncan Evans

This Week

LIFE & DEATH, p.23

Slicing and dicing has never been such fun, just give a patient a touch of the scalpel without anaesthetic and enjoy the howls.

WICKED, p.24

Activision's game might be well wicked, dead rad or even cool. Some of us weren't so sure, but the effects were impressive anyway.

SPHERICAL, p.26

Another confrontation between the third act of Hamlet and a chip shop. Platforms and ladders to be sure, and very small graphics, but our Andy enjoyed himself nevertheless. Rather a strange release from Rainbow Arts considering its past, and something of a step backwards if you ask me.

FIRE BRIGADE, p.27

No, this has nothing to do with Blue Watch or London's Burning. This is a recreation of the battle for Kiev, on a one meg Amiga only. Though quite worthy, it is incredibly slow at loading, and was very prone to crashing during the setting up stages. Still, very good 2-D graphics, which use the Amiga's medium resolution capability.

ADVENTURE BRIDGE, p.28

Strange things are afoot on Blackscar Mountain. Our Tony goes on a quest for the truth about this and *Shards of Time*.

Both programs were produced with STAC, and are from Titan games, a small software outfit from Worktop.

POPULAR COMPUTING WEEKLY

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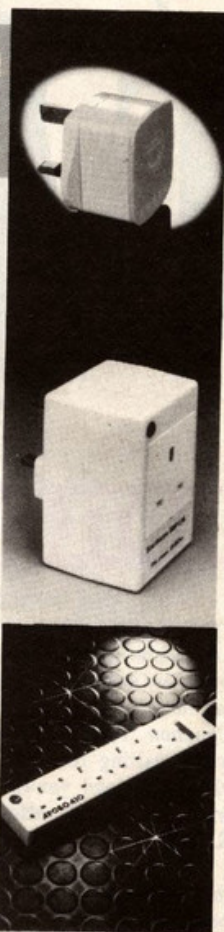
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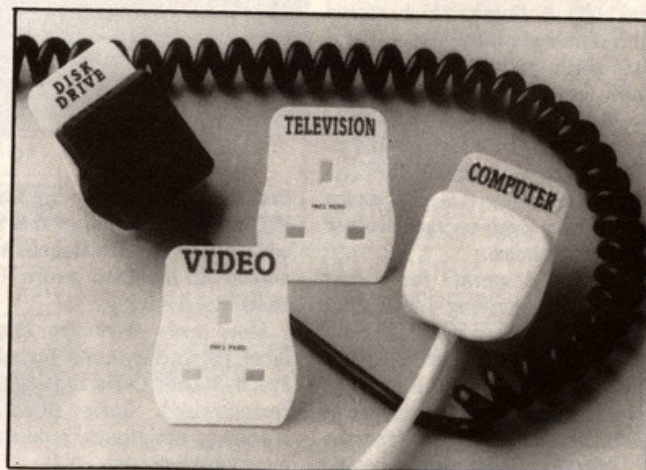
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● No-one smiles in an NHS hospital. Not while I'm the doctor.

F A X B O X

Program: Life & Death
Version: PC
Price: £29.99
Supplier: Mindscape
Reviewer: Duncan Evans

RELEASE DATES

PC: Out now

I don't know why I decided to become a doctor. I mean, the pay's lousy, long working hours, hospitals are being closed down, endless waiting lists, public apathy. The list goes on.

But I did, and found myself being welcomed to Toolworks General by Dr. David Lindstrom as a First Year Resident. The layout of my stretch of the hospital soon became familiar, the main hall, Monica on reception, the staff room where you could pick who you'd be working with in the operating theatre, the theatre itself, the rooms of the patients, and the all too familiar student classroom.

Ah, the number of times my fellow students and I have been hauled in there to have some elementary aspect of surgery explained by a belligerent Dr. Lindstrom.

Thankfully the first few cases turned out to be nothing more than intestinal gas, and bacterial infection. I'm not sure who was more nervous, me, armed with my textbooks, or the poor patient, who yelped in pain every time I prodded in a tender region.

My first big shock came when the pain was localised: the lads were joshing me that it was knife time. I can tell you I was sweating blood until the X-rays came back from the lab showing kidney stones. Kidneys aren't our speciality so we always refer them.

The big day did come though, when I had to go into the operating theatre to perform an appendectomy. The big operations come later if you show enough promise. That was big enough for me, and still is, even after a number of operations.

It takes time to get everything right, and it showed that I'd spent too much time playing footer rather than



● Time to practise my examination technique I think.

swotting on the old textbooks.

The patient, a kindly gent of 55, smiled thinly as he was wheeled into the theatre, Dr. Manglier (the mangler as we call him) and Dr. Danielson ably assisting. Unfortunately it was the last time anyone saw the patient smile.

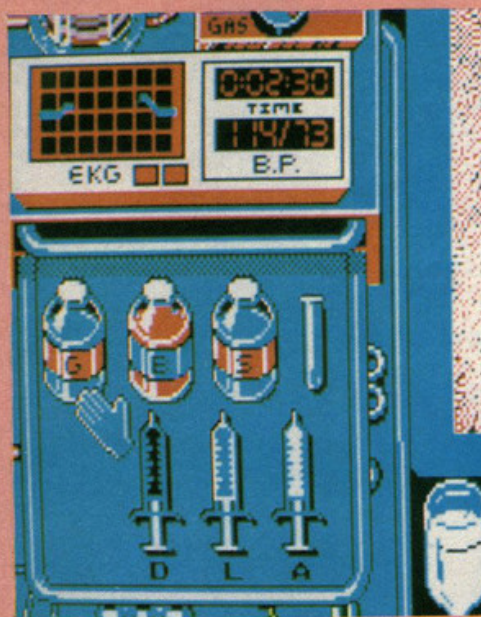
I turned on the gas, scrubbed hands, donned the gloves, washed the operating area and then fitted the surgical cloak. Everything was ready, and picking up the scalpel I made a McBurney's Incision, without shaking too much.

There was quite a bit of blood but I soon had that clamped and cauterized and was on to the next layer. It was at this point that his old ticker threw a

wobbly, and only a blood transfusion and injection of Dopamine restored falling blood pressure. Pressing on, I peeled back layers of flesh, stopping only to administer Atropine to keep the heartbeat at a regular pace.

It was when I got down to the peritoneum that things started to go wrong. Using a clamp to force it up slightly, I nicked it with the scalpel before using the scissors. Alas I nicked too deep and punctured the colon. It was then that I found I was operating too far up, and the appendix was just out of sight. Faced with this fiasco I didn't notice the Premature Ventricular Contraction until it was too late, injecting the Lidocaine just as the heart gave up the ghost. A bloody corpse stared up at me, and my patient never smiled again.

Life and Death has got to be the most informative and potentially *sick* game I've ever reviewed. It sports great CGA graphics and digitised screams and yelps from the patient. Just cut someone without anaesthetic and listen. Hugely entertaining and completely engrossing, *Life and Death* must be converted to other machines, to let everyone have the opportunity to manically wield a scalpel and have their hands in someone else's life.



● And now it's scalpel time. Hold still dear, this won't hurt at all, he, he. Below, I bet he regrets not joining BUPA.



↑ DR. MENZIES: YOU HAVE INJECTED ANTIBIOTICS, DOCTOR.

