

STAMIGA

FORMAT

The complete package for Atari ST and Commodore Amiga owners

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ROBOTS!

How the ST and Amiga are tooling up for the future

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ST AMIGA FORMAT

The complete package for Atari ST and Commodore Amiga owners



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Price cuts on the ST lead in the Christmas push (already!), plus reports of hot new products from Am-Expo '88 and the British Music Fair.



GOLD DUST

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HOME ACCOUNTS 32

Digital's new ST package promises to save you its asking price - can it deliver?



TRIP-A-TRON 60

Jeff Miller comes up with his long-promised 'light synthesizer' for the ST. Give your mind a psychedelic experience it'll never forget.

WORK AND PLAY

Now that we've reached the grand old age of three months, that is, we're getting a good mixed bag of good work-magazines. Of all the suggestions for improving the magazine, the two most common are to let drop all the boring business and programming stuff and just cover the games, or to drop all the kiddy games stuff and just cover the business and programming.

In a way, we half expected this. After all, the ST and the Amiga are the first true all-round home computers they've both got brilliant graphics and stunning sound for games, and they've got massive memories and high quality screens for the most demanding of business applications. There will always be people who don't realize how powerful the other half of the machine they use really is.

In the old days, you might have had an IBM PC to work on, alongside

a Sperry for a quick nap when you had the need for light relief. Now one machine does the lot.

The vast majority of commentators are delighted with the mix of serious and entertainment software in Format. People who bought their ST or Amiga purely to play games or are discovering how to tap its underlying power, and people who bought one as a specialist workstation - graphics, music or business - are discovering the joy of playing the best games written by top programmers the world over.

We've got a suggestion to solve the arms race in and full stop. It's simple really, give all leaders of the world governments an ST and Amiga each, and they'll be so busy wrapping their heads round new discoveries they'll be too busy to do any harm. Brilliant. Why hasn't anybody thought of that before?

MUSIC



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WORKBENCH 86

A gut-punch of tips and tricks to squeeze the most out of your Amiga.





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NEWS

Making a song and dance

STOS - The latest Commodore is a new BASIC-like ST programming language, specifically designed for producing graphics action games with. Written by French software house Jeux International, the European rights have been picked up by Mandrake Software of glass arena Macintosh.

Intended for a games creation program, it seems that the major programming houses are very interested in using it. In the past, companies have named adventure creators like GIG and PINK, claiming they only produce very limited and similar games. In this case though, French software house Unisoft have already written their latest game Skate Ball with STOS, and are reportedly very pleased.

Among STOS's reported features are: moving up to 25 sprites on screen at once; adding an interrupt driven music banking track; inserting predefined sound effects; compressing Digas or Resonance graphics; zooming; generating sub-screen menus; and scrolling up to 16 different screen areas independently.

The STOS package includes three sample games written with STOS for you to examine, an icon editor, a quote editor, a character set editor, music editor and sports designer. Spreading over three disks, it comes in at £29.95.

■ Mandrake Software, Luton Road, Millington Park, Abingdon, Wiltshire, SN1 3DP. 0225-576666



■ The sports designer in STOS

PRICE WAR LEADS AUTUMN 16-BIT PUSH

It now seems almost certain that the price of the basic 500ST will drop to £299 in the Autumn, re-establishing its price differential over the Amiga. Paul Welch, Atari's UK Marketing Manager, confirmed that details were being finalised on a follow-up promotion to the successful Summer Games pack, which offered 1400 worth of high-quality games in the £299 ST price.

As of September 2nd 1988, Atari dealers will be offering two packages: a base 500ST at £299, or a bundled deal again of 21 plus around 4800-worth of games software at £399. Welch commented, "We haven't led up to the games yet, but I expect them to be of the same standard as the Summer Pack, which went very well." In other words, they will be repackaged recent hit price releases, not budget games.

Welch added that Atari had earmarked £1.2 million for TV campaigns and advertising in the pre-Christmas period, and he expects to shift 70,000 STs. Official Atari figures say there are around 150,000 STs in the UK already, but independent estimates would put it at not much higher than 130,000.

Amiga assault

Commodore are responding by setting out their plan for a massive advertising campaign leading up to Christmas. Following the recent price cut to £299, the so-called 'Cheese advert' is un-



■ Welch, looking to sell 70,000 STs in the pre-Christmas period.

ring in the quality stakes for the late summer ending the virtues of the A500. A four-week TV campaign is scheduled for the last two weeks in November and first two in December.

Dean Barrett, Atari's counterpart in Commodore, was optimistic about the Amiga's autumn prospects. "We got no control over Atari's pricing policy, but we're putting our biggest ever push into this year," he said. "Last year we only spent a million or so, this year we'll be at least triple that with the bulk of the spend in the pre-Christmas period." The theme of the TV ads hasn't been finalised yet, but Barrett added wryly, "They won't be featuring the Chelsea football team."

The advertising campaign began two years ago by Apple to push its Macintosh as a special-ist DTP system rather than a general-purpose computer. It

was created with turning round the features of the company. Commodore may well be hoping for a repeat of 'the Apple effect' by pitching its high-end A2000 range machines at specific vertical markets rather than its general-purpose micros. It's no secret that Commodore are putting together a desktop publishing package based around the Amiga, although so far the arrangements haven't been sorted. A suitable minimum configuration system would be a twin disk drive A2000 running Professional Page, made with a high resolution monitor, at around £1500 including any printer.



Enabling word processing

Amos have released an updated version of their Protext word processor, v1.6, for the ST with several novel features. One which could be a lifesaver for disabled users is a new way of using the Shift, Control, and Alt keys.

Chris Smith, Amos' UK representative, says, "Some Commodore can be impressive if you don't have full use of both hands, so now you can press [Control] first and then A, for example.

Other new features include the ability to redefine any character's screen appearance, and for the first time you can run GEM desktop accessories from within Protext. You can connect Protext files into Protext files, retaining all the embedded coding and so on.

Perhaps most useful is the 'Where/Insert record' mode - you can record any series of keystrokes and 'replay' them later on. Ideal for those repetitive editing chores.

Protext costs £29.95, or £15 if you are upgrading from a previous version.

■ Amos, Protext House, Brooman Rd, Peterborough PE2 2BB. (0733) 239311



AMI-EXPO '88

A major event in the Amiga calendar took place in Chicago between 20th and 23rd July - AmiExpo, the Amiga developers' showpiece. Martin Lane from The Amiga Centre Scotland went over to scout out new products.

Most exciting was perhaps the demonstration of the long-awaited Video Toaster from NewTek. The Toaster is an effects processor to produce Top-of-the-Range style results from your Amiga. You plug a video camera into it, and the Amiga can take the image, upscale it onto a sphere, flip it, split it, preview it or do whatever else is real time - that means as fast as the camera grabs the frames. Complete with a professional quality graphics card, NewTek are aiming at a price of under \$1,000* in the States. That sounds cheap, but professional graphics alone can cost \$750, and real-time graphics workstations real around \$40,000 at the moment. A PAL version suitable for the European market is under development.

On the even more expensive graphics side we're taking over \$5000 - you can't afford it, but what anyway is a 24 bitplane colour scanner from ASDG. This can grab images in 16 million colours, and although the Amiga can't display them all, modern colour output devices such as 'television' colour laser printer can print them.

Two others from ASDG are Duplex 3d Professionals, a specialist programmer's tool sold at \$25, and the Twin-8 board. Duplex 3d includes lighting fast scrolling, search at 100,000 characters per second, moving text blocks in vertical columns, multiple windows open to the same file, and an interface to the Affix advanced data interchange language. The Twin-8 board is a plug-in to the A2000 to allow you to attach industry standard hardware like barcode readers and Digital to Analogue converters. Sounds essential to hardware developers.

Other smaller utilities on show included an expansion rack for the A500 and A1000 to give it slots for A2000 or PC-compatible expansion cards. Family 80 Fonts is a set of three specially designed fonts for Super-80 and Amstrad-80, going for \$48.95; there's a PostScript version of the Profibus word processing package, for those of you



who own laser printers; and finally WOPR3.1 is a replacement for the standard GUI which is a commercial development of the PG ConMan program. As well as being able to edit your last command lines, which the Commodore Workbench 1.3 release due in the Autumn will offer anyway, WOPR3.1 offers command aliases, resident commands like more (swapping files to get a directory) and the ability for GUI users to 'type' data (send the output of one program to the input of another between two tasks running concurrently, all in about 100K.

■ For further details about any of these products, contact The Amiga Centre Scotland, 4 Hart Street Lane, Edinburgh EH9 3PH. SWN 8033 147 6242

Brief briefs

Timeworks Data Manager Professional is a new logical database package for all models of ST. It costs £69.95 from Electric Distribution. 0294 81798, and claims relational database operation, fast sorting of data, a simple setup procedure and a built-in word processor.

Kana 029321 4395 have improved their ST 8.0 (standard mouse) compression program. Version 2 will do £29.95, or a £30 upgrade to existing 8.0 (mouse) owners. Files are displayed uncorrupted during copying and adding up to 32000 checks can be stored in Archival mode, which saves in around 20 minutes playing time. Kana require: 1% 540 GEM based and MD2 computers.

Digit 0799 450049 are bringing their business PC and ST software ranges to the Amiga. Following Digitool (reviewed last month) and Home Accounts (this month), **Marketing** and **Marketing**

Plus £34.95 and £49.95 respectively) are out to ease the burden of businesses doing direct mail operations.

Advanced Memory Systems - purveyors of the DTP Stop Plus range of word frame memory - have been bought up by the Swiss company Logitech. Logitech are major mouse producers, supplying the rodents for Microsoft Packard and others, and AMS used that mouse in their own DTP packs. Acquiring AMS seems to be a move by Logitech to take DTP far afield, rather than go through distributors as before. How the deal affects the launch of Amstrad Plus, AMS' ST DTP addition, isn't yet clear.

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British Music Fair

Chris Jenkins battled his way through the maze at the Wembley Conference Centre and reports on the 1988 British Music Fair, where there was plenty to excite ST and Amiga owners.

Space 1999

Perhaps the best man came from the oddily-named M20000 (1999 to you) - most of the American ST-7 software range is to be launched on the Amiga. This includes RCS, the Keyboard-Controlled Sequence program, and a huge range of patch editors for the Roland 05/05/15/MS/TEC, Yamaha DX7/DX8/E, Casio CD, Kawai RL, and Ensoniq ESQ1, all around £120. There's also the music score writing program Copilot. The beginner's Level 1 package costs £79.95, whereas Level 3 at £299.95 supports laser printers, desktop publishing packages and alternative fonts. Also on the way is another range of Amiga patch editors/converters from Soundboard, including all the old favourites plus a generic librarian for a huge range of synths, with prices





around £200, and from Intelligent Music, the Amiga version of M, a very powerful sequencer can store up originals for the Apple Macintosh.

New ST products coming through M-BOX22 include Fingers, a real-time variable generator at £80, and Phantom, a revolutionary package which generates and reads SMPTE video/film synchronization code through the ST's serial port. Used as a desk accessory with a sequencer package, Phantom could save you £200-300 on SMPTE hardware.

Draw a tune

The most serious new package is Intelligent Music's MIDI Draw, an ST package which allows you to translate mouse-controlled graphic notation into MIDI data. Scripts, volumes and MIDI parameters can be printed, and performances can be saved so they can be recalled. Price is yet to be announced.

Another good bit of news is the launch of Pandora Technologies, a UK software firm producing ST patch editors which work as desk accessories with all

the major sequencer packages. The £75 packages work unusually quickly, come in a Postscript font, and work with the Yamaha DX7, Roland D50/110, and the new King MI and Kawai K1. Another real gem in the pipeline is Ludwig, an algorithmic composition tool. Ludwig works using up to eight simultaneous MIDI tracks, composing music according to sets of simple instructions relating to chords, timings and events. Ludwig's music can be edited in real time, and it creates files which are incompatible with other hybrid A-to-M sequencers. Ludwig isn't finished yet, but it looks fantastic and it's aimed at the budget market.

Stenberg's huge range of ST products extended with the latest version of the Pro-24 sequencer (ST), and the Eas, an editing and music theory program aimed at the educational market.

Stylish Lynex

Last but by no means least, the Lynex sampler from Commander Electronics showed how it can out-perform much more expensive samplers, using special signal processing chips designed for inside guidance, the Lynex is a featureless 15-inch block box connecting to the ST's expansion port. Because it doesn't use as much of the ST's own memory, you can load any sequencer package you choose, and use it in conjunction with the Lynex's sampled sounds. And still control external MIDI devices.

The Lynex claims sampling

quality above that of Compact Disc, plus anti-aliasing routines which maintain the sound quality even when you transpose over the full MIDI range. Prices start around £1800, which is about the same as conventional keyboard samplers that appear to offer lower quality and less expansion potential.



■ The Lynex sampler from Commander Electronics. Hooked up to a 10400T.