Gameplay 89%

Graphics 87%

Sound 77%

Overall

88%

F A X B O X

Program: Wicked
Version: ST
Price: £19.95
Supplier: Binary Vision
Reviewer: Kerry Culbert

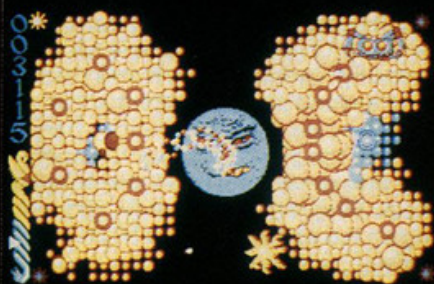
RELEASE DATES

ST: Out now
Amiga: Out now

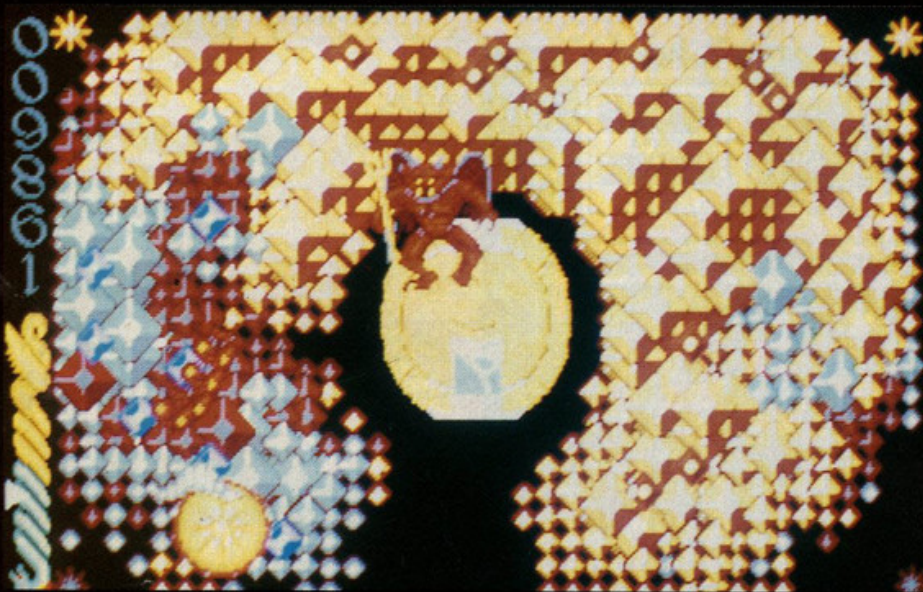
First there was the Edwina egg scare; next came the bacteria scourge associated with hazelnut yogurt; now there is *Wicked*, horror of horrors, spores of evil out to penetrate the Universe by settling and spreading. You, player, are the vaccine.

Joystick-controlled, *Wicked* kicks off well with a demonstration sequence which summarises the game: "... kill the Guardians of evil before they kill you". There are three game balance options from which to choose but there is not much difference in skill level between them.

A blood-trickling eye glares at you as you select your battlefield in the zodiac



● Wicked? More like slightly naughty.



● Aha, is that Paul Channon I espy?



star signs. Not a game for the squeamish this. The first three signs are a walk-over, especially Scorpio and Virgo. After selecting a constellation, a map unrolls with three highlighted stars which are the source of evil.

The theme of the occult is carried through to the central face of good or evil on the main screen, as once each day and night they reveal a Tarot card, ranging from the Tower of Destruction depicting disaster, to the sun symbolising Goodliness. A crystal flies out and lands from each of these cards, and you should not need two guesses which crystals to avoid and vice versa.

As you enter the screen, good por-

tals – red and yellow – and evil – blue and green – are producing growth. Good can cover only evil growth you have shot. When the sun face appears small silver discs appear on good portals. They can be picked up and dropped only on existing good growth, thus halting reproduction of evil spores.

At night, red flashing stars appear which seek evil growth to colonise another disease-ridden area, so they must be shot at as soon as they appear.

The biggest disadvantage of this game is that the concept is so simple it is difficult to get worked up about a few colonies of bacteria.

Wicked also lacks variety. There are seven Guardians of evil such as the Devil, Spider or hand but they do not change with the constellations. What is more, you can harm the Guardian only during daytime. This is easier said than done as the central face turns as quickly as a spinning coin at times.

On the left-hand side of the snake/bird dial, a white arrow indicates your status in the battle. The right hand of the same dial shows when you are running out of time. When the red arrow reaches the bottom, tiny replicas of the evil face fill the screen as the spores pop the vaccine bubble (you, dear player) and enact some interesting visual effects.

Blood trickles down the screen and your grave appears with a filthy gnarled hand rising out of it.

Similarly, when good prevails, baby Suns fill the screen in victory. You will need to rub in plenty of that sun-tan oil you have bought for your holidays.

I wish I could find some sonics worth mentioning, but I cannot so we will leave it at that.

Wicked is a reasonably entertaining game but generally lacks imagination and sound effects, and I found the sun difficult to manoeuvre at times. It makes a change from reading your stars, though, as you are given the chance to make your world good rather than to submit to fate. Just like life I suppose. Being *Wicked* brings out the philosopher in me and is a little like eating cream cakes – naughty but nice.

Gameplay 79%

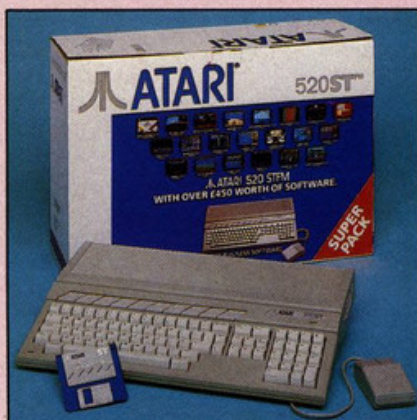
Grafix 68%

Sonix 65%

Overall

71%

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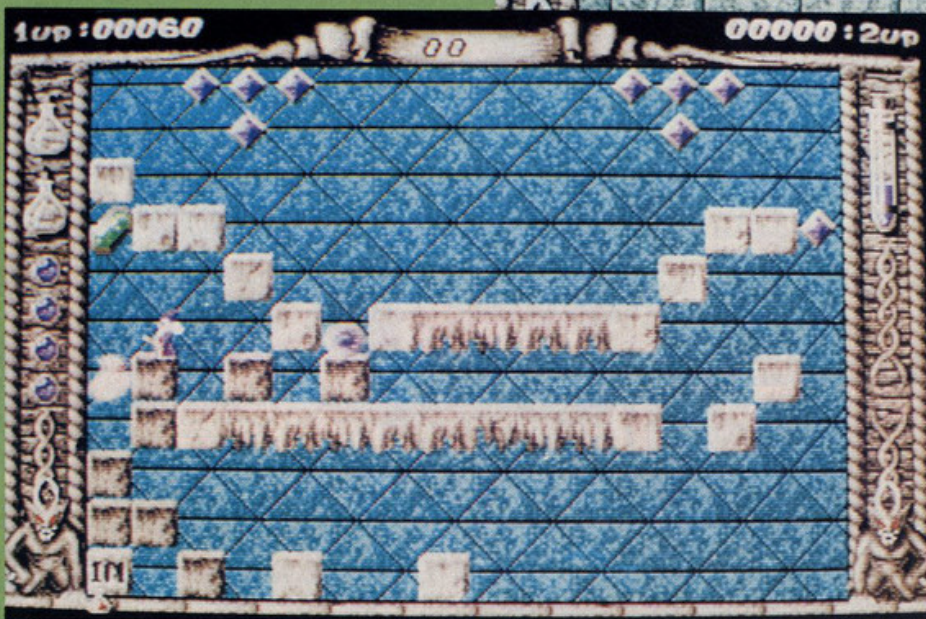
Program: Spherical
Version: ST
Price: £19.99
Supplier: Rainbow Arts
Reviewer: Andrew Banner

RELEASE DATES

ST: Out now
Amiga: Out now
C64: July
Spectrum: Out now
CPC: July

Many thousands of years ago in a time and place beyond your wildest dreams, evil was lurking. Evil was all around, in the forests and woods, in the villages and streams, in the earth and air. The power which represented the evil forces was mighty but, like any self-respecting power, it wanted more and learned of a starball.

The starball is a sphere of unimaginable power and influence. If it falls into the wrong hands, evil will reign and the powers of goodwill and happi-



ness will be dashed; evil would rule for eternity.