JUNGLE DRUMS

Good news for owners of Oberlin's £100 MIDI Digital Drum Machine. Rather than loading and saving patterns, songs and drum sounds using cassette, you can now use your ST. The original designers of the hardware have just finished a Pattern Editor package, which uses an on-screen grid system to create patterns, songs and sound files. They simply store in the MIDI via MIDI. The software will come with preset lists of eight sound samples, and should cost around £60. Oberlin also announced two sound sets on tape, a range of budget effects pedals, and the M8000, a cost-reducing digital synthesizer at an amazing £199.



PROGRAMMING NEWS

Typical of course, just as our feature on programming language in this issue went to print, most of some exciting new releases reached the format offices.

The whole truth

8080C is a machine-oriented programming language, despite being the most popular in the world. It may come as a surprise to you to learn that its creators, John Kennedy and Thomas Kurtz,

also think it's a bit of a jargon.

The reasons are simple. They originally designed a simple, simple programming language which was then hacked around by hundreds of different computer designers to squeeze into their needs, with arbitrary extra commands being added whenever they were needed. Result: chaos.

To clear their names, Kennedy and Kurtz have designed True BASIC - what 8080C should have been, they say. This is now available from Precision Software for both ST and Amiga, price £64.95. True BASIC claims to offer:

Portability - programs written on one machine can be transferred to any other, even if they use graphics and trackball buttons.

Structure - constructs like IF-THEN-ELSE, SELECT-CASE, DO-WHILE and DO-UNTIL, have been added into the language, together with proper support for procedures and separate modules.

Graphics support - commands

to draw circles, lines, text and other graphics objects are part of the language rather than being left to each computer's designers to invent. Drawing is done on a general graphics screen and the system converts it to your particular computer's coordinates.

Speed - True BASIC is a semi-compiled system.

C++ goodies

Good news and bad news for C programmers. The good news - Lattice, computer compilers for ST and Amiga, have announced an Amiga version of the enhanced C++ language. The bad news - it costs £560 and needs 1.5MB of memory.

The Lattice C++ system is a pre-processor that converts C++ code into conventional C on the ST. We haven't been able to subject this to the rigors of the Format Laboratories yet, but it claims to be typically 10% faster and on average 20% smaller than other C compilers.

Also at the C front, UK-based Electric Distribution have now got a new version, v3.5, of the well-known third stream C on the ST. We haven't been able to subject this to the rigors of the Format Laboratories yet, but it claims to be typically 10% faster and on average 20% smaller than other C compilers.

True BASIC

A Machine-Oriented Language for the Amiga

John C. Kennedy
Thomas E. Kurtz

■ Precision Software, 8 Park Terrace, Worcester Park, Surrey BT4 7JF (01-337 7144)

■ Lattice Inc - UK contact: Mathematics, 26 Portland Square, Brenton 082 892 (01753 426781)

■ Electric Distribution, 8 Green Street, Billingham,

Cambridge CB4 3JL (0954 41788)

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- Please send me a Power BASIC, enclosed is £49.95.
 Also enclosed is my GFA BASIC 2 master disk & mouse mat FREE! please also supply Saved! and a mouse mat FREE!

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FUTURE PERFECT?

A real appetite-whether to the new games that'll be melting your mice in the next two months. Andy Storer orders an hors d'oeuvre.



VECTORBALL

VECTORBALL

Microframe ■ ST & Amiga ■ £24.95

Two drunks play a complex blend of aerobics, martial art and bowls on a stage of five contoured pitches in what sounds like quite an intense encounter. Super smooth scrolling of the mesh metallic surfaces ensure it'll look good too. Whether this kind of sport will make the Olympics in 2008 entirely depends on the Android Liberation Front.

SPEEDBALL

ImageWorks ■ ST & Amiga ■ £24.95

The new one from the long lost Omega Brothers of "Xena" fame. Set in Speed Dome it's another future sports sim, this time including jousting and tackling to blow the opposition away in very scoring headover action.



SPEEDBALL

Put your sword against beautifully animated medieval backdrops featuring the best 3D fight simulator. As far as gameplay and graphics go the one will put Defender of the Crown back in the Middle Ages.

POLICE QUEST

Microframe ■ Amiga ■ £29.95

This 3D animated adventure is based on an American cop's world of crime and punishment, murder and narcotics. Over 100 city streets and four highways provide the landscape for hot leads and high speed pursuits. Features including both full voiceover text and joystick control will hopefully make Police Quest more than just a shoot-out fest.

RED STORM RISING

Microframe ■ ST & Amiga ■ £ not announced

Readily for more advanced than

Glenn Sevier, Microsoft's previous sub-aquatic sailing, Red Storm is its focus on the tactical operation of an American nuclear attack submarine in World War II waters. Did I miss something? - Eh! You talk as the commander it to locate and destroy Soviet subs as the laws that Arctic base using your realistic simulation of onboard tools and weapons systems which include intelligent torpedo.

OPERATION WOLF

Swain ■ ST & Amiga ■ £ not announced

This superior conversion of the Taito number one computer will feature six levels of floating action as you take on the role of a mercenary given the job of rescuing hostages from a war-torn land. No, it's not Grand but some single courses in which enemy soldiers, armoured cars, choppers and tanks abound.



MAINFRAME



IRON LORD

Dei Soft ■ ST & Amiga ■ £24.95

As an apprentice knight, out to prove your bravery, loyalty and courage, you will have to prove your proficiency at archery, wrestling and jousting. Once accompanied the road has begun -



POWERDROME

POWERDROME

Electronic Arts ■ ST & Amiga ■ £24.95

A futuristic planetary simulation (see this month's ST cover story) where you compete against four players from other galaxies in six races situated on different planets. You'll have to tune your Solid 3D racer for each planet's conditions as well as adjust its suspension position as you negotiate tracks featuring crusher gates, but robot ic pitfalls might make your task of winning Powerdrome a little easier. Along with Vectorball, this is the kind of Olympic action we all want.

MAINFRAME

ImageWorks ■ ST & Amiga ■ £ not announced

Although we're being saturated with tiled 3D vector graphics at the moment, Mainframe looks like it could win all awards for multi-surface object manipulation. We're talking Free, Free, Free in a game play to be based in the cyberspace of William Gibson's Count Zero. Since it'll probably be shipped around the same time as Electronic Arts' version of Neurosphere it looks as though we'll get more than our fair share of cyberspace.



IRON LORD

ZYNAPS



ZYNAPS: the most imaginative sci-fi shoot-'em-up game yet, from Hewson. It has a combination of 140 possible story sequences to fire your imagination. Zynaps is a game constructed like a comic book, with three chapters and four episodes of mind-blowing action. Each part fits together until our hero finds the final conflict. It's the battle to end all battles!

ATARI ST Series £19.95
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ATARI CD ROM

Does the thought of slipping the Encyclopaedia Britannica snugly into your pocket excite you? Richard Monteiro reviews Atari's long-awaited CD ROM unit, the CDAR504, which promises to put Gigabytes of data within your ST's grasp.

£799 ■ All STs ■ Atari UK, Railway Terrace, Slough, Berks SL2 5BZ 03753 3034447

A CDROM is like a ready-to-hand disk with a track length of just under three miles, capable of storing over 500,000,000 bytes of data. Huge amounts of information can be stored on a disc no wider than a floppy and whose information can be retrieved at speeds approaching those of hard disks. One thing has prevented this technology reaching home computer users sooner - price. Once again Atari's edge, Power Without The Price (B), is, as usual, rings true: they have introduced a Compact Disc unit that plays both audio and ROM CDs for under £800.

The customarily oversized CDAR504 package comes in one mid-sized box (similar in shape to the Mega's processing unit and 3.5-inch hard disc) with a lead for connection to the ST's DMA port, and CD and control software on 3.5" disk. The front panel boasts a power switch (also used to reset the unit), a couple of LEDs indicating disc activity, a headphone socket, an open/close button for the disc table, a pull-out remote control unit and a digital display. The remote is used to store libraries populated with just audio and software, and DMA in and out, allowing through connection of other DMA devices like hard disks, laser printers and even other CD players.

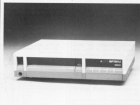
Computer data

CDs offer around 500Mb of storage, reduced to around 500 Mbytes if formatted for computer data. Usually, there is nothing to differentiate between ordinary audio CDs and computer CDs - the player works out the type of disc for itself.

When connected to the ST, the CD player acts like a high-capacity hard drive. In general, CD "look times" (the time taken to find a file once the directory has been read) is similar to

early floppy drives (remember there are over 100Mb to search through rather than 360K) and transfer rate is faster than most hard drives (11Mb per second). In practice it takes roughly two seconds to retrieve any piece of information.

Golden's Encyclopaedia, although Atari haven't finished the job. Software to access the CD drive is supplied on 3.5" disk, this is simply a ROM program, storing in the confines of ROM, that allows you to extract data from the CD. Items can



be much for the theory, but how does the CD software and player interact with the OEM environment? Facts on File Inc's Visual Frequency/English Dictionary was supplied with the review machine (retail machines are likely to be bundled with

be searched for and then printed or saved as an ASCII file. The stored file can then be merged into other ASCII-accepting programs.

The exact method in which data can be manipulated will vary from program to program. As the CD player

DIGITAL DEALINGS

If you want to be in with the CD crowd (and that's not just for the sake of it), you need to know a little more about the technology.

Example - a digital recording of a sound wave. The more bits of memory used to store the sample, the better the reproduction.

Resolution - Most of today's CDs play at 1500-1600Hz. They can reproduce the original sample completely. Top-of-the-range (Class 1) offer 1500 resolution with the BBC managers very high-quality tracks only using only 1500s, but keeping the tracks well separated in top condition.

Over-sampling - single samples are fed to digital-to-analogue converters (DAC) a number of times. This is how usually. This has the effect of increasing the maximum sampled frequency.

INNER WORKINGS

A Compact Disc, audio or ROM, is 120mm (4 7/8") in diameter and roughly 1.2mm thick. Buried 1.1mm under a protective plastic coating lies a reflective layer coated with a fine spiral of pits. These pits represent sequences of binary digits (that is, either 0's or 1's). Each pit is 0.5µm in depth and 0.8µm apart with consecutive loops of the spiral 1.6µm apart. This means that data is recorded at 30,000 tracks to the inch - a whole heap more than standard 3.5" disks

(which offer 90 tracks per inch).

The disc's information is read by a laser beam produced from a gallium arsenide semi-conductor laser. An oval beam of near-infrared light is focused to a spot of 1µm in diameter. This spot is directed towards the disc's tracks and is reflected back if it hits a space or scattered if it hits a pit. Then a change in the level of reflected light signals a transition from a pit to space or vice versa.



REVIEW

WATCH YOUR LANGUAGE

Programming languages bring out very strong feelings in people, especially programmers. The advantages of C over Pascal, Pascal over BASIC and BASIC over C promote a never-ending cyclical debate. Which one is right for you, and which are the latest contenders? Read on, find out, choose...

Once you've tried of Teresco, when you're weary of Word Perfect, when you've done steps by Degas you may start to wonder if there isn't more to life, and computing in particular, than running programs other people have written. What about writing your own? If you've tried using ST or large BASICs you'll know something of the problems and triumphs that programming can bring. There are plenty of languages other than BASIC though, each of which has its own advantages and drawbacks.

BASIC

The most popular programming language for novices, and entirely neglected by those who haven't used modern versions, its advantages are its friendliness to the first-time user, its attractiveness and its forgiving nature with errors. Antique BASICs like ST BASIC gave the language a bad name, being slow and hard to program. Super modern versions can be very good - often having compilers and structures like procedures borrowed from "better" languages. BASIC is a good all-rounder, and the modern versions are suitable for the computer, but handling and graphics work, though they are normally well as fast as C or Pascal because they tend to be interpreted not compiled.

C

Probably the second most popular language, C claims to offer near machine-code speed without all the complexity of low-level programming. There's no doubt that C is fast, and many business programs are written in it for this reason; it is also very portable from one machine to another. C can be a little hard to understand at first, as its source code is not as self-explanatory as some more verbose languages. The structure of the language though, allows you to do almost anything you like with the

machine. Watch out for C's lack of error checking though. Obscure bugs can produce the strangest effects in C programs. It's a good, multi-purpose language.

Pascal

One of Pascal's main tenets is to produce very readable source programs; it also happens to rigidly constrain you to make you write good code. Pascal is only available as a compiler and is good if you like a language to check what you're doing. It is happy to throw up all kinds of error messages during compilation to let you know of syntax and program errors before you get near to running the code. Pascal is particularly good for writing long programs, as its imposed structure makes the source code maintainable. Its string handling is not as advanced as BASIC's, nor is its machine access as good as C's, though it has still been used to write word processors. Good compilers can produce code as fast as C.

Modula 2

To some extent Modula 2 is a rewrite of Pascal, but with a major change to its design philosophy - the idea of modules. As parts of a program are completed they can be stored in libraries and combined together into the finished program. Modula 2 is the second of the more programming languages, but compilers are available for both ST and Amiga and offer many of the advantages of Pascal with the bugs fixed (eg, dynamic strings), plus the development speed advantage of separate module compilation. Some modern Pascals have tried to get round this by adding modules to their compilers as an extra-credit.