Two people also learned of the starball from the ancient document of Quarol. It transpires that Quarol had hidden the ball many years previously in the hope that no evil force would find it but before he did so, it was used to banish evil from the land. Now, these two people, Wuron, a dwarfen magician, and Pulgram, an elf, have discovered that Quarol had only partially succeeded and the job had to be done properly.

Pulgram and Wuron eventually located the starball and we find them about to infiltrate the castle of Mirgal,

the evil force. Once inside, the two fearless characters must find the room of the dragon, Mirgal, and overcome him.

You must guide the starball through the many rooms in the castle by the use of magical blocks which can be summoned and banished at your command. The starball can be transported from room to room only by the use of a door. The doors are located in awkward areas of each room and you must devise a method of guiding the starball into the door without it becoming trap-

you to jump to other levels. There are many more objects to collect, some of which can be difficult to identify.

The graphics in the game are not masterful nor are they over-burdened with colour or detail. The title and ending pages, including the hall of fame, are beautifully drawn with deep blue colours and detailed gothic-type lettering. The sound effects are satisfactory but, again, the music and effects on the title and ending pages are far superior to those in the game.

On a last note, I feel that I must



• Good versus Evil? It's not exactly The Omen is it?

mention the manual which accompanies the game. It has probably the best game instructions I have seen. It provides a witty background and follows with the instructions, accompanied by humorous drawings of bungling wizards.

Spherical can be a mind-boggling game. It combines arcade-type graphics with an element of strategy which might deter some people but, if you like games which make some use of the grey matter, you should like *Spherical*.

Gameplay 80%

Graphics 77%

Sonix 75%

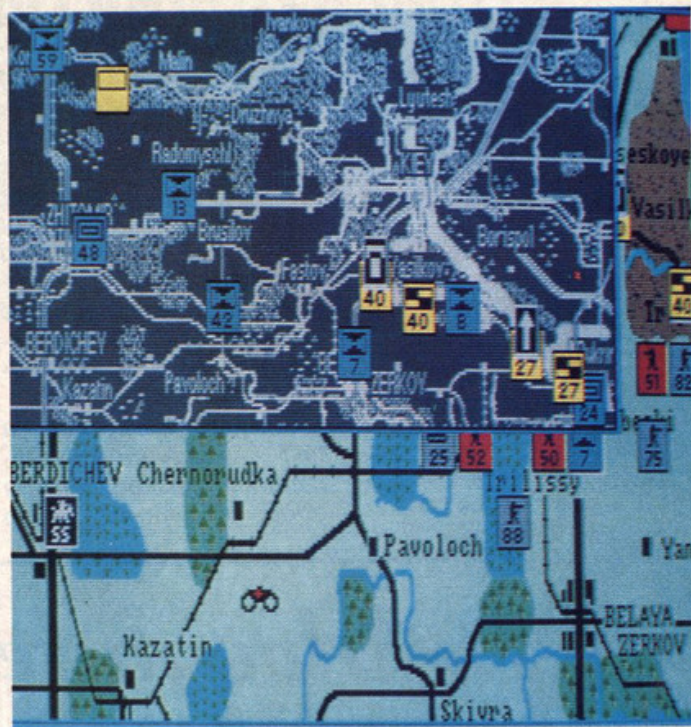
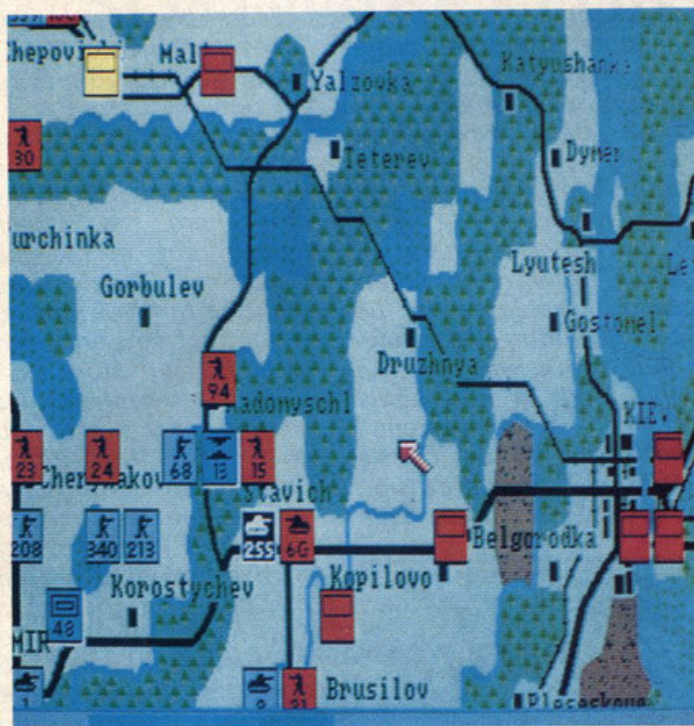
Overall

79%

ped below the level of the door.

Spherical will remind many people of *Solomon's Key*, as the gameplay is almost identical, as are the graphics. Fortunately, this game is more appealing than its predecessor and, for me, more fun to play. While *Solomon's Key* was a simple get-the-key and go-through-the-door job, *Spherical* will get your brain working, as it is all too easy to let the starball fall into an area from where it will not escape.

Littered round the rooms are special objects which will aid you in your quest. Diamonds provide wealth, which increases your score, while scrolls provide passwords allowing



F A X B O X

Program: Fire-Brigade
Version: Amiga
Supplier: Electronic Arts
Price: £24.95
Reviewer: Marc Jones

RELEASE DATES

Amiga: Out now

Someone once said that history evolves in epicycles, so it is time to don your helmet and military paraphernalia, climb into your yomping boots and head for Kiev for an all-out encounter. Do not be misled by the title of the game. *Fire-Brigade* does not refer to Pugh, Pugh, Barney McGrew and other such water-laden characters of the trusty red brigade. On the contrary, it refers to Balcks 48th Panzer Corps and a mass of blood-curdling, angry German tank commanders.

The game can be played by two players, which is probably just as well because of the initial complexity of the various commands and procedures. It is not a five-minute game. The player can take the side of either German or Soviet forces. This is determined at the configuration stage where other options are open to selection, including skill levels, symbols and so on. I probably do not have to suggest that, to start, Recruit is the best option for the skill level.

Every good army marches on its stomach so it is best to keep hold of it and plan the way in the briefing room. As General Hoth or General Vatutin, it is your task to select whether to review a new staff plan or update an old one.

This has to be completed before you can continue into the fields of eastern Europe.

As you march into the battle zones the game takes on a strategic emphasis and calls for a very large bag of thought and an in-depth knowledge of the explicitly-detailed handbook. As soon as you have mastered the details it is an easy game to play which offers a var-



ity of strategic possibilities. The game is very well-documented, including a few pages on the historical background of the battle for Kiev which provides you with that spice of reality which seems to be the trend at the moment. A map and two orders of battle cards are also provided.

The forces are controlled by HQs which direct movement of particular tank corps and infantrymen. The orders are at your finger-tips and with the ability to assess the existing strength and weaknesses of certain garrisons you can command your forces to their respective effectiveness. It is also possible to survey enemy HQ/units through sneaky little, light-footed Intelligence men who spy on opposing

forces. Keep your eyes peeled and keep your head low.

Air transport is also provided with 'Tally-ho Hun' below pilots at the wheel and 'Look there is a Ruskie on a Huskie heading for the river' type of flying aces. With ground support in the form of artillery, rockets and anti-tank weapons, combat should be fairly violent and could take a significant level of strength and morale out of your staff, so it is best to use brains before the brawn and win with strategy as opposed to general barbarianism.

A range of scenarios provide the game with a degree of diversity. The graphics are of a fairly good resolution and depict the terrain of eastern Europe well, with details of rivers and a minimum amount of city roads. Many military-minded types may gain great pleasure from hours spent with historical relevance but do not worry about changing the course of history, as it is, after all, only a game.