Assembler

Because compilers generate machine code by set formulas, high-level lan-

guage programs are rarely as fast as if you write them directly in Assembler yourself. Assembler is very hard to write because it takes you 10000 lines to do what 2000 lines of C would do, and any mistakes usually cause an instant machine crash! If you need really fast code, most languages let you write the critical sections in Assembler and leave the rest in C or whatever. Most business programs are written in a high-level language, though games are still done in Assembler because that's the only way to get really fast graphics in the smallest possible space.





And the rest

There are of course dozens of other languages with their fans. **Forth** is quite different in design from most other languages. It's written in an assembler-like mnemonic form, and works with a "stack" of numbers rather than providing variables in the conventional way. It also uses "Reverse Polish Notation", which is like adding numbers backwards. It's hard to give the bang of it at first. **BOL** is a historical oddity when Commodore launched the Amiga, their plan for the operating system fell through at the last moment, and they bought an adaptation of the Cambridge University "Impar" operating system, which happened to be written in

BOL. **C** is a later derivation of BOL. **Prolog** and **LISP** are two artificial intelligence languages good at solving sentences up the brain, verbs, etc., and of course **Basic** is the now standard processing language for controlling transducers.

So which one's for you?

As always, and without wanting to copy out, the best choice of language must be your own. You should look at the particular program's you want to write and analyze the features that will be most important to you. Don't dismiss BASIC as the language prods would have you do - the friendly development environment it offers is a real

help. If you want to call programs you'll need a BASIC system with a compiler, to be able to generate standalone programs that don't need the interpreter on disk too. If you want to write complex games, maybe existing on graphics applications, consider making the extra investment of time in learning GEMC assembler for general applications. C seems to be far and away the most popular language at the moment, and so has the best support: the Amiga technical manuals give all their examples in C, for instance; if there are going to be lots of different programmers, you may find the structure of Pascal makes the code simple to integrate and debug.

COMPILER COMPANION

Lattice also created a "Compiler Companion" kit with two disks to help programmers in other programs - Pascal, C, assembler, the rest. If you're used to a UNIX environment this kit will make you feel at home. DTF and SP431 support the update files, EXTRACT and RUCDistribute both find, FUD is the search, GDF commands for text in files, LMS and TOUCH "Make" type editors to keep source files, keeping source and object files in files, PC board board and XCOPY to C-compatibility paths for local file systems, etc.

If you're writing really big systems with dozens of modules, or are an experienced GEM programmer, you'll find these very useful, but average users can probably get by quite happily without. Call in (24) from Motorola.



Lattice C 4.01

All Amigas
2 drives recommended
\$215 (standard), \$215 (developers) ■ Rowland Computers

Lattice Systems in the States have a pretty good reputation for selling robust programming tools, and it's no surprise that their Lattice C has become a standard. Version 4 is a major overhaul of version 3 (lots of number theory should not be too

surprised at that), and continues the endless struggle for faster but smaller code.

The package comprises four disks, of which two are necessary for the load sequence and general compiler operation. The final two disks are a collection of utilities, examples, header files and other goodies. The boot disks have been very well set up, so there is almost no installation needed, and back the disks up and mount your Amiga. All the logical drivers are installed for you so that the compiler and linker will find the libraries without you worrying about path names. The only exception is that

there are no printer drivers at the boot disk, which means printing your first listing very hard work!

Also included in the boot sequence are two PD editors, ComMan and PopCUI. ComMan modifies the CLI so that you can retrieve and edit your last few command lines - invaluable when later commands specifying half a dozen libraries can stretch to two lines! - and PopCUI lets you open a new CLI window at any time by pressing `AmigaCtrl - equal` - invaluable when your program crashes and you can't find any commands. It goes without saying that it is assumed if you are lucky enough to

LATTICE C ON THE ST

EMM 85 ■ META/GENCO ■ NEWS ■ ONE 200K OR TWO 300K DRIVES
16-bit Motorola have done a licensed implementation of Lattice's Amiga code on the ST, but as yet this is still the older version 3 system. However, the way of recompiling them is many times easier which brings the system up to Amiga's "strongpoint" level.

As the ST has no standard text editor, Lattice comes with a simple one. It uses GEM menus and conventions, but is hardly inspiring. It's a stand-alone editor, so there is no integrated error flagging from the compiler. It's just about feasible to run Lattice C on a single drive ST (stand alone drive) but it helps if you've got a 1040 or Mega and can run a RAM disk up.

There is a "trace shell" system to give you a rough and ready edit/compile/debug time run environment. A "BASIC" utility helps you bring your object code sources files to life. Lattice's Amiga Lattice C, there is no GEMC assembler provided. An extremely useful symbolic debugger is provided, which allows you to trace your program's execution step by step, print out the contents of named variables, and otherwise spot your programming errors at run time.

If you don't specifically open a GEM window, standard output goes to a simple TUI text stream, and control returns to the GEM desktop when the program finishes (keeping your output off the screen).

Overall, it's an excellent system for the serious programmer, producing very efficient code, but it doesn't make too many efforts to be friendly to novices.



■ Lattice C on the Amiga has a very simple compile-and-link command: `cc -c` and does it all for you for the file `RAM`, in this case.



■ AmigaBASIC gives you a nice friendly environment where you can see the program's code and output in separate windows. Debugging left is easy with a compiler.

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DEVELOPERS EXTRA

Search no longer for the extra 1000 characters in the Developer's version of Lattice C! The first thing is a decent text editor, so provided from ED and the window (Edit) - Edit. Also provided is Metacopier, a symbolic debugger to help you trace program execution, a Make* ability to keep libraries of modules up-to-date, and a linked editor. All very useful, and to say everything is written in programming, but you can't help feeling they ought to be in the standard package, especially to they write the OS.

with C you are so fat with the Amiga's GUI - to cuddly workbench soon has, really.

So you start to writing your first C program. One major problem from the standard Lattice system is a bad editor. Either you look at the extra 1000 for the developer's version (see margin table), or you use the Amiga's very own ED.

Easy as A, B, C

Compiling a program is made as simple as possible. To compile and link a file TEST.c into a runnable program you would just type `CC -L TEST.C`. The resultant file TEST can be run as a stand-alone GUI command. You can compile and link separately if you want to - the linker is version 7.3 of the PD BLINK linker - and you can also run only the first pass of the compiler, to check for syntax errors in long programs.

The compiler's error trapping is a bit mixed, it gives out the line numbers if given, are very accurate - error on line 115 really means line 115 - but it is impossible to suppress location errors. For example, on one test file we entered a `{};` comment terminator off, resulting in a 'illegal macro usage' 100 lines later! It is very good at giving warnings that can reveal bugs,

LATTICE C
LATTICE C DEVELOPMENT SYSTEM
METACOMCO

such as using uninitialized variables, or misplaced semicolons in if statements that mean control can never reach a certain line.

Speed 'em up

Compilation speed and link time have been greatly improved over version 3. Code sizes have generally shrunk by 20%, but any speed-up of final code is variable. Lattice uses the R32 multi-iterators have been turbocharged by a factor of 5, but on simple arithmetic you won't notice much change. 16-bit integers are now properly supported, some common string functions that are usually library calls are now built in to save space in the final code, and the linker can now handle true overlays for those really whopping programs.

One nice option is the ability to specify whether code is to go into Fast or Chip memory - this is handy for graphics programming as the Amiga screen buffers can only access the 512k of Chip memory, if

you're of a mind to write 65500 code you can't include it into a C library routine, pretty well. Small code fragments that you want to include files you need, and show you the gist of the usage. Regrettably there is hardly any attempt to explain screen in AmigaDOS - you're left to plough through the standard MOS Kernel manuals yourself. There ought to be some extra libraries of single 'type window' commands to aid users.

Lattice C version 4.1 is undoubtedly capable of producing superbly compiled code. Programming in C is with the action is, by popular vote, and the serious programmer who needs efficient code and detailed machine access will look a long time before leaving Lattice C.

features

performance

ease of use

support

format value

for

- Simple installation
- Easy compile and link commands
- Fast, compact code
- 65500 assembler built-in

against

- Editor and debugger should come as standard
- Unfriendly environment for novices

MCC PASCAL 2

Amiga version reviewed, \$5 version also available
199.95 ■ Metacomco

There can be few who doubt realize the connection between the Modula-based company Metacomco and the Amiga - AmigaDOS, the computer's multi-tasking operating system was written by Metacomco. Despite the pre-eminence of C for system programming, there is still a hard core of Pascal-using Amiga owners, and Metacomco released MCC Pascal 2 provide them with the same system-level access as C. The new version, Pascal 2, has been considerably

upgraded, with many new features and a good few 'problem' fixes.

New features

There are a number of additions to the original version of MCC Pascal, the most significant of which is the ability to compile separate modules which can be linked together after compilation to produce a finished program. This means that once a section of code has been written and satisfactorily debugged, it can be combined with further code without having to be recompiled again.

This technique speeds compilation of large programs, which can now be sub-divided into several small

or modules, and lets you build up your own library of commonly used procedures to incorporate into your programs. MCC Pascal handles modules via three new keywords: `MODULE`, `IMPORT` and `EXPORT`. `MODULE` is used instead of the keyword `PROGRAM` to build a source module, and `IMPORT` and `EXPORT` are used to declare procedures or functions within the module and programs so that they're prepared to link with each other.

Dynamic strings are now supported, along with functions including `CONCAT`, `COPY`, `DELETE`, `INSERT` to manipulate them. Standard Pascal only considers fixed length arrays of characters and leaves you to write



your own functions to handle them. The new facilities certainly make life a bit easier.

Random access files are now supported too, so programs such as databases or accounts packages are much easier to implement. New keywords are introduced to handle random access files, and include functions to return the current position of the file pointer and to reposition it to a defined record.

Other useful additions to the language include bitwise operators to manipulate bits within bytes, STEP in the FOR structure and OTHERWISE in CASE statements. There are even GOTO and GOSUB statements (Stack/Format - EG, though quite what use these have on an Amiga is not clear. Expect a fairly heavy use from the Goto if you use them - seriously.

Edit, compile, link, debug

The process of program development follows a cycle of editing, compiling and linking to other program mod-

GREEK, LATIN, PASCAL AND C

The first computer program ran at Manchester University on June 21st 1948. This was effectively written in binary: the operators worked out which bits of each word needed to be on or off, stored a few variables on the first panel, and out things go. As a result, only the machine designers could actually program it. The first 'language' was assembly. A clever student decided to write a program that would read a file of short instructions ('mnemonics' are memory-lugging abbreviations) and convert it into binary automatically.

In 1954, John Backus got fed up with being patronised by physicists to write programs for them, and decided to devise a system to let people write their own programs without intimate machine

knowledge. FORTRAN (Formula Translation) was the result, compiling its first program in 1957 on an IBM 704 computer. The business-friendly nature of the FORTRAN tool allowed more scientists to write programs - developed COBOL (Common Business Oriented Language) in 1960. Between them, FORTRAN and COBOL, still dominate the world of programming, to the regret of many.

About the same time, the end of the 50s, the academics struck back, John Backus, realising his mistake in FORTRAN, helped design Algol in 1958. This brought the concept of procedures, local variables and recursion into the world, and at

least is very similar to today's Pascal. John McCarthy (no relation) developed LISP in 1960, still regarded today as an exciting language for artificial intelligence work.

The 60s saw a split in the language world, either people opting for complexity and others for simplicity. In 1968, the Algol team went to re-write the language. They pulled dozens of other features into it, and so academics, the Unix (Unix World, was so favoured by the result he went all out and designed a really simple-looking version of Algol, called Pascal. Familiar? Ten years on, he has indulged in a re-writing exercise, turning Pascal into Modula-2. Also at the point to make programming simpler, Kenney and Korth invented BASIC in the next 10s.

In 1971, a Cambridge academic designed a simple language called BCPL (the inventor, Martin Richards, says that the CPL did stand for Combined Programming Language, but he isn't sure whether the B stands for Basic or Beginners.) This achieved worldwide obscurity, until Alan Kay (Thompson and Ritchie modified it to become the language B, then a new version called C in 1973. By an accident of history (no-Cambridge 60s drama across the pond), BCPL was also the language chosen to write the Amiga's operating system.

METACOMCO PASCAL

AMIGA
SOFTWARE

2

Software for the AMIGA

and, using your errors and correcting. The quicker and easier the environment (editor, compiler etc) can make this process, the more useful the system will be, and the more programmers are likely to use it. Metac Pascal handles the compilation part of the cycle, leaving you at the hands of ED for your editing and left to your own devices for the logic errors.

The compiler itself is hooked from the GUI and the linker can be called to follow an format, automatically. It would have made life a bit easier to have an integrated editor-compiler which could bring you back to the source when compiler errors are discovered. The linker is the old linker LINK as on the Amiga master disk (apparently written by Alan at Metacomco, hence VLINK). The best way of setting up the compilation process, particularly when specifying paths to the source or object files, is as a command file. This can be written in ED and then EXECUTED to call

the compiler.

Compilation is reasonably fast. Though a program of any complexity is likely to make many calls to the library routines, more of which later. The compiler and libraries are fairly compact, so you can get the lot on a single disk, so it's therefore feasible to run Metac Pascal from a single drive machine. Overall the compilation/link cycle is fairly long winded, which puts an extra burden on the programmer to get the code right first time.