Gameplay 82%

Graphics 78%

Sound 30%

Overall

77%



After a rather slow start, STACd ST adventures are coming along at a steady rate. **Shards of Time** is done with a good deal of style but, strangely, **Blackscar Mountain** is a different matter. Bad grammar and bad layout lessen one's interest in what, given the evidence of the other program in the duo, is probably a good yarn.

Blackscar Mountain is a text adventure-with-pictures crossed with a good old monster-bash

those monsters around.

There are other problems, too. Some of them are contrived and seem to have been written by someone who is trying to make life difficult for the player.

Nevertheless, there are some other rather interesting problems to be solved among all the mayhem and it will not take you long to find some crackers. At the moment, I am stuck in an Ogre's cave, with him just outside the cave, waiting to have

successfully in the similarly-titled **Lords of Time** – but I still enjoyed playing this one.

Despite my misgivings about the spelling and grammar in **Blackscar**, the atmosphere is well-defined but at several points in **Shards** you might be forgiven for believing that you are playing an Infocom story.

The atmosphere is handled very well. You must meet three other Time Agents who have ventured into the Time Zones before you. The first one I found had met an early demise at the hands of the locals. You will also notice eventually that the zones are all similar but centuries apart and objects found in one may well be relevant only in another zone.

The puzzles, too, are very well-done. Very near the start of one zone is a well, and a fairly heavy hint that a rope might be a Good Thing to have. You will not have to go far to find no fewer than three suitable ropes, none of which can be obtained easily. It may all be a gigantic red herring but this is the kind of brain-teaser I love, and I am determined to keep at it until I have cracked the problem.

SHARDS OF TIME/BLACKSCAR MOUNTAIN (£7.99 each)
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Adventure Bridge

and treasure-grab; there is a traditional blend of magic and plenty of monsters – a bestiary in the dot matrix documentation gives you the run-down on all those you will meet, along with subtle hints on tackling them.

In time-honoured fashion the monsters seem to have a human-like interest in money and they tend to leave huge amounts of it laying in chests, some of which you can open easily while others contain traps which will prove fatal unless you have the cure to hand. You will need plenty of money to visit the village General Stores, where you can buy the necessary equipment for your adventures.

Along with all this, there are the usual adventure-type problems to be solved. Your quest is to rid the Mountain of the evil curse and, of course, that will not be simple with all

me for dinner. In the cave with me is a bag of flour, some pepper, a juicy piece of meat – Ogres love food – and a giant pair of bel-lows.

Shards of Time is a bigger adventure in terms of locations and more of a "get-the-object, find-the-use-for-it" story, but it is handled superbly. The eponymous shards – three of them, despite the five on the loading screen, or is that a clue? – are parts of the Time Crystal, scattered across the three time zones. The Time Crystal is an integral part of the Time Matrix Stabiliser, which is, of course, now unstable. Your quest in **Shards** is to recover them and thus STW – Save the World.

Having time zones is a well-worn method of squeezing several adventures into one program; it has been done plenty of times previously – most

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So you want to be a programmer?

Paul Marks talks to the men who know and tells you how.

Okay, so you know a sprite from a sprocket and a vector from a variable resistor but do you have what it takes to be a programmer in today's chart hungry games biz?

Getting a foothold in leisure software programming is getting tougher by the week, as the marketing bigwigs decide that 16-bit is where it's at – even though 8-bit is still selling like there is no tomorrow. The result is that you have to be a grafter who can turn your hand to either 8- or 16-bit programming and make the tea with your left foot while taking screenshots.

But seriously, with the industry in a seeming state of flux, dedicated development houses and the development arms of major labels are having to juggle their resources to keep pace – and that affects the criteria you have to meet when looking for programming work.

Gary Bracey, Software Manager at Manchester-based Ocean, runs a 30-strong team of programmers, many of whom are currently writing 8-bit software: "We still contract out some 16-bit work," says Bracey "but as Spectrum projects and the like are finished some programmers are converting to the 16-bit machines or consoles. However, 8-bit is still very buoyant, as witnessed by our *Robocop* game, which has been number one in all the formats chart for months now."

Indeed, over in sunny South London, at Probe Software, boss Fergus McGovern reckons there is a veritable glut of Z80 programmers looking for work, though he expects his involvement in 8-bit to decline slightly: "With the likes of Ocean entering the budget market we won't be able to place as much budget material with publishers as

before," he says.

Ocean's budget material comprises some powerful back catalogue: *Rambo*, *Enduro Racer* and *Daley Thompson's Decathlon* are all now available as Ocean budget titles.

When Probe's McGovern takes on new programmers, he usually puts them to work on a low profile budget game, which represents the least risk investment: "New people are always a risk so we give them non-critical projects until they prove

"We don't want any weirdos, the kind of people who sit hunched over the computer all day in an anorak and relate only to computers."

themselves – the cost is low enough for us to scrap it if it all goes wrong."

But qualifications and ability aside, what kind of person tends to make the grade? All the software houses we spoke to were agreed: they want dedicated non-clockwatching teamworkers with a genial temperament.

Random Access is a new development house run by the Sales Curve, Accolade's U.K. agent. Its first major project was the excellent Virgin shoot 'em up, *Silkworm*. Says project manager Simon Pick: "We don't want any weirdos, the kind of people who sit hunched over the computer all day in an anorak and relate only to computers. They

have to have team spirit – basically a good personal attitude."

The ability to get on with others is paramount; few if any games are written entirely by one person, unaided. You may be a good coder but what do you know of vector mathematics? For example, at Argonaut Software, developers of *Starglider II* and EA's forthcoming title *Aggressor*, graphics man Danny Emmett uses his physics degree to useful effect in creating the mathematical algorithms that allow computers to represent 3-D images. "I have to explain how, for instance, one planet will look from another planet, taking into account their orbits," says Emmett, "so I spend a lot of time just coming up with the optimal method of representing something."

So how does the budding programmer get noticed? Simon Pick at Random Access scans Compunet, the on-line service: "Some people put some flashy routines upon Compuent which show the potential the programmer has to make it," he says. "But just because they can do short routines doesn't mean they can string a whole game together," he adds.

Basically, the message is to talk to the development houses about your ideas: "Some people come up with what they themselves think are duff ideas but which in reality turn out to be brilliant," said one software manager. It is always worth talking: the price of a letter or a telephone call could be your fare to a fun time in a growing business where the sky's the limit.

CONTACTS

Some useful numbers:

Ocean: 061-832 6633

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Random Access: 585 3308



Some young guns. Tell us who you think would make the best programmer and why – the creature from *The Evil Dead*, left – Adrian Mole, centre – or Vivien, right. State which micro you own and you could win some software. Our address appears on page 6.

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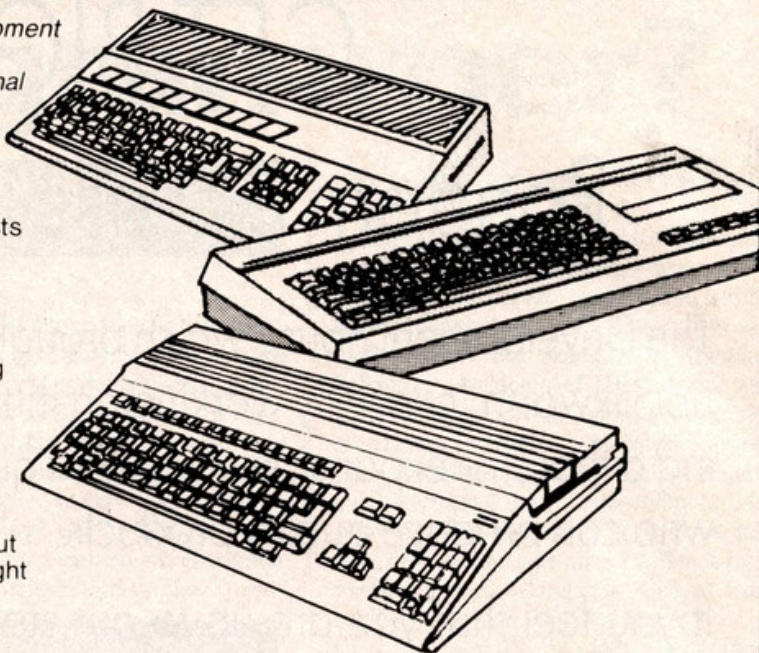
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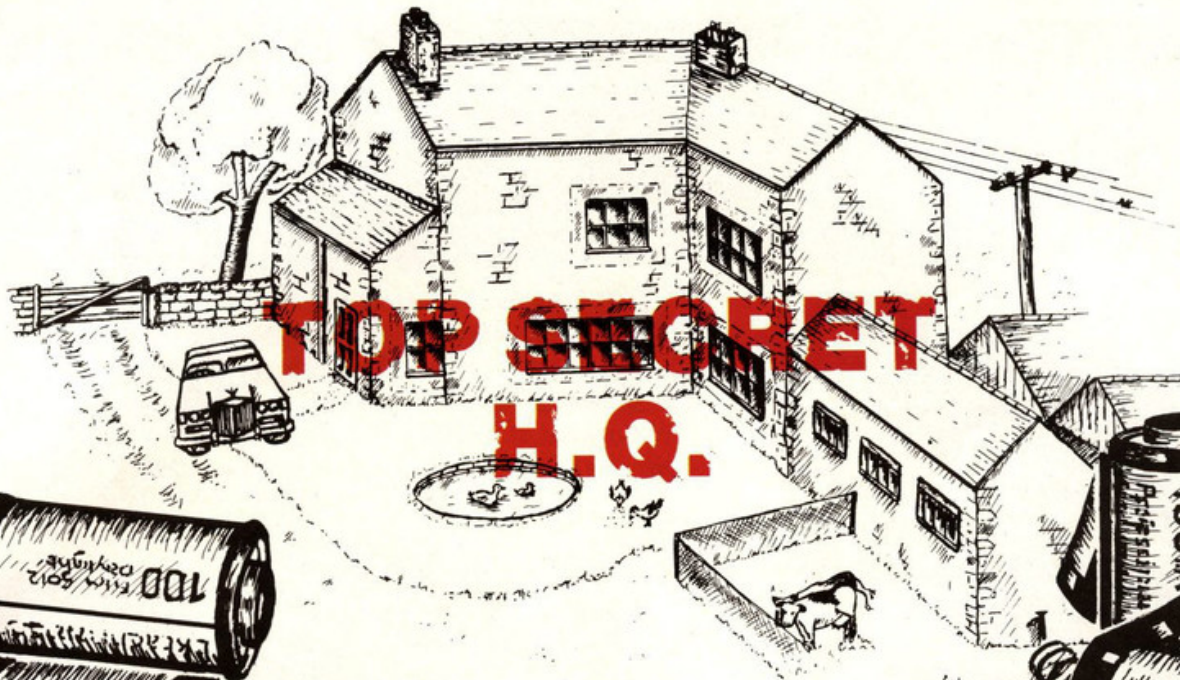
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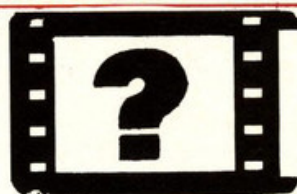
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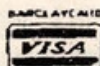
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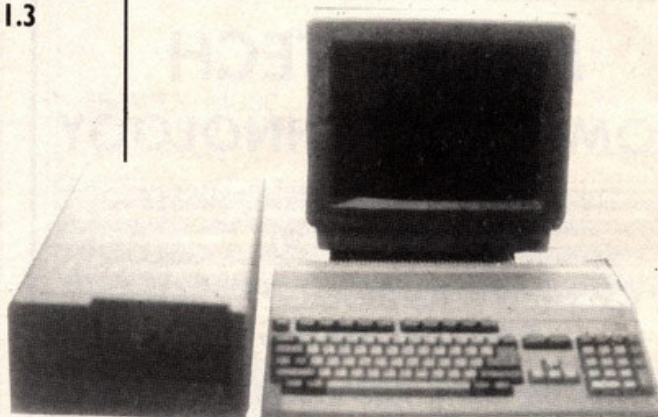
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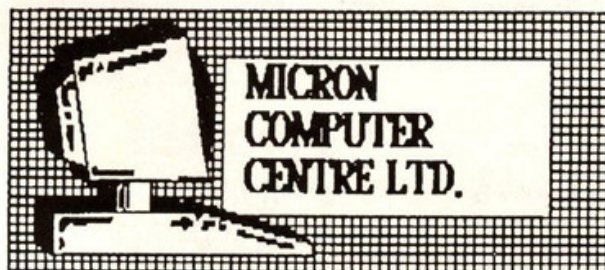
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The maximum number of keystroke entries – the variable M.

The type of entry – i.e., figures only (R = 1); letters only (R = 2); or a combination of both (R = 0).

The positioning on-screen of the routine, the variables C & L.

The processing of upper- or lower-case characters as required.

As you can see in lines 120, 150 and 170 the variables M, R, C and L have to be set before the routine is approached – lines 300 to 580. M and C are allowed only a combined maximum of 39, since this is intended as a one-line routine. L refers to the number of lines down on the normal CBM screen on which the routine will appear, a minimum of 0 and a maximum of 24.

The processing of the SPACE character is worth a mention, since it allows the user to insert only one space between groups of words or numbers in the string, together with its automatic deletion if added accidentally to the end of the string.

The purpose is to create a standard format when creating or searching a file; if this type of environment is not required, omit all references to the variable "S".

The returned string, A\$, can be re-defined or combined with a counter as part

```

10 REM:
20 REM:
30 REM:
40 REM:
50 REM:
60 :
70 :
100 PRINTCHR$(147)
110 C=1:L=2:GOSUB450:PRINT"LETTERS & FIGURES"
120 L=4:C=2:M=20:R=0:GOSUB300:PRINT"A$ IS:"CHR$(18)A$
130 :
140 L=8:C=3:GOSUB450:PRINT"FIGURES ONLY"
150 L=10:C=6:M=15:R=1:GOSUB300:PRINT"A$ IS:"CHR$(18)A$
160 :
170 L=13:C=3:GOSUB450:PRINT"LETTERS ONLY"
180 L=15:C=5:M=17:R=2:GOSUB300:PRINT"A$ IS:"CHR$(18)A$
190 END
200 :
210 :
220 REM:R=0:LETTERS & FIGURES
230 REM:R=1:FIGURES ONLY
240 REM:R=2:LETTERS ONLY
250 REM:M=? :MAX NUMBER OF CHARACTERS
260 REM:L=? :LOCATION DOWN THE SCREEN
270 REM:C=? :LOCATION ALONG THE SCREEN
280 :
290 :
300 U=ASC(" ").:REM:THIS IS YOUR CURSOR
310 POKE198,0:S=1:CM=C:GOSUB450
320 FORC=CMTOCM+M-1:GOSUB470:NEXT:C=CM
330 GOSUB460
340 WAIT198,1:POKE198,0:H=PEEK(631)
350 IFH=13THENGOSUB490:RETURN:REM:CUSTOM INPUT'S RETURN TO MAIN PROGRAM
360 IFH=20ANDC=M+CMTHENC=C-1:S=0:GOSUB460:GOTO340
370 IFH=20ANDC<MTHENGOSUB470:C=C-1:S=0:GOSUB460
380 IFC=M+CMTHEN340
390 IFH>64ANDH<91AND(R=2ORR=0)THENGOSUB480:S=0:IFC>M+CMTHEN330
400 IFH>47ANDH<58AND(R=1ORR=0)THENGOSUB480:S=0:IFC>M+CMTHEN330
410 IFH=32ANDS=0THENS=1:GOSUB480:IFC>M+CMTHEN330
420 IFPEEK(53272)=23ANDH>192ANDH<219AND(R=2ORR=0)THENGOSUB480:S=0
430 IFC=M+CMTHEN340
440 GOTO330
450 POKE211,C:POKE214,L:SYS58732:RETURN
460 GOSUB450:PRINTCHR$(18)CHR$(U):RETURN
470 GOSUB450:PRINTCHR$(18)CHR$(32):RETURN
480 GOSUB450:PRINTCHR$(18)CHR$(H):C=C+1:RETURN
490 IFS=1THENC=C-1
500 GOSUB450
510 IFC>M+CMTHENPRINTCHR$(18);
520 PRINTCHR$(58)
530 OPEN1,3:PRINTTAB(CM)CHR$(145):,INPUT#1,A$
540 GOSUB450
550 IFC>M+CMTHENPRINTCHR$(18);
560 PRINTCHR$(32)
570 IFS=1THENS=0:C=C+1:GOTO540
580 CLOSE1:RETURN