Library routines

Metac Pascal is a specific implementation for the Amiga, and so such contains external function calls for many of the low-level ROM kernel routines. This is fine for the system program man, who is prepared to wade through the ROM kernel manuals and wade through file contents (only a list of the calls is provided in the Metacomco manual, but is not really adequate for applications programmers).

The person who needs to put together a program for an end user doesn't want to get involved with

development tools or compilers or linker tools. By all means provide these routines for those who want to tweek the Amiga's innards, but also supply options (color GUI, 31, 32, 70, ...) for the 90% of programmers who want to put together their own applications, fast. The Amiga's operating system is complex, which is even more reason to have pre-packaged standard functions for simple graphics, form design and window and menu handling. Without them, the language is restricted to the systems programmer who is happy to work with kernel calls.

Metacomco want to sell the language to home users, rather than just to professional software writers, just a friendly user environment and some Amiga specific extensions to the language are badly needed.

ERROR NUMBERS

There are three main types of error in programming with a compiler. Consider errors are pointed at by the compiler when its actually compiling your program. These include syntax errors, undeclared variables, and so on. The time errors occur when you're a user-compiler compiled program which contains things like division by zero or requests moving register numbers. Getting a program to work, the final step, and usually the hard bit to spot, are errors in the program logic. Here the program matches the code you wrote, but what you wrote was not what you meant!

for

- Separate compilation to linkable modules
- Random access file handling
- Extensions for dynamic string handling

against

- No high-level extensions to handle Amiga specifics
- No integrated editor/debugger environment
- Complicated compile/link setup

features

performance

ease of use

maintainable

format

value



AMIGA TOO

GFA SystemTools are currently working on a compiler for Version 3 of the G. Glendon are reporting to SHG that finished copies by late 1988. In Amiga-GFA-BASIC Version 3 system is due a couple of months after that. The design compiler will be available by early sometime in the new year.

GFA BASIC 3

ST only, Amiga version due November

£64.95 ■ Glendon with over 50,000 GFA BASIC 2s sold worldwide, it's not hard to understand why SystemTools — or rather Frank Ostrowski — decided to write Version 3. It's not a simple upgrade either, but a complete re-write: greater speed, more commands, longer and better manual, enhanced editor.

Integration in GFA's tools, program creation, debugging and restore fail at start from the same place. The editor, at word processor quality, checks the BASIC syntax as you type in commands, indents instructions with loops, FOR NEXT, DO LOOP WHILE, REPEAT UNTIL to format them and displays commands in upper case. All worthwhile stuff that saves much of the drudgery out of program development and goes one-way to creating bug-free software.

Further editing commands let you delete and restore lines of program, mark, copy, move and delete blocks, jump to top or bottom of the program and find and replace instructions. Functions are accessed either via key

GFA-BASIC Interpreter for the ATARI ST

sequences or from a menu bar at the top of the screen.

Beyond the editor

Other options — like coding and saving files, changing ASCII files, dumping files, switching character sets (more

only), testing for loop constructions and running a program — are accessible from the menu bar. An immediate or direct mode also exists, but is limited to a single command like PRINT 4, 5.5, POKE 57248,22 and the like.

Writing programs is one thing, having efficient commands to do specific tasks is another. GFA is furnished with powerful instructions that often replace groups of commands from other dialects of BASIC. For instance, GET and PUT allow software sprites to be manipulated effortlessly. FOCUS and FOCUS2 help you show pattern-filled shapes very quickly; menu bars and windows can be set up and interacted with. OPEN and ON MENU GOSUB, GOSUB and the deeper GOSUBS are well covered, so things BASIC can be handled with confidence.

Upward compatibility

Version 3 can run programs written in other versions of GFA BASIC, but they must be stored in ASCII files and then MORGE3 into the new BASIC. After that the normal SAVE and LOAD

VERSION 3 IMPROVEMENTS AND ADDITIONS

The manual — which used to be a 300 page job after sustaining almost no editorial — now stands at 500 printed pages. Getting up program commands and GEM handling are much more clearly explained. However, that is still published on a substantially bright red paper (if photographing it and you'll see why — 54).

Menu bar options have been increased. The most noticeable addition is the Atari symbol at the left edge of the menu which, when clicked, brings up another menu bar. 'Better' makes it possible to alter the appearance of the program being run, except after the first character in every line, or all characters in the listing, can be forced to upper case automatically. 'New name' tells the computer to check for any new variable being entered — useful when long variable names are in use.

Procedures on the editor screen can be 'folded' (shortened) to just their definition line. The procedure code isn't affected, merely its representation on screen, which makes for short-clear listings. Multiple functions are also supported.

Several existing commands can now take extra parameters, thus increasing their usefulness. FIVE now determines any of 12 variable categories, ONE can produce a string from a number with extra options for specifying length and decimal place (many other string handling instructions have been treated in this way). ERASE can delete several specified arrays in one go and ON GOSUB allows multiple branching (GOTO, GOTO2, GOTO3, GOTO4, GOTO5, GOTO6, GOTO7, GOTO8, GOTO9, GOTO10, GOTO11, GOTO12, GOTO13, GOTO14, GOTO15, GOTO16, GOTO17, GOTO18, GOTO19, GOTO20, GOTO21, GOTO22, GOTO23, GOTO24, GOTO25, GOTO26, GOTO27, GOTO28, GOTO29, GOTO30, GOTO31, GOTO32, GOTO33, GOTO34, GOTO35, GOTO36, GOTO37, GOTO38, GOTO39, GOTO40, GOTO41, GOTO42, GOTO43, GOTO44, GOTO45, GOTO46, GOTO47, GOTO48, GOTO49, GOTO50, GOTO51, GOTO52, GOTO53, GOTO54, GOTO55, GOTO56, GOTO57, GOTO58, GOTO59, GOTO60, GOTO61, GOTO62, GOTO63, GOTO64, GOTO65, GOTO66, GOTO67, GOTO68, GOTO69, GOTO70, GOTO71, GOTO72, GOTO73, GOTO74, GOTO75, GOTO76, GOTO77, GOTO78, GOTO79, GOTO80, GOTO81, GOTO82, GOTO83, GOTO84, GOTO85, GOTO86, GOTO87, GOTO88, GOTO89, GOTO90, GOTO91, GOTO92, GOTO93, GOTO94, GOTO95, GOTO96, GOTO97, GOTO98, GOTO99, GOTO100, GOTO101, GOTO102, GOTO103, GOTO104, GOTO105, GOTO106, GOTO107, GOTO108, GOTO109, GOTO110, GOTO111, GOTO112, GOTO113, 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DELUXE PHOTOLAB

When Electronic Arts released the phenomenally successful *Deluxe Paint II* art package they gave themselves a bit of a problem: how on earth do you follow that? The answer, it seems, is *Deluxe Photolab* — Ben Taylor picks his way through the pixels.

BRUSH OFF

It seems only fair to be reminded of the use of the word 'brush', as the simplest brush a brush is much like an eraser — in an *II* package like *Deluxe II* — you can click on menu choices to change the drawing cursor to a brush, squiggle, spray, or whatever. However, on the *Amiga* you can also make any part of the screen, to matter how large, and use that as a brush. This is how *Amiga Paint* packages implement moving and copying bits-of-it-a-picture — define it as a brush, and you're done. The whole area of its destination. Moving areas of colour can't be moved around really fast by the *Amiga's* famous *delta* key.

£99.95 ■ Amiga only, requires 380
Electronic Arts ■ 11-49 Station Road, Langley, Bucks, Bucks SL3 8PW
0293 494421

What you get for your money with *Deluxe Photolab* is a three separate programs, designed to complement one another. First and foremost is a paint package which can work in any *Amiga* graphics mode; second is an image processing utility program called *Colors* (English translation: *Colour*) to convert pictures from one screen mode to another among other things; and finally *Painters* prints out your pictures as a series of up to 10 foot squares!

Photolab Paint

Photolab can work in any of the *Amiga's* screen modes. When you first run it you are presented with a menu screen offering any mode from low resolution (320 by 200) to high resolution (interlaced), and most importantly the 4096 colour HAM mode. You can also select how many 'bit planes' to use: 1 bit plane gives you



2 colours (black plus another), 2 planes 4 colours, 3 planes 8 and so on, subject to the limitations of the current mode.

Users of *Deluxe Paint* will immediately feel at home with *Deluxe Photolab*, it uses many of the *Electronic Arts* standard conventions

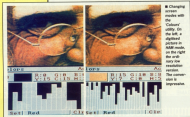
— define a brush with the right mouse key to move it, or the left mouse key to copy it, use the space bar to halt any operation, and so on. The colour palette is displayed on screen and also on a separate palette editing screen — you can specify a colour by eye, or by choosing Red/Green/Blue or Hue/Saturation/Brightness values. You can also specify start and end colours, and ask for a smooth sequence of shades to be created between them.

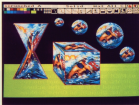
You can define brushes in the usual *Amiga* way to enjoy areas of the screen around, in *HAM* mode brush redrawing is very slow, and you can't keep a smooth line. This is because *HAM* brush work is done under software control, not by the *Amiga*. One excellent bonus is that you can turn-point brushes between different mode screens — define a brush in 4096 colour *HAM* interface mode, and you can go to a low resolution image and guide it in. The conversion is done for you.

A new feature in the *Deluxe* genre is 'brush trapping'. Once you've defined a brush, you can draw any outline you like — a regular or freehand shape — and the brush is stretched to fit it. Squircle a brush into a circle and you'll give the impression of things trapped in a bubble, for instance.

Another powerful feature is shade control. When drawing any shape to be filled, you can ask for the filling to be graduated. You can define a 'topcap', where the fill colour is solid, and it tapers away as you go retails outwards. You can adjust how fast it tapers off, and you can also 'fitter' the shading so it either looks like contour lines (as shown) or is a smooth mix (made of dither). There is, however, no support for ray tracing — in *Paint* you can ask for a scene to be highlighted as though there was a light source at a given point.

All the regular paint features are also present, of course. Magnify





■ 'Break Warpings' is a new feature for the Deluxe series - here we've broken Russian Roulette into all manner of shapes.

mode shows you both enlarged and normal size screens at the same time; brushes can be rotated and resized as you like; the undo seems very good and covers almost everything, including bits that have gone away. There are more paint modes than there are ads for: calligraphers in the Sunday Times Magazine - look, MG, OR, Bendi, Ma, Baa, Ma, Mii, Subtree... together, they give you the power to mix pixels in any way you like. Images can be animated as they are created, to smooth any jagged/real, and you can turn areas of a picture into greyscale black and white if the urge takes you.



Colors

Colors gives you a whole host of useful image processing functions that presumably couldn't be fitted into memory at the same time as the paint program.

First, it can convert any resolution picture to any other. It tries to demosaic to do the best possible job, and even converting a 4096-color HAM screen to a low-resolution image you'll be surprised how good

The Amiga has half a dozen different screen modes. On 2K machines, low resolution is 320 by 200 pixels, and can use 2, 4, 8, 16 or 32 colours. High resolution is 640 by 200 pixels, with up to 32 colours. In addition to this, you can run the machine in 'letter-size' mode which doubles the vertical resolution to 312 pixels, making it much squarer image. However, unless you have a long persistence phosphor monitor, interface mode means flicker gets noticeable.

The Amiga only supports 32 colours directly, but there is a trick which allows you to double this called 24K mode (Extra Half Bits). Normally, 3 bits

per pixel gives you 32 colours. 24K uses 6 bits for 24 colours, the extra 32 colours being the same as the first 32 except at half intensity. (Some early Amiga 500s don't support 24K mode.)

So far, this doesn't sound exceptional. The reason the Amiga is such a stunning graphics machine is that there is another mode called 288K (True Art Beauty) which can display all 2886 possible colours at once on a high-resolution screen. 288K uses 1 or 8-bit planes giving 160 or 16888 colours. The screen is then a pixel can be set up to use the colour of the pixel next to it, but with one of the red, green or blue components modified.

For you?

Deluxe Paint64 is simply the best argument there has been for exceeding your memory to a full 1MB. It takes a powerful paint program which loses everything else standing (including Plotter Paint) and combines it with an invaluable set of image processing tools in Colors. Coupled with a digitiser, this is the way to push the Amiga's screen to its limits.

for

- Paint package works in all screen modes
- Can work on images bigger than screen size
- Brushes can be stretched to fit any shape
- 'Colors' utility converts images between resolutions
- Excellent manual with tutorial examples

against

- Won't run on unexpanded 500k (needs 1MB)
- No digitiser support

Posters

Posters combines the Deluxe Paint64 trio, providing a utility to print pictures out at any size. You can choose the paper to be Portrait or Landscape file, printed tall and thin or short and fat - Landscape is a better approximation to the screen size. You can spread the picture up to 16 half squares over 200 sheets of paper, and Posters will calculate the page breaks and send the image out for you to paste together. Just think though: 200 sheets of high quality paper could take 15 hours or more, not to mention getting through a dozen of those good old German award colour printer ribbons!