```

▲ "Custom Input" program for the CBM 64.

of a file creation routine. Finally, line 420 serves to allow the processing of capital letters if you have chosen the CBM lower-

case mode; you can omit this line, if you wish, when you are sticking to the normal graphics default mode. ☐

The VALET routine – Spectrum 48K or Plus

Paul Garvin Baker

Function: To increase amount of spare space by converting all numerical constants automatically in a Basic program to "VALEd" strings and deleting the hidden Number Marker and "floating point bytes", saving three bytes each time. I obtained an increase of 1,030 bytes after turning this routine loose on my source copy of Tasword Two.

Called by: RAND USR address. (Relocatable).

Length: 212 bytes.

Variables: None. **Checksum:** 20754.

Error checks: If there is no Basic program in memory the routine returns to

Basic immediately.

Any statement after a REM – either at the start of a line or following a colon – is ignored to avoid corrupting possible module code routines.

Notes: If you intend to use the "compact-by-renumbering" method – using a full re-number routine set to a line increment of 1 – re-number before using VALET, as it affects GOTOs and GOSUBs. Also keep an unVALEd back-up copy of the Basic in case extra lines need to be inserted at a later stage.

VALET running time is proportional to the length of Basic program in memory. My

copy of Tasword took about 40 seconds to process.

The routine supports Scientific Notation and numbers declared using the BINary function.

Program execution will be very slightly slower in the VALETed version due to all the constants needing to be calculated, something for nothing you do not get.

VALET is designed to do the donkey work of general-purpose memory enhancement rather than to compact programs to their ultimate. For instance, VALETed DATA statements will contain one more byte per number – the VAL token – than they have to. VALET requires no understanding of program flow and will allow programs to be RUN without further adjustment.

How VALET works: The hl register pair is loaded with the cursor position – K CUR system variable – and that value is preserved on the stack, as the routine makes a ROM call which otherwise will corrupt the value and produce a harmless but disconcerting effect if the program is LISTed in a following statement. The hl register pair is then loaded with the address of the Basic program area – PROG s.v. – and a jump made one byte into the Test-for-end-of-program routine, at "Testent".

Here the de register pair is loaded with the value of the VARS system variable and the two values are compared by subtraction. If they are equal, the cursor address is recovered and re-loaded and the routine returns to Basic; otherwise a jump is made to the start-of-line procedure, "Line".

hl is incremented twice to step past the line number and the address of the first line-length byte is copied into the ix register. hl is again incremented twice to the first byte of the Basic line proper and REM tokens and DEF FN are tested for.

If a REM is found the routine jumps to the find-start-of-next-line procedure, "Nex-tln", which calculates the start from the address marked by ix and the line-length byte values but if a DEF FN is found hl is advanced to the start of its argument to avoid corruption of its internal Number Marker, by "Skip". Those two possibilities disposed of, the routine enters the main scanning loop, "Look".

The scanning loop tests each byte in turn against the codes for a colon, a Number (CHR\$ 14) Marker and the ENTER token (CHR\$ 13). If a colon is found, the routine jumps back to test for REM and DEF FN statements, "Rem" and "Defn"; if an Enter token is found the routine jumps to increment hl past it and re-perform the end-of-program test, "Test".

If a Number Marker is found the value of the following byte – the sign byte – is preserved in a storage location against future need, "Num", and a two-loop process is employed to find the correct position for

the VAL and leading quote. In the first loop, "Num2", hl is decremented and the value to which it points is tested; with the codes for "E" or "e" – if either is found the routine diverts, "Scitest" & "Notsci", to test the possibility of scientific notation – with the code for a quote, as this will indicate a string, including previous VALET numbers and with the code for "9", the highest possible number code.

When it has found a code higher than "9" the routine then tests for the BIN token; this must be included in the VALET string to give a true result. If a BIN is found the routine jumps to the Insert module but if not the routine enters the second loop.

The second loop, "T4", sends hl forward once again, checking byte by byte for a minus sign – if found the routine diverts; "Minus", to decide between simple subtraction, a negative number, and a subtraction involving a negative number; "DNEG" jumping to the Insert module on conclusion; a decimal point without leading numbers or zeros, or numbers. On either of those occurrences the routine jumps to the Insert module.

The codes for VAL and the leading quote are now inserted by calling the ADD-CHAR ROM routine with the code value held in the a register.

The address of the following byte is returned in the de register each time. A small loop, "T3", is now entered to re-locate the Number Marker and the trailing quote inserted by the same method.

Next the Number Marker and the floating point bytes are erased by calling the RECLAIM2 ROM routine, the line length is loaded into the bc register, decreased by the three bytes saved and re-loaded into the line-length bytes. The routine then returns to the scanning loop, "Look".

To use VALET, LOAD, MERGE or, for auto-run programs, LOAD and BREAK to get into Basic. Type-in, in direct mode; LOAD "VALET"CODE – plus address if different from that from which it was SAVED; :RANDOMIZE USR address (e.g., 23296) and press ENTER. Play the tape on to which you saved VALET and VALET will execute as soon as it has LOAded. When you get the 0 OK report, LIST the program and see what has happened. □

Type 1, Listing & Direct Input

```
10 LET tot=0
20 FOR n=0 TO 211
30 INPUT "Byte value?";v
40 POKE (23296+n),v:LET tot=tot+
n
50 PRINT n,PEEK n
60 NEXT n
70 IF tot <> 20754 THEN PRINT "E
RROR, DO NOT ACTIVATE":STOP
80 SAVE "VALET"CODE 23296,21
2
90 VERIFY "VALET"CODE
100 RANDOMIZE USR 23296:LIST
```

Basic loaders for VALET code.

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Type 2, Using Data Statements (as Type 1, except)

```
30 READ v
and;
110 DATA 42,91,92,229,42,83,92,2
4,12,221,229,209,221,110,0,221,1
02,1,35,2 5,35,237,91,75,92,229,
237,82,225
120 DATA 32,5,225,34,91,92,201,3
5,35,229,221,225,35,35,62,234,19
0,40,217 ,62,206,190,32,6,35,62,
61,190,32
130 DATA 250,62,58,190,40,234,62
,14,190,40,8,62,13,190,40,202,35
,24,238,35,126,50,128,92,43,43,6
2,69,190
140 DATA 40,107,62,101,190,40,10
2,62,34,190,40,12,167,62,57,190,
48,234,62,196,190,40,19,35,62,45
,190,40
150 DATA 60,62,46,190,40,8,62,47
,190,56,3,35,24,238,62,176,205,1
36,15,235,62,34,205,136,15,235,6
2,14,35
160 DATA 190,32,252,62,34,205,13
6,15,235,1,6,0,205,232,25,221,70
,1,221,78,0,11,11,11,221,113,0,2
21,112,1
170 DATA 24,139,58,128,92,167,25
4,127,56,3,35,24,180,35,62,45,19
0,40,192,43,24,189,43,62,57,190,
56,7,62,4 7,190,48,2,24,130,35,2
4,155
```


ST joystick I/O

Keith Planer of Whitby, N. Yorks writes:

Q Would it be possible to use the joystick ports of my Atari 512STFM for input/output purposes? I do not see how to get data into the machine in any other way and these ports seem ideal. I want to control relays to switch household items on and off - TV, hi-fi, lights and so on - and then be able to read inputs to see what is on or off.

A You could read in data through the joystick ports but the process is rather complicated, since you would have to read through the keyboard microprocessor. A better I/O port is available on the Centronics printer connection. It is an 8-bit bidirectional port with one additional output and one input port. The main 8-bit port comes from the sound chip which has two I/O ports, the other being used for other controls on the disc drives, and the RS232. Connecting to the port is a matter of obtaining a 25-way D socket; if you look on the back of the ST you will find that the built-in Centronics connection is female, whereas the RS232 is male, you therefore need to use a

socket to hook to it.

The various connections are shown in the diagram and accessing the various pins depends a little on what language you intend to use. Machine code provides the simplest and fastest access but it is possible to do it from Basic; it is a little complicated since the DEF SEG must be used to access the protected memory.

The 16 sound chip registers are not available directly to the memory of the ST. There are two intermediate registers which must be used to get at them. The first is at \$FF8800 and is the read data/register select. When written to, it selects the sound chip register to be accessed.

To read the contents of a sound chip register, read from \$FF8800 and the currently-selected register will be read. To write, an additional location is used - \$FF8802, the write data address. Any data written to there goes into the currently-selected register. The only registers you need to consider are the mixer (7) and I/O port B (15). In the mixer, only bit 7 is important as it selects whether the whole of port B is to be used for input or output. Setting the bit to 1 makes the port out; obviously, 0 is for in.

Register 15 is the port and if selected for output, anything written to it will end up on the Centronics port pins. When set up for input reading this register gets the current state of the pins; 0 and 5V are used for off and on or 0 and 1. The general routine for a read is: Write 7 to \$FF8800 to select the mixer

Read \$FF8800 to get the state of the mixer

Set bit 7 to 0 (clear it) in the previously-read data

Write the altered data back to \$FF8802 - to the mixer

Write 15 to \$FF8800 to select the I/O port

Read the data from \$FF8800

Writing data is the opposite process, i.e., instead of setting the mixer for input, set it for out and then write the output data to register 15. Reading and writing the other two lines - busy and strobe - is also possible but not so simple as they are routed through the MFP and port A respectively.

One minor point is that when using the sound chip, things can get into a muddle if you leave the key click enabled. You can turn it off putting 0 in memory location \$484 with 2; this keeps the key repeat but disables the key click and bell.

ST extra disc

F Hendricks of Brighton writes:

Q I realise that you may have answered this question previously but could you tell me how to fit a Shugart 5.25in. disc drive to my ST? If possible, could you give me a wiring diagram and instructions?

A A Shugart drive normally uses a 34-way connector and the ST has 14. Make the connections show in the diagram. Since I do not know exactly what connector you have on your disc drive I cannot really draw a picture for you. You will have to look at the pin numbers on the connectors and work it out for yourself.

Shugart	ST Name
8	4 Index pulse
10	5 Drive 0 select
11	6 Drive 1 select
16	8 Motor on
18	9 Direction to step
20	10 Step
22	11 Write data
24	12 Write gate
26	13 Track 0 sense
28	14 Write protect
30	1 Read data
32	2 Side select
All odd numbers	7 Ground

Epson Monitor

George McAleer of Antrim, Co. Antrim, N. Ireland writes:

Q Some time ago I wrote to you about using an Epson Q702A 12V DC monitor with an Atari 520STFM. At that time you had not come across the monitor or had the pin-outs so were not able to help. I have since then dug up the pin-outs which are as follows.

- 1 - Video
- 2 - Vert sync
- 3 - Horiz sync
- 4 - Init
- 5 - Frame ground
- 6 - Not used
- 7 - Not used
- E - Frame ground

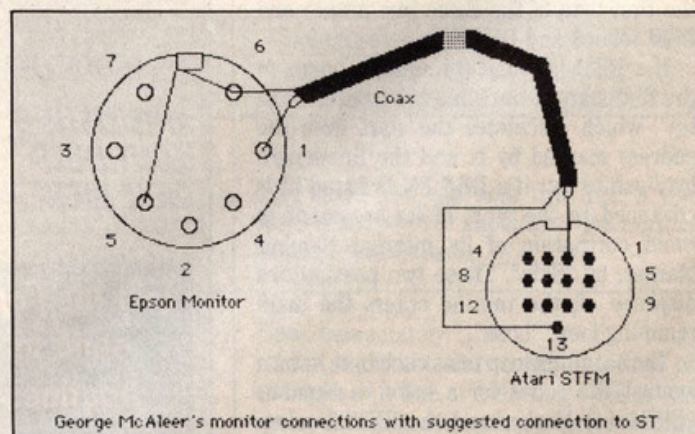
On opening the monitor end of the connecting lead I found the Video was COAX with the core going to pin 1, the braid going to pin 6.

I now have a 12V power supply unit and I hope that this, with the above connections, will help to give me a wiring set-up if possible.

A As you will have noticed, I have made a few modifications to the diagram you supplied. Since you have an STFM, you have the internal modification which allows composite video to be extracted from pin 2 of the ST 13-pin video port.

Connecting this to pin 1 and the grounds as in your cable - I do not quite see why pin 6 is connected but it can do no harm if it is labelled as not used - should give you a picture.

You should make sure that the 12V power supply provides enough power for the monitor or you will probably blow the supply fuse. Look on and inside the case to see if the power consumption is mentioned - it should be somewhere - and make sure you provide more than this. If the power is labelled in watts use the formula Power (Watts) = Voltage (Volts) times Current (Amps) to work out the amperage you need to supply.



George McAleer's monitor connections with suggested connection to ST

Prime correction

H Taylor of Ruabon, Clwyd writes:

Q Thank you for publishing my program on the Sieve of Eratosthenes in the June 1 issue of Popular Computing Weekly. I am afraid I miscopied a vital line from the screen. Line 50 should read: 50 R=Q MOD 2: IF R=0 THEN Q=Q-1

That line finds the largest odd number less than $\sqrt{(2*S+3)}$, e.g., if S=17 and Q=5 and L+1, the only primes needed in the crossing-out process are 3 and 5. I apologise for the error.

A Thank you for the correction.

A3000 configure

Jeff Blake of Wilmslow, Cheshire writes:

As you reviewed the Acorn Archimedes A3000 perhaps can you tell me how to pre-set the key repeat rate? When I am using Basic I find that the standard key repeat is rather slow when used with the editor. I would use *FX 12,3 but this effect disappears when I switch the machine off and on. Is there a way to set this up?

What you need to use is the *configure repeat command. You get into supervisor mode from the desk-top, either with *commands or Exit or F12. Type STATUS and you will be able to see the current repeat getting along with all of the other settings. They are all held in powered RAM and are set up with the *configure command. To get the result you require try:

*configure repeat 3

and then type *status to see the setting. This will be saved in battery-backed RAM and therefore saved when the machine is powered down and re-instated when it is powered up again.

```
DI          ; Interrupts must be off
LD BC,&F792
OUT (C),C   ; Set up PPI control
LD HL,BUFFER
LD C,&40     ; PSG to input mode
LOOP LD B,&F6
OUT (C),C   ; Select port C and output ROW
LD B,&F4
IN A,(C)    ; Read result from port A
LD (HL),A   ; Store in buffer
INC HL      ; Next position
INC C
LD A,C
AND 15
CP 10       ; Test for last row
JR NZ,LOOP
LD BC,&F762
OUT (C),C   ; Set PPI control back to standard
EI
RET
```

AMS keyboard answer

H. E. Haxwell of Goldmark Systems, 51 Comet Road, Hatfield, Hertfordshire AL10 0SY writes:

I was interested in your query from Richard Sharp of Cheadle Hulme in the June 1 issue

regarding reading the Amstrad CPC keyboard. I have just finished writing such a routine.