Plot64 comes with the WorldArch 1.3 printer drivers, so there is direct support for 24 pin printers, and is theory all the printing works a bit faster.

AMIGA SCREEN MODES

Resolution

320 x 200

Resolution mode

320 x 200

Screen of use

320 x 200

Resolution

320 x 200

format value

320 x 200



PATCHING THINGS UP

Many people know of MIDI as a musical interface standard for tying instruments, effects units and mics together. It can also be used to transfer the actual sounds of the instruments, though, as Chris Jenkins explains.

Will you ever realize that your ST or Amiga can become the centre of an electronic music system which would make musicians of us little as the years go collapse with awe. With the help of MIDI, affordable computers like the ST and Amiga have found a place in every sort of music, studio from four-track in Finsley to digital in Detroit.

But are you aware of all the possibilities musical applications for your computer?

MIDI music software for the ST and Amiga falls roughly into three categories. It's for the most popular and immediate is MIDI sequencing, by which performances on MIDI synthesizer keyboards and other instruments can be recorded, edited and re-arranged. At the more exotic end of the spectrum are packages to automate the mixing process, print out music scores or create sounds by learning synthesis. In the middle, the application which attracts most attention after sequencing, is patch editing.

In the beginning...
The original synthesizers bristled with knobs and switches, one for each

sound parameter such as filter settings, envelopes, waveform and modulation. This hardware was expensive and unreliable, and didn't allow sounds to be recreated after use, except by painstakingly re-wiring all the settings. The logical step was to

replace this with a digital patch editor, especially with complex synths which can have over 200 sound parameters.

Patch editing software restores the visual aspect of sound creation, allowing you to see the status of all the synth's sound parameters on your

SOUND SAMPLE

Digital synthesizers can store accurate reproductions of acoustic sounds by 'sampling' them. This technique is also used in making a digital 'recording' of the sound and storing it in memory on a disk.

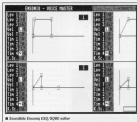
THE ART OF NOISE

Like many musical software applications, patch editing has its own jargon, which can often be traced back to the earliest synthesizers.

When Bob Moog developed the voltage-control synthesizers,

filters and envelope shapers which made practical synthesizers portable, electronic circuitry was bulky and limited. The first synthesizer voice 'modules', constructed from separate components, each linked together by 'patch cables'. Each different voice would require a different pattern of connections and performance settings.

Later synths used pre-wired boards instead of patch cables, and eventually the whole process became digital. With the introduction of the Sequential Prophet 5 and other polyphonic, programmable synths, all the sound modules were hard-wired together, and the patch settings and sound parameters were stored in volatile digital memories. Despite this, the phrase 'patch', meaning a particular group of sound settings, remains in use.



■ SoundFile Expert 833/8385 editor

put sound creation under digital control. Practically every modern synth since the Yamaha DX7 uses 'digital access' editing. This means that with the help of an LED or LCD display, and a slider or numeric pad, you select the number representing the sound parameter you wish to edit and enter a new value for it, which is stored in memory. A complete sound patch can then be assigned an internal memory position, recalled for use at any time, and in most cases recalled in later requirements. Some synths store as many as 256 sounds on board, with more on relatively expensive cartridges or memory cards.

Digital access editing is cost-effective and reliable, but can be

display Amplitude and filter envelopes can be represented as graphs to be manipulated on-screen, and impressive functions such as Yamaha FM algorithms make much more sense when shown in graphical form.

Patch editing software also makes available facilities like semi-random patch creation, and in some cases the conversion of sounds from one synthesizer to another. Another advantage is the possibility of storing all your sounds on cheap floppy disks rather than expensive hardware cartridges. You can manage to cram almost 2000 DX7 sounds on one £1.50 blank disk; compare the expense of storing that amount of data on cartridges at around £75 for 256 patches! You can end up using a



HOME ACCOUNTS

Keeping track of your money can be a complex business these days what with HP, credit cards, cash cards and so on, not to mention standing orders of varying frequencies and amounts. Pat Winstanley tots the points up for Digita's home accounts package.

RECONCILIATION

Reading a bank statement can be a boring experience until you learn that most cheques and deposits may not yet have made it through the clearing system. To find your real position simply tick each debit on the statement against your cheque stubs and standing order list, and credit against wage (cheques etc). Then tick off any unreturned cheques off the balance and add on any standing deposits to find your true position.

ST version reviewed, Amiga version due in August

£29.95 ■ Digita International, Kelsey House, Bains Road, Buntingford, Devon EX3 6HU (0399 45090)

Home Accounts aims to provide you with a simple method of keeping track of your monthly budget. It's intended for home use, and as such prefers simplicity to full business accounting functions. The disk and glossy 40 page manual cover the program itself and a very short demonstration file with just a couple of entries to show the format and commands used.

The system can handle up to 12 months' data on file with 12 different accounts and up to 500 expenditure items. Up to 100 different standing orders may be entered and 350 transactions for each account which should be enough for even the most compulsive spender.

Having backed up the disk, load the program and set the date, your first task is to feed in details of

the various accounts you will be working with eg, current, deposit, credit card etc. Up to 12 accounts may be defined each having space for account number, name and type and a two letter code by which the program will recognise it.

Setting the scene

Other account details include the optional setting of minimum and maximum balances for the account which could be useful for monitoring interest received from savings accounts and avoiding going overdrawn. The first option allows you to set an opening balance for the account. Additionally you may call up a 'memo pad' where extra details can be recorded as notes. These are ignored by the system but can be very handy.

Next you need to define the vari-

ous types of transaction, giving each an abbreviated code for the system to recognise. This will be used later if you want to take advantage of the optional budget facilities. Each type of expenditure is given a unique code such as MOG for mortgage, ELEC for electricity etc.

Having defined all your accounts, and typed the next step is to set up transactions for each. These are divided into regular and manual entries and each is treated differently by the system. Regular transactions are those entries which are known in advance both by payment date and amount. The standing orders for mortgage, gas etc. will go here. You may also have a regular transfer of funds from one account to another, say for savings, salary or housekeeping. There is also space to make comments which will be shown on later reports.

Manual transactions are used for cheques, variable salary, cash with draws etc. Since these are not known in advance they must be entered for 'posted', in accounting parlance posted as and when they occur. They are set up in much the same way as regular transactions but are posted to the accounts to which they apply rather than details for all accounts being mixed together. An additional facility is available whereby transactions may be marked so that they do not appear in the final report until they have also appeared on the bank statement. This allows unreturned or uncashed cheques to be seen at a glance.

The posting of transactions to the various accounts is performed automatically by the system. It works on the basis of the difference between the date that the file was last saved and the date you find in a current. Any transactions in the file which are dated in between will be

Bank File System Account 0001 Report										
Regular Transactions										
Start	End	Exp	Date	Type	F	From	To	Details	Debit	Credit
21	Jan	00	01	01	00	0000	0000	gas rates	47.00	
21	Jan	00	01	01	00	0000	0000	water rates	25.00	
21	Jan	00	01	01	00	0000	0000	transfer		500.00
21	Jan	00	01	01	00	0000	0000	postage	10.00	
21	Jan	00	01	01	00	0000	0000	salary		750.00
21	Jan	00	01	01	00	0000	0000	phone	50.00	
21	Jan	00	01	01	00	0000	0000	insurance	10.00	
21	Jan	00	01	01	00	0000	0000	electric	10.00	
21	Jan	00	01	01	00	0000	0000	gas	40.00	
21	Jan	00	01	01	00	0000	0000	mortgage	200.00	
21	Jan	00	01	01	00	0000	0000	water rates	40.00	
21	Apr	00	01	01	00	0000	0000	gas rates	47.00	
00	0	0	000	Update	Enter	0	00			
ACCOUNT REPORT	DATE	START	END	DEBIT	CREDIT					
0000000000000000	0000									

■ Setting out your regular payments - standing orders - in these accounts

SEEING DOUBLE

Home Accounts uses "double entry bookkeeping," which for the uninitiated is simply a matter of fabricating a credit in one account with a debit in another. Thus a cash post with 20 new dollars, your bank account and credits the cash account in your pocket, while every post into your bank credits that account and debits your employer's bank. A new 13 debits the bookkeeping and credits the bank new stock account.



► Two ways of seeing how badly overdrawn you are. Bar Graphs and Pie Charts are just two of the ways of presenting data in reports.

applied to the accounts to which they relate to produce an up-to-date balance.

Now the news

Of course, all this work would be for nothing unless the results of all the transactions could be shown, and Home Accounts has a comprehensive reports menu.

Any account can be presented in the form of a bank statement either to the screen or printer. You can choose whether or not to include unrecorded transactions such as unrecorded checks, which months to display, and even which types of transaction should be included.

Another option is the facility to search for and display any transactions whose details you define according to the comments you've entered in the files. Thus you could list all the deposits you have made and to a computer stop by making sure that the details of each such transaction contained the name of the stop then asking the program to search for that name. Wildcards are also available to match any characters.

It's easy to forget the exact words used to refer to different types of expenditure so these can also be listed either to the screen or printer, as can a list of all regular transactions for the month.

The manual is divided into three sections, first a general look at the capabilities and limits of the system with notes on computer terminology, looking up data and getting started followed by a step-by-step section on how each feature is used. The third section goes into more general detail of the different features. Although all necessary information is included, being aimed at the home user a little more theory on bank reconciliations and double entry would have been

advisable.

Operating the system is fairly straightforward. The mouse is used to select options from pull-down menus while (Tab) or the mouse pointer are used to place the cursor where required. Some of the editing screens allowed scrolling by means of video player style controls. On the whole I

to see some form of simple spread sheet facilities rather than a static budget account, and such an addition would round the package out. For me it stops just short of being a Really Useful Engine but good value if you're more interested in keeping records than juggling finances.

WHERE'S ALL THE MONEY GONE?

Are you one of those people who can budget their income and expenses in the last penny, never drawing from the net bank? If so, you aren't going to be reading these Accounts anyway. But if you're one of the vast majority whose actual earnings never quite manage to match your budget, then there's a useful facility for you.

Using the codes which were set up earlier you can set up a budget for each type of expected expenditure for the whole of the accounting period. These relate all actual transactions have been posted to the relevant accounts you can use the program to tell you just where and by how much your spending has varied from the budget. The reports can be shown as a list of absolute figures, a bar graph or a pie chart, the pie chart is useful for showing what

proportion of the total expenditure is taken up by different categories, although viewing comparative expenditures or forecasting probably won't test your patience for long.

Each month of the accounting period is shown separately so it's easy to see where things have gone wrong. Strangely, while the representation of amounts is in different coloured patterns on the charts, the key to types is shown in black and white patterns which are indistinguishable from each other. While different types can be worked out by counting along the key on the bar graph, this isn't possible with the pie chart.

The graphics cannot be sent to the printer directly, but may be dumped using the (Alt) and (Print) keys.

found the controls easy to learn and very positive, except for rather sluggish mouse button response at times.

At the end of all this, it's even possible to list just part of a file as a template, say at the year end when all you really want are the regular transaction details together with opening balances.

The bottom line

Although intended for the home user, the program is equally suitable for small businesses, clubs, charities, and education. You will find it far quicker to use paper and pencil for general bank reconciliations etc., but the budget progress reports are definitely useful to see where the spending goes, and much faster than manual methods. It would have been nice

for

- Very quick after initial data entry
- Few things to confuse the home user
- Simple controls

against

- Concepts poorly explained for the uninitiated
- Graphics difficult to print/color/print
- Budget shows what you shouldn't have spent

Features:

1 2 3 4 5

performance

1 2 3 4 5

ease of use

1 2 3 4 5

manuals

1 2 3 4 5

format
value

1 2 3 4 5



A MIDSUMMER SPRITE'S DREAM

If you're a graphic artist, how do you go about designing the characters and backgrounds for a game? And what features do you need in your art package to do it? Nigel Brownjohn, designer of the soon-to-be-released ST *Verminator* from Rainbird, explains a little of the production process behind a major game's graphics.

Providing 16-bit software is a very mixed business. The sense of achievement when a product is released is undeniably euphoric; however, the confident smiles of the production team concerned can mask unspoken nerves and a degree of disbelief that the product will ever truly flourish.

This is not usually the case with 16-bit games, but the call for 16-bit, rather than 8-bit, and complexity of 16-bit software can lead to endless months of worry and backbiting work in all departments. For a publisher to sit idly down and write an article that claims a piece of games software is 'hot enough, and I've already shiny games become such misses, but to

blindly chase the production team into the bargain without bothering to ask them why they think their product is a little weak in certain areas seems rather like a game title short of the mark. It is not necessarily due to a complete thing to rile the public off, as some articles would have you think.

Problem page

To produce a piece of games software in theory is relatively simple; in practice this is definitely not the case. When designing a game it is best to take into account that any small thing that can go wrong will go wrong. Money problems, ill health, unfore-

seen difficulties and an army of other graphics, all seem to appear as you as a project gets under way. If the production team doesn't care about the game they're creating, then many of these problems don't occur and the production time is relatively short and uneventful. Producing bad games is easy!

The best 16-bit games appear to be those which have had a year or two's work put into them. I think this is evident in games such as *Life* or *Dungeon Master*. The progression of games software onto the more powerful machines with their increased graphics potential has likewise increased the relevance of the graphic artist: steady graphics are no

Nigel Brownjohn is a freelance graphic artist. His early experiences included the graphics for Terry's *Snake a Snake*, *Master's Journey*, *Star*, *Witch* and



Two Palace. His first ST project was *Metamorphosis*, and a lot of his time spent on this game was the forthcoming and highly original *Verminator* for Rainbird.



Verminator, one of Brownjohn's more creative designs



■ Two scenes from "Adventure", Brenda's forthcoming game from Bantam. It's a weekly graphics adventure where you play a three-fingered colored Snake Collector with a trail to clear up the debris of Chaos, a microscopically parallel dimension with more than a passing resemblance to the inside of a trial jury (the tree has claws, canines, fangs, a mouth and a kind of excited behavior). The aim is to become rich and successful and there's a number of ways of going about this. You can kill pests all day - with your hammer, bricks, levers and voodoo boards - to earn money the hard way, or you might try harvesting a reputation by taking on the more rugged job assignments. Alternatively, you can arrange yourself the coordinates with both the bank and the mob and simply refuse to pay them - thereby earning yourself up as a hero of the anonymous debt collectors. Or you can simply spend all your time in the casino and gamble your way to the top. (Should a lot like this, eh?)



A LIFE IN THE DAY OF A GAME

The work involved for the graphic designer naturally varies depending on the nature of the game. If I'm being commissioned to do a conversion of an old game, then I'm usually just taking the original graphics and re-drawing them in a higher quality, as I'll show very clear signs to aim at.

Sometimes I suggest a game to a particular software house, after times they approach me with an idea, and I work up a design for it, however tend to like a good few explosions and that kind of thing, whereas Bantam are of course quite different. You've got to tailor your ideas in a style that you know will be acceptable to the publishers.

More recently, I've been working in partnership with Chris Hensley, at Paganware's name, and together we've been doing the complete game design. This is much more challenging, and of course more interesting. We come up with the basic game between us, then I produce some graphics and music. Chris gets to work on programming it, and gradually we put ideas, funds and fun and it all comes together. A game is never finished until the deadline gets you - with frustration, for instance, the main character and maps were finished long ago, but we're still adding things here and there. I'm always thinking of little touches to make games just that bit slicker.

My work is all done on the Atari ST, since that seems to be the state the bulk of the games in the UK will head on, and so the one most software houses are interested in. Usually any ST game is converted for the Amiga within a month of this, but that doesn't really affect me. The graphics for designed stay the same, the backgrounds and everything are just ported over and Chris gets to work on the re-programming.

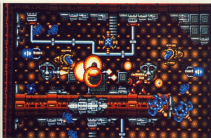
longer executable on such machines. Unfortunately the new possibilities in terms of game structure or graphics are often not fully explored at present for economic reasons: most software houses are not interested in 3-Dal games that cannot be converted to the smaller 16-bit machines where the bulk of the profits still lie.

Pick a package

It is within these restrictions that the graphic artist must operate, and so it is vital that images which are before only simple look as easily striking as possible. In order to achieve this, graphic artists must have the most effective graphics software they can lay their hands on, as the standard of these packages not only dictates the speed of production but also the quality of the work. Having said that, it is equally important to use software you feel comfortable with, if you feel clumsy using a particular graphics package then the chances are your work will either be inferior, falling short of its full potential, or it will take you

twice as long to produce it. Commercially speaking, this is vital too.

The work I am involved with usually concerns animated sprites and the backgrounds they move over. Therefore I need an art package that is geared to achieving these things. I use Bantam's Advanced Art Studio, which although lacking some of the qualities of Film Director is more than adequate for my particular requirements. Art Studio has a detailed yet comprehensive layout, and provides a far less daunting prospect for the artist than many art packages that look far more geared for word processing than graphics! There is also a useful help menu that is constantly displayed, supplying vital information of a game. When the user gets more familiar with the package this can be switched off so that it doesn't interfere with work at high speed. Another thing that makes Art Studio so comprehensive is its superb use of fonts. These come, unlike some I could mention, are well drawn and true to the font's.



■ It came from Hesse's *Guardian*, another delightfully busy screen from Nigel Topples.

As well as being very comprehensive, Art Studio is also extremely good for sprite construction. When sprite frames have been drawn or a grid they can be transferred instantly to the waiting files for instant animation – just define the first and last frames of the sequence, click on the animation icon and your sprites will leap around the screen before you in its glory.

My personal requirements centre around animation, as that is what first attracted me to computer graphics. Ideally what I need is a totally transparent affordable package capable of manipulating any sized object through a full 360°. Also if it could work out of the midscreen frames of the animation, after it gives it the relevant key frames, I'd be a very happy man so this would save me hundreds of hours' work.

Real time animation is a beautiful thing, but people are sometimes unaware of the mindboggling task of co-ordinating all the hundreds of pixels that go into making up a piece of animation. The bigger the sprite, the more difficult this becomes as the various parts of the figure are not moved in a big chunk but dot by dot. Then are various functions to assist the process such as 'copy', 'rotate' and 'fit', but they never do much to help on the whole.

Economy course

Creating backgrounds for games on the Art Studio is done using its treatable 'map mode'. This can create vast maps comprising thousands of pre-drawn blocks and allows the graphics artist to develop his talents in this field to perfection. Building maps out

of 16 by 16 pixel blocks is made far more difficult by the increased need for economy in a program. An important part of the graphic artist's work is not only to produce excellent graphics but to do so using the minimum number of blocks, frames etc. When this is applied to map construction the graphic artist must make his 16 by 16 blocks as versatile as possible. A block designed to look like one object should, if possible, be used to look like several other objects on the map. The program is endless and can be mindboggling in its implications.

Art Studio allows me to draw and animate sprites of any reasonable size, it allows me to build huge game maps and animate them, as well as drawing screens etc. However, what I wouldn't give for a fusion of Art Studio and Film Director! Art Studio unfortunately only allows me to animate one sprite at a time which is crap when I'm designing and drawing sprite games with up to 20 sprites dancing around and interacting on screen simultaneously! I never get the full picture until a programmer has coded all my graphics into the game, and by then, due to looming deadlines and other various factors, it's too late to change anything. What I find myself looking for these days is not so much a graphics editor as a pseudo games editor!

When doing graphics for an Atari ST game the first thing I usually tackle is the main character, as this dictates a lot of the flavour of a game. For this reason it is well worth putting a lot of thought into, as there's nothing more depressing than seeing yet another spacing or non-orthogonal spacer with a laser gun crawl onto the screen

at the start of a game. First impressions really count.

Originality and attention to detail are the keys to producing high quality graphics. This applies to all aspects of the game and its graphics. The graphic artist, apart from working out how big the map should be or how many frames to use in total on the sprites, should also work out exactly what he or she wishes to achieve as far as the 'look' of the game goes. It's all very well drawing lots of good looking sprites and maps, but if they don't all complement each other and look like part of the same thing, then the game's flavour will suffer drastically as a result. *Verminator*, for example, was designed to look thoroughly weird, very colourful and non-sensual while maintaining a strong identity. The main character is very amusing and totally original. Whether the end result of all this thought and care is successful is not up to me, the designer, to say, but personally I'm very happy with it and I know a lot of other people are too.

3-D sprites next?

With the increase of three dimensional graphics in games software, many people are saying that the day of the computer sprite is drawing to an end. I don't consider this to be true; better graphics software and bigger machines mean improved sprites with proper support for rotations, light sources, shading and perspective.

If three people could see the images in my head or even had a chance to glance through my personal graphics files, I know for a fact they would soon change their views.

THE ANIMATION
SOFTWARE

FILE TO
DIRECTOR

■ *Drawscope* works on an ST, and *Ultimate Standard's Advanced Art Studio* is for workstations. Alternatively, *File Director* has a lot going for it too, and it sometimes a little better.

SKYCHASE

the final test



... airborne combat for every simulation fan. Modeled after USAF training competitions, take your pick from a dazzling array of the world's leading fighters in this thrilling one or two player simulation. With user-definable features, there is an endless series of possibilities to Skychase as you battle against your adversary. You can find out what might really happen when the speed of an F-16 Falc0n meets the agility of an F-16 falcon - with you at the controls of either!

Features:

- 7 frontline jets to choose from
- Great sound effects
- User definable fuel, ammunition, G-Forces, playing area and more
- One or two player options
- 5 skill levels
- Skychase poster and T-Shirt offer



image
works



BY YOUR COMMAND



Portrayed as metal monsters carved in the image of man, the robot is nothing more than science fiction. Or is it?

■ **FACT:** robots have existed since the 1950's.

■ **FACT:** many have computational power greater than the human brain.

■ **FACT:** muscle is nothing compared to rippling metal.

■ **FACT:** industry uses robots for manufacture, packing and painting; any science fiction film worth its salt features robots, some real, most spoof.

■ **FACT:** personal robots introduced this decade are more numerous than versions of AmigaDOS and GEM combined.

■ **FACT:** but nobody has produced a robot which has the intelligence of the human mind or the agility of the human body.

So where are they and who's using them? Will Marvin, the Terminator or No 5 ever 'come alive'? Richard Monteiro (R2M2 to his friends) investigates.



WELDING

Perhaps the most famous example of AI is Joseph Weizenbaum's Eliza program which provides text-to-integer conversation with a computer. Weizenbaum has a great dossier of the subject (it comes from many people but Eliza comes) in his volume being that AI "very can complete ought to give rise to feelings of disgust in every civilized person."

ROBOTS AND MEN

Robot, being Greek derivation for slave labor, was first coined in 1507 by Hans Capke in his story *Cyber*. Robotics was also spawned from fiction - in this instance from Isaac Asimov's book *Robotics* published in 1942. Although the concept of the artificial man-robot man is Greek legend, it wasn't until 1961 that the first factory robot was installed.

DAY OF THE ROBOT

Ever since Czechoslovak Karel Capek coined the word robot, the world has been treated to visions of labor-saving machines coming in, and often carrying us, the image of man. It is this aspect of robotics, the idea that intelligent hunks of metal and silicon will reflect the human race's fears rather than its virtues, that has been built on

by many science fiction authors. While it provides great entertainment, it is - for the moment - fiction.

Before the advent of home or personal macros, computers were large and very expensive. Typically, an early computer would fill a warehouse and keep tens of operators in work. This is also true of early robots: huge industrial beasts taking up vast floor space and costing millions. The beginning of this decade, however, saw an explosion in the personal robot market, today there are hundreds of toy robots, computer-controlled robot kits

and small scale production robots.

There is nothing mysterious about a robot; it has four main parts. Firstly, there is the outer structure and mechanical design. Secondly, there are motive power problems, which give the robot movement. These are called actuators. Thirdly the robot must recognize its position and know what it's working on - for this it uses sensors. Finally the whole assembly must be controlled and coordinated - usually the role of the computer, although specialized circuitry is used in smaller robots.

ARTIFICIAL INTELLIGENCE

There are many robots that require sophisticated programs to allow them to learn from their experiences and make decisions based on those experiences. This type of pseudo-learning is known as Artificial Intelligence (AI). Together with KBS, Intelligent Knowledge Based Systems, AI programs are generally large databases containing known facts about a state or task or place, a set of rules for generating a required action when an event occurs and a strategy processor for changing old rules as experiential demands.

The application of AI may result in robots being able to design a product for a particular application and then manufacture the item without any human intervention. If you already have a robot that can make a full-scale model of a vehicle out of polystyrene, then computer-based plans in a matter of hours.



TELECHIRS AND EXOSKELETONS



The most common use for telechirs is to handle dangerous materials. The operator sits in safety behind protective glass while the mechanical arms handle the operator's every movement. Other forms of telechir magnify or reduce the operator's movements.



Wally does a Power Loader, a lightweight exoskeleton used for loading and unloading heavy equipment, before battling the gnomes Queen Abla.

Remote control devices have often been used to extend the reach, power and hardness of human limbs, but it wasn't until after the Second World War that this type of machinery advanced in range and found use. As scientists were required to manipulate radioactive substances in the atomic energy program, robot technology had to advance to provide the means.

Telechirs, being Greek for 'hands at a distance', are remote manipulators in constant use in nuclear plants, chemical factories, explosive plants and other sites where dangerous substances and devices have to be handled by humans from a distance.

Microscopic telechirs are used to extend rather than merely the movements of a human hand, complete operating on the brain or liver, scientists dissecting microscopic samples and technicians feeling minute devices off one brain to reduce control cable movements to precise fractions of an inch. Other remote devices do the opposite by magnifying movement and amplifying force. Many cars, for instance, have servo-assisted brakes in which the force of the human foot is amplified by hydraulic or pneumatically power.

THE THREE DAY WEEK

After the Second World War, when companies were looking at ways of improving the efficiency of mass production (more merchandise, less rejects — that sort of thing), Ford in the USA showed the world the way by having the first factory robot installed. Today there are around 30,000 industrial robots in Japan, 10,000 in the USA and 2,000 in Britain. There appears to be no lack of demand for the industrial robot — they do the difficult, monotonous, dirty, dangerous jobs that we humans love to avoid.