First, you left unanswered the question of the control pins on the sound chip. The BDIR is BUS DIRECTION and the BC1 and BC2 are BUS CONTROL although BC2 is tied permanently high.

Your description of the 8255 control was, of course, correct. To read the keyboard you must not only program port A of the PPI for the input but also the PSG must be in input mode.

This is achieved by setting BC1 high and BDIR low while selecting the keyboard row on port C i.e., send ROW OR &40 followed by an input from port A.

Of course, if you only want to test for a specific key you need test only the appropriate row. The ROW number is the KEY number divided by 8 with any remainder being the column number. The numbers are, of course, 0-9 and 0-7 respectively.

If no keys are pressed all inputs will be &FF so it is easy to do a bit test or any logical test of your choice to find any re-set bits and, of course, pressed keys.

A more sophisticated method is to enable the lower ROM, disable the interrupts, specify 2x10 buffers in HL and DE and call the routine at &883 in the CPC6128 or &846 in the CPC464.

The routine is worth studying as it will also detect any changes since the last scan.

Thank you for the tip - there are times when I need all the help I can get.

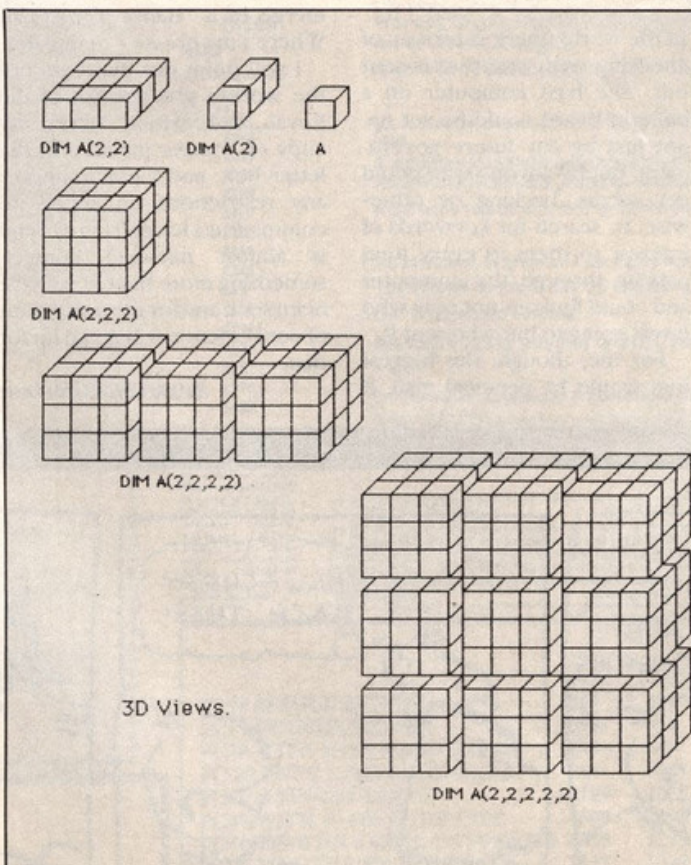
Array dimensions

L. Mason of Belfast, N. Ireland writes:

I have an interesting problem. It concerns arrays and their dimensions and how to visualise them. I can easily see one, two and three dimensions but I cannot work out what a four-dimensional array looks like. Is there a trick way of doing this or is the human mind incapable of such things? After all, the world we live in has only three dimensions.

If you look at the drawings in the 3D Views you will see a trick way of doing this. Starting with A, the DIM command, if you are using Basic, sets up a one-dimensional array A(2) with three elements. Note that they are numbered from 0 to 2, giving three in total. A two-dimensional array is A(2,2) and a 3D array is A(2,2,2). To see the 4D array, i.e., A(2,2,2,2), imagine three 3D arrays next to each other. The 5D array works in the same way - imagine three 4D arrays. The thing to note is that extra dimensions are always placed at right angles to the existing ones.

You are correct about being able to visualise only three dimen-



sions. Because of that it is not possible to work out the true relationship between the elements

of more than a 3D array, unless anyone knows better and can prove it.

Apple HD with ST

Jonathan Dickson of London SW6 writes:

I have an Apple Profile A9M 1005 hard disc. Once used with an Apple III, what are my chances of being able to use it with my Atari 520 ST? I would be grateful for information on whether and/or how this can be done? On the back is a notice saying 'Connect this unit only to specified Apple computer interface'.

I know nothing about the drive you mention. The ST can work with Small Computer Systems Interface-like devices. Normally hard disc drive connections are fairly standard and the fact that yours requires an interface to work with the Apple III may mean that it is also standard. Look on the case to see if you can find the manufacturer and write for more information; the chances are that it was not made by Apple. The command structures are defined in *ST Disk Drives Inside and Out* from Abacus but this gives very little information on the interface. If you can sort out an interface the book could be useful.

If anyone knows any more about this subject and will write to me I will pass on the information.

Great modem bores of today

The worst kind of computer communication enthusiasts are the ones who come up and slap you on the back and say: "I don't know how you live without a modem. Ordering software, the news, the 'teleconferencing' and the multi-user games. I just cannot understand anyone not having a modem." Then they go off to pay a three figure telephone bill.

The strange thing about communications is that it does not allow you to do anything you could not already do in the big real world, and all without call charges, line rental and V.A.T.

Of course, one of the major attractions of comms is the future potential. It would make the paperless office much more viable. But carried through to other walks of life would that be such a good thing?

The day that comms freaks look forward to is the day when they get up in the morning and instead of scraping the mail off the mat, access their terminal and see what goodies have been left in their mailbox. What would you find? Well, if junk mail is indiscriminate now, when companies have to pay for postage, paper and printing, imagine the campaigns you could have if all it cost them was an eight second telephone call.

You would no longer be able to say that the unpaid bill was "stuck in the post". Your friend-

dly, helpful bank could send you a nasty reminder every day about your overdraft and of course the bulletin boards would by law have a system so that you had to access the files before you could get rid of them.

Also there is the problem of censorship. Even if an envelope is not the most secure container

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in the world, there is no way of checking each one that is sent out. The host computer on a bulletin board could be set up, not just by any future government, but by anyone who could get access, hacking or otherwise, to search for keywords of interest to them in every item passing through the computer and could find out not only who it was going to but who sent it.

For me, though, the biggest loss would be personal mail. If

there was no longer a Royal Mail letters service, could little Lesley Jnr. (or Snr. if that way inclined) send a green wax crayon drawing of the family dog, which somehow found its way into the middle of your latest article, to granny, if at some point in the future the Royal Mail is like the private carriers are today handling only special business documents and parcels. Comms enthusiasts would point out that writing letters takes a lot of time and effort, but of course that's the point. For pen-pals and love letters straight from the heart, would that shoebox tied with a ribbon be the same if it was crammed with Telecom Gold print outs, even if you could get a printer add-on to spray it with perfume/aftershave as required.

At Christmas could you resist the temptation to make up a mailing list of all the family and merge in a "Happy Christmas. Where's my pressie?" template?

I will point out that I am not the world's greatest fan of the Royal Mail, which leaves my copy of *Popular* jammed in the letter box, and I don't support any restrictions on access to comms, but a letter from a friend is almost personal contact, something more than ideas have been sent, and for me no amount of convenience will make up for that.

Stuart MacGlashan

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