So what effect will robots have on society? Already industrial robots are used for coal mining, servicing nuclear power stations, cleaning sewers and parking lots. The past is already being left in manufacturing plants which strive for greater output, and higher quality can only be achieved by automation. More and more redundancies with remaining staff working fewer hours. The most agile and intelligent robots become, the less there will be for us to do.

But on a brighter side, robots might eventually write magazines (I dare would say they already do — it's the shopping for us, cook our food, drive buses, provide our television and film entertainment, take care from surgeons. One school of thought suggests that, in the long term, this will indeed be the case. So, so more work for Aki; he certainly won't be dull.

No matter how important robots are to the World's industrial future, it

is wrong to view them purely in terms of economics and productivity — for instance, their use is fostered as a source of both entertainment and education is rapidly catching on.

What part will robots play in the future? The idea of a world dominated by mechanical men existed long before robots were ever invented and, in fact, such a scenario is no closer than it was 80 years ago. Attempting to predict the development of robotic technology is still the province of the SF writer.

However, if the robot is to become more useful, it must become more mobile — which means getting rid of wheel and track arrangements and replacing them with legs! (not too, but three or four for stability). The robot shell needs to become lighter, plianter and carbon fibre must

be used in place of traditional steel structures. Similarly their method of sensing will have to become far more accurate. All this will give them greater freedom and flexibility. Then, and only then, will we see the emergence of the true thinking, moving machine.

■ **Flexible Manufacturing Systems (FMS)** are starting to displace their dedicated counterparts. FMS robots load and unload components from machine tools like the latter programmed others, and can then be reprogrammed to produce new products.



THEORY

Perhaps it's time to reflect on those Atoms' Three Laws of Robotics which he invented in his science fiction. He suggested on a future, robot-created world:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence, as long as such protection does not conflict with the first or Second Law.

REALITY

The PROLOG, Programmable Robot (Operable With Logical Entry Response) is one of the delightful wonders employed by the army. The Logical Entry Response in this case is key-900 machine guns. It is designed to control a variety of weapons and generator towers. But what if it spots a passing armoured tank? Well, that's just one of the armoured. However, the army are planning to incorporate robot weapons and remote identification.

AMIGAS IN INDUSTRY

(General in Texas is the primary location of MBI interfaces, specialists in man/machine interface. After plugging in his job an director of a duty in 1982, Richard de Blase set up MBI. The move seems to have paid off as the company is involved in producing software and interfaces for controlling delay-proofer parking robot another project. Home Computer Systems, is near completion (details elsewhere in these pages).

Blaise located in Chickadee, Easton and Maryland are already using the system which consists of large parking machinery (handling over 250,000) interface between computer and machinery, several reloaded Amigas (general in 16000s with in built hard drive) and Telexlike software. The total cost is still under £100,000 which, says de Blase, is very competitive.

The interfaces and software are all de Blase's work, the network, (Telexlike), is from Telexlike (who didn't do up to nearly every Telexlike feature an write) and the parking machinery comes from a variety of sources. It depends on the duty's requirements (just a full automation and variety of products) and the amount they are prepared to pay.

MBI's Telexlike software — written in Amiga BASIC and compiled with the 68000 compiler — allows the operator to key in rates, view the goods list, print customer details, display a transport summary and much more. The software speaks to jobs at every stage, and even repeats the orders entered to avoid mistakes, which appeals to the operators. As the system works under the Amiga's multi-

tasking operating system, one operator can perform various tasks almost immediately on one machine, and several operators can share the same data as the whole system is reloaded. Usually three or four Amigas are networked — although there is no limit to the number that may be added.

The parking robot takes the sales data and decides which product needs parking and how much of each product is required. The whole process is automated from collecting cartons, to filling, to heat sealing, to shrink-wrapping.

■ Many industrial robots like this are used to control America's oldest system the country. Richard de Blase (founder of MBI) says Amiga is central there, usually three or four will be working 24/7. The parking Telexlike software accepts the orders and the robot divides how much, when, where, shipped and when, shipped, parking.





THE ROBOT BOOK

For an information read, packed with colour pictures of robots being used in almost every conceivable application, by the Robot Book by Richard Pearson, MD of PRL. Although a little out of date (published in 1985 by Wileys), it is still very interesting. ISBN 0 7152 043 44. Many thanks to Richard Pearson for giving us permission to use several of the pictures from his book in this article.

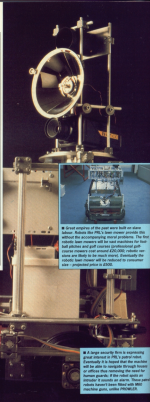
PERSONAL ROBOTS

One company that has got history on the flag, for a reason other than its name, is Personal Robots Ltd (PRL). The company was formed in 1984 by Richard Pearson - former editor of Microcomputer Printout, Business Micro and Home Computer Course magazines - and associates in the research and development of robots technology. Keller then manufacture their own robots, PRL, license them to other companies.

Applications for large robots are very limited - paint spraying, packing and so on - which is why popularity of the personal robot has soared. Personal robots include educational ones, toy robots, exoskeletons, telebots, domestic robots and free moving robots. PRL are great believers in all aspects and have probably done more to push the development of small robot than any other company.

PRL are currently working on robot navigation systems, security robots and robot vision. Already they have Robotik, a modular construction system, for engineers and research scientists to design and build their own robots with the minimum of effort. A custom version of this will be ready in September for the £2000 mark at the latest. PRL aren't just into the serious side; they have done some starting work on toys with artificial intelligence, and one of these creatures even made it onto the Wigan show.

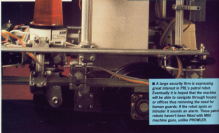
If you're a follower of Tomorrow's World then you have probably seen other PRL products like the autonomous patrol robot and robotic lawn mower.



■ Great emphasis of the gear went built on slave labour. Robots like PRL's lawn mower provide this without the accompanying moral problems. The first robotic lawn mowers will be used exclusively for football pitches and golf courses (professional golf course mowers cost around £20,000) robotic versions are likely to be much more. Eventually the robotic lawn mower will be reduced to consumer size - suggested price is £300.



■ Pearson is going these research vehicles use internal net technology in absolute lowest cost technology.



■ A large assembly firm is expressing great interest in PRL's patrol robot. Eventually it is hoped that the machine will be able to navigate through houses or offices thus removing the need for human guards. If the robot spots an intruder it sounds an alarm. Home guard robots have a 'beam break' with 6000 machine guns, unlike PRL's £300.



■ Only in Australia can you find such a robot. Designed as a non-stop cheap cleaner, the robot—although slower than its skilled human counterpart (the robot taking around 15 minutes to complete the job)—has a control computer containing an image of a standard street in its memory. The robot's steering head has been built so as to detect variation in street width to cheaply clean. See next issue where the next street is coming from.

ST AND AMIGA IN CONTROL

What better way to understand how a robot works than by controlling one from your home? For £390 (R08 0429 795294) you supply you with the Amiga Home Control System. This computer interface lets you use the same fun that connects Amiga to multi-thousand pounds parking robots and software.

The software has been geared towards home security. It allows video cameras and other sensors to be connected to the interface and, if certain occurrences occur like someone jamming the front door has the power to force the computer to phone the police or any other number of your choice, sounding you first a modem attached.

The possibilities are endless and not restricted to home security: eight input and eight output channels are available, modern and generic sockets are provided and an optional main modem can be fitted to the interface. The main modem allows you to communicate to other devices via the main high frequency signals are sent along the main cable. Typical uses include switching lights on and off, limiting the radio TV viewing and controlling other household appliances.

Dele Electronics (0782 744303) manufacture an interface and robot arm that can be controlled from an Amiga. Price for the arm is £39.99 with the interface and control software is £55.

R01 (0490 535001) are the only company to come up with a robot-control system for the ST. Robotarm II, which is a cut down version of their professional modular construction system, is made up of an interface and software. No firm price has been set, but it is likely to be around

£75. The system is designed to control Lego robot arms and flags: prices for Lego kits starts at £400. Robotarm is being aimed at the educational sector, although there is no reason why home users shouldn't benefit from it too.

The software (PROBE) — written in C — has been ported from OS/2 based Contemp and suitably modified to its simplified form, Personal Robot Operating System and Environment allows the user to attach icons to graphic representations of the robot and, by tagging commands to the icons (like move forward for three seconds), the robot can be manipulated in a manner that is both

intuitive and fun. AF is one of the more advanced subjects that PROBE addresses.

Robotarm is due for a September launch — look out for a full review of this remarkable robot in a future issue of Format.



■ Richard Parnes, who created by a hand-demonstrated Robotarm II.



■ It might be longer, but the Japanese guide robot will still direct your hand that once more than leaving 100 guide dogs for 10 years. The robot guide can carry loads, avoid obstacles and communicate with its owner via the hand.

STS AT TVA IN USA

The Tennessee Valley Authority in Chattanooga, USA, provide electrical energy for millions of houses and companies in the surrounding area. Their exhibition robots — detailing how their numerous nuclear-power stations work and the methods used to bring electrical power to so many houses — uses a massive pair of robot arms controlled from an ST to point to various objects in the exhibit.

The engineers, John Redman and Mark Munday, took over a year to design the robot and

writing control software. The project was started from scratch as no manufacturer could offer a robot kit. Around 20 STs are used in the exhibit, the majority are hooked up to interactive-presenting touch-screen displays. The ST looking after the robot has a hand drive used for storing digitised camera videos for its use.

The man involved in the work decided on STs because, at the time, no one was selling comparable machines at such agreeable prices.

SCREENPLAY

As the Autumn rush gets under way, our mailbag of goodies just gets bigger and bigger. Undaunted, intrepid reviewer Andy Storer pulls out the best.

In the past month, **FORMAT** received 27 software games for review. 16 of these were released exclusively for the PC, 8 for the Amiga. Add to this a further 10 budget 8-bit conversions marketed by Atari itself and you have more releases than most people can reach. So how do we choose the best? I had since we read world-wide review those games that showed **DEPTH**, **DEPTH** and **IMPACT** and were sticking to our word.

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Format Gold

There's **WHIRLIGIG** and you there **LIGHTHOUSE 3D** - a lot of eyes, a lot of impact - we're taking **REALISM** on at least an approach to it, given the fact that you're wandering around **4,298,887,299** interUniverses looking for **PERFECT SOLUTIONS**. Since it took western spirits at least **12,000 YEARS** to work out perspective it's good to know the boys from Mannheim took only a couple to get **REARVIEW** **SHADOWS** up and running. Let's hope the cooling catches on.

But on to **SPACE HARRIER**, our other **FORMAT GOLD** winner. Here we're taking **IMPACT** to the 7th degree in a surreal stretch out in space-arena where **Floury of STYLE** looking around in these low - tones of the **UNBURNED SPIRITS** you're ever likely to catch a glimpse of. So it's an **EX-GRACIA**



FRIGHTBLAST that got played to death while the posthumously titled, but have you seen the speed at which it shifts? Even now, its **TECHNO-IMPACT** are any out in front when you consider the things would have cost going on for 3 Mbytes and 3 processors. Can't wait for the floppy version.

And the rest...

MINIBOOST announced a new software label the other week and first of the launch got was **SHY DRAGON**, a combat gem being in from the States. As a two player dueler it's **PRETTY DAMN BARE** and you'll be pleased to know its vector graphics are clear enough to be able to distinguish between an F-14 and an A7C.



After one French software house

lost all records for the **LONGEST LIQUID LUNCH EVER** the other weekend, we decided enough was not enough and went off to **LANXOR'S ONTARIO MORTALE**. The way the French push you mark onto one disk is a mystery at best - so those who love their language had to teach the sound chip to speak in French.



FRANGLAIS is the kind of **FRENCH LESSON** we would all do with. On the other hand, **BETTER DEAD THAN ALIEN** is a lesson in moderation. That's to say, how long can you go without booting it up and totalling every form of life you come across? While it may not be all that original, the **EXECUTION** is wonderful. **TAKE A BREAK** to join the search for life as we don't know it. And then wait.

Which brings us to our final choice, **PIVOT EMPIRE STRIKES BACK**. The pin ball is quite straightforward - shoot everything in sight and win for the second. **NEXT TIME GIVE US MORE LEVELS, LAND!**

Oh, and just before you turn the page, a final word on our reviews. Below the games we do have a couple of boxes showing machine, mode of play and price. So, just to make it clear - the White box is the version of the game we've reviewed, that's.

Now turn over and get stuck into **WHIRLIGIG** - don't get yourself in a spin...



CLOSE... BUT NOT THAT CLOSE

So what of the games that didn't get reviewed? Here's a few less-than-stellar mentions: **OVERLANDER**, **PIRE AND PIRACY** and **RACEY BOY**, all released for both machines, are pretty standard in terms of gameplay and graphics - except in **BOGGY BOY** there's no **BURN-UP ROADSTER** **HOLICIDE** involved. All are great fun. For a while.

Hooked together under a sporting umbrella (is it Summer again already?) - Ed saw **FOOTBALL MANAGER 2**, **PETER BEARDLE'S INTERNATIONAL**

FOOTBALL, **WORLD GAMES**, **WORLD DARTS**, **BOSS ROYALTY'S SUPER SKI**, **SCRABBLE ON LINE** and **COSMO ROULETTE**. You can find out all you want about these by reading their box covers.

Then there's the outstandingly unimpressive ones. **EMPIRE'S** box cover looked great, and **CRIBBY GRIFFIN** had great fun taking the s out of the overweight - we couldn't see the joke. As for **OSCARO**, well we've sure **OCLAN** will just love it. Why don't **SCA** call it **ORGANOID** and remove any confusion.



WHIRLIGIG



MAELSTROM/FIREBIRD

ST - \$19.95, reviewed. Macosx, colour only

Amiga - \$19.95, disc only, mouse

If you spend one minute visiting each of the 4.1 billion sectors of Telecomsoft's latest 3D epic you'd still be playing in 8172 years time! And if you reckon that's daunting, then imagine a game where you have no fewer than 100,000,000,000 enemy ships to blast away at in an attempt to reach the maximum possible mission score of 4,294,967,295. And even then you would have lost. The winning score is infinity.



You fire a missile at an approaching Photon Class Cruiser



But you're in danger



That's another fuel point

GAMEPLAY

The 'Whirligig' is a vast network of spacetime sectors or 'epigapoxes', comprising stars, asteroids, planets and alien vessels, linked by numerous star gates. It forms a pattern based on prime factors and 'perfect numbers' - the aim is to traverse these sectors in a search for 'perfectspoxes' where you have to locate and collect 5 perfect solids.

A perfect number, since you ask, is a number that is the sum of all its divisors excluding itself and, unbelievably, there are only five of them below 4 billion - 6, 28, 496, 8128 and 33550336. 6=1+2+3, and 1, 2 and 3 are the divisors of 6, hence, 6! These are the reference numbers of the perfect epigapoxes you're after. Don't panic if you bombed your last maths exam though - Whirligig doesn't demand any particular expertise, although there are shortcuts open to you if you can solve some fairly the mental riddles.

You don't need to work just away through all those levels one by one. The underlying maths of the star gate network allows you to leap through millions at a time. You can travel at sector 10000036 in less than 30 leaps. Whether you'll have visited the other perfect spoxes in the program depends on whether you're your calculator handy, figure!

Within each of the five perfectspoxes you'll find a single floating 'perfect solid', starting at a time-

disc, then cube, octahedron, icosahedron and dodecahedron which you must lose through a stargate to capture. Once you've collected all five, you've achieved the perfect score! Simple!

Almost. Along the way there's a whole host of alien vessels, some fixed, some orbital for a limited, but are out to make sure you'll have more to think about than maths exams. Your helm has obviously provided some striking devices - although your joystick control and radar control will reveal the position of stargates, fuel and missile dumps, you don't see any alien craft until they appear in front of you. Your adventures have their own idea of perfection. And you don't figure in it.

Your arsenal consists of heat-seeking missiles and cliff pods mounted around your cockpit and fuel you progress through a sector is best blasted with ease - especially as your missiles like heat so much that if you miss your target ship they'll come sailing home with a big bang. Cliff pods are often the best bet as they simultaneously deflect any incoming missiles while totaling any target in the vicinity with more fuel, so with fuel, you'll need to replenish your stocks regularly, and finding sectors that contain either or both can lead you away from your planned route.

GRAPHICS AND SOUND

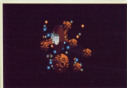
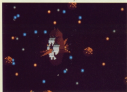
Shadows are no new departure for solid 3D - graphics programmers realized years ago that shaded objects look much better with a corresponding shaded area beneath them. In Firebird's other recent release, Venus, ground shadows play an integral part in the gameplay - for close proximity combat it's essential to refer to the position of the shadow cast by an aerial opponent.

In Whirligig the shading comes from an offscreen external source like a lamp and is, in a sense, incidental since altitude and relative position have no meaning. Shadow is confined to the object itself; it has no function other than to illuminate and inject a realism to appearance. As such, this is an original

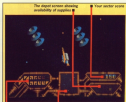
achievement beautifully implemented and serves to elevate 'Lightsource 3D' as a feature which should form the basis of all future solid 3D releases. It's so convincing it's essential.

It's this that the mouse handling is slick. Directing your ship is more than a question of left and right, control is loose.

Sound is also outstanding. The background music could be described as a slightly distant rendition of a Paganini version of the Capitan Paganini theme playing at 1/80 rpm. What sound-effects are present mainly seem of impending attack from the range of alien vessels.



■ You head towards a Stargate and space explodes as you enter



- The fuel and missile gauges darken from left to right as the level drops
- The radar displays strategic and navigational information - it won't give the position of moving asteroids though
- Your pop-up control panel can be activated by pressing [red]



■ You move closer to a couple of debris to stock up on missiles and fuel



- You've evaded all alien opponents and found your final Perfect Shot - a tetrahedron. You must see it through the Stargate to make sure it's yours though. Only 4 more to go now, but you could be searching for quite a while - The final Perfect Shot is an **Esquadrone 33000000**

CONCLUSION

Despite a graphics which evidently fails to give 3D graphics which are real of this world and a background which is truly amazing, there's still an essential something missing from *StarGate*. It has the depth, yes, but not the breadth to be a true classic. There simply aren't enough different things happening for it to be considered as anything more than a graphic exercise or excitement. But for the moment that's enough - lightwave 3D games have made their debut with style.

*** graphics



moving graphics



sound/music



loading interest



overall 84%



SPACE HARRIER



ELITE

ST - £19.95. Mouse or joystick

Average - version irrelevant

Two years ago the star of the PCW show was a Sega coin-op more accurately described as a climb-on. Quakers for a ride on this low-slung jet bike with monitor for windscreen caused severe congestion and a number of punch-ups. When Space Harrier hit the streets a few months later the effect was the same. Arcade life shifted into overdrive. Now you can forget about all the other punters and jet around the galaxy from the comfort of your own chair.

■ (1) These chaps are really leeching their heads over nothing. Better give them a taste of their own medicine.

■ (2) Make room for the main room... you fly above the spiky but what thanks do you get? Make sure you don't hit that tree.



GAMEPLAY

The aim of Space Harrier is to save the land from the scarily potent of supernatural phenomena. This wouldn't normally be the assumed itinerary among you, except for the fact that in this case your opponents are approaching the supernatural and, despite being able to fly for long periods, you need to keep your feet firmly on the ground to cope with the rush of images hitting you. With the control you get three lives before you had to doze into your pocket again - now you have three times as many chances to get used to the manoeuvres. They're not tough.

There are two levels of frenetic action as you try to dodge and destroy all manner of surreal flora and fauna. The speed of movement is electrifying - distant objects accurately focused you at frightening pace as you run, leap or fly to a landless horizon. Each level begins with a battle against a host of flying skeletons - coming above visible heads, evading black mist, floating fly-agaric and scowled mutant war machines among them - some in spiral formation, coming at you from all directions, firing vomiting neon ellipses. To make matters worse, the landscapes feature obstacles such as beds of stone columns, towering boulders, mutant cygnets and 4-way pinacole bushes which you must weave and jump around like you've just had half a pint of liquid nitrogen poured down your trousers.

Levels conclude with prolonged combat against such terrific adversaries as chamberlain dragons breathing balls of fire, vomiting olive spirals and giant Sansaia robots going just nuts on you before the next over-top frenzy is loaded. And what have you got to counter this heathen horde with? A mouse. That's what. In other words, go completely insane with the fire button and blast everything in sight.

Thankfully, mouse control is extremely responsive which is just as well since half the time you only need to retrace blue due to several responses. Some levels require hand movements so fast you could scratch your desk top. As there's no auto repeat on the fire button your forefinger takes a bit of a hammering too. As for your eyes... well it's probably best not to go out drinking afterwards unless you have a Lamborghini and at least half an outside at your disposal.

To take a break from continuous firing you need only hit Space and you can continue play on a frame by frame basis - useful if you're unable to master a particular sequence. But beware; you can't actually go through an entire level on this slow frame by frame advance if you try, you are unceremoniously dumped back to level one. Hit Escape and you're returned to the rigours of real-time. Playing with the mouse is easier than with joystick, since response is much sharper - and you'd better believe it, reaction is what this action is all about.



■ (3) Blooming hell... A bunch of flowers get ready to spray you



GRAPHICS AND SOUND

Stunning. *Space Harrier* was pretty hot in the arcades with its custom hardware drivers, but on the 16-biters you'll still be surprised by the speed at which those huge sprites come hurtling at you. The transition from a small distant speck to a massive full-screen presence is like whipping a steam train to the max. They're almost too fast.

But it's not just a question of shifting around any old bunch of sprites at lightning speeds. The artwork is superbly detailed with great attention paid to the overall visual character of each level. Combined with the marvellous scrolling landscape, the game positively screams style. It's as if all that arcade action has been squeezed into the small screen. The objects you're up against are depicted just as brightly and seem to move just as quickly as in the coin-op.

The sound doesn't quite match the graphics for style, and is confined to an ever-present backing track intersub with the regular city of your character as he gets his head-on once again. But it's visual action that counts in this one and *Space Harrier* is an elegant lesson in how to simultaneously shift large chunky sprites at impressive speeds.

■ (4) Things begin to get a little tricky as robotic dragons decide to get in on the act. It'll be all too easy to control but-fun with these guys around.

■ (5) This character too-head-and-dragon process gets an abnor-

CONCLUSION

By the time you've reached the fifth level and ridden the back of a dragon you'll be hooked on the spectacular action of *Space Harrier*. Because of its high quality graphics content you just can't write it off as arcade fare. It really is an excellent conversion and its screen velocities alone should ensure equally fast sales. Get Ready!

total graphics



moving graphics



sound/effects



testing interest



overall 83%



■ (5) The breathing butterfly better fly in high-speed attack formation. Just when you thought things were cooling up some of their friends arrive.

AMIGA
£24.95



FUEL FOR EN



Your plane has ditched on a mountainous plateau somewhere in deepest Tibet. You and your companions are alive. A large shape moves toward you, you rub your eyes in disbelief, a *Comman*! - where are you... and what? Stunning, monochromatic 3D graphics and a easy scrolling, give that 30:1 drama mood as you learn not only to survive, but also that your companions are not all they first seemed!



FROM

ocean



Digitised graphics, originating from full colour photographs of Daley Thompson himself, take full advantage of the Amiga's and the Alan's capabilities giving you a taste of the real sports simulation. Featuring an optional game play which allows you to "work out" in the gym where your performance will directly affect your performance in the final events themselves - another first for Ocean!



FROM

ocean



Dynamic's attention to detail and superior graphics presentation add an extra dimension and Army too is no exception. A full blown shoot-em-up that you'll control through several levels where you will take command of first an armoured jeep, then helicopters and finally, on foot as you make your way through the jungle to the enemy's headquarters ultimately to seek out its decimators.

FROM



16 BIT STATE

ATARI
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£19.95

ENTERTAINMENT



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Exceptional graphics, innovative
game design and digital sound
all add up to recreate the
atmosphere generated in the box
office smash for closely following
the original (despite your lack
your platform, selecting individual
men for engagement, who will
encounter the enemy and/or
many footprints of your work to
find the smoky underground
headquarters. For embracing the
warrior of forward sound novel
flair and a character—your
enemy will have a day, from
beneath the water which float
the lower floor, making your
know—the atmosphere built
enough to all.



One phrase sums up the
charm and appeal of
Arknoid: "It's just there
another go!" Arknoid is
addictive using all the
capabilities of the 16-bit
more this conversion is
almost an exact replica with
all the excitement of the
original. Take your smash
hit. Thus Arknoid - Egg
blockbuster.



OF THE ART



SKYCHASE

IMAGEWORKS

Amiga - £19.99, Joystick only

Atari ST - version out soon

The first release from ImageWorks is an air-to-air combat simulation imported from the States. Modelled on US Air Force and Navy flight school training competencies, Sky Chase offers would-be ace a choice of seven aircraft with which to engage in head-on confrontations

against another player or the computer.



■ You're about to get blasted by a rival paper-plane's missile.

GAMEPLAY

Sky Chase provides simple, fast action, no nonsense dogfights - immediately. There's no need for lengthy expeditions across empty air space to find an opponent - at the beginning of each sortie the aircraft collides with its head-on in a fly-by separation. From then on it's down to checking the radar whilst you grip that joystick and ride the Jo.

You can choose between piloting an F-14, F-15, F-16, F-18, MiG-27, MiG-29 and, for the kamikaze among you, a copier airplane. Oxygen can take on a whole new meaning as a copier fighter under computer control takes on your F-15 and spouts out the real meaning of pulp as you hit the deck with around 2 tons of lead in your chest.

Since there's no penalty for flying around (you have unlimited fuel, ammunition and air-to-air missiles), you stay as fast and get as there and have some fun. Once you have your opponent in view, a sighting appears center-screen and you can burst off some missiles. As you get nearer, a targeting box comes into view and you can double-click Fire to launch a missile. Once locked on, the missile feels its way home with amazing devotion.

When you're on the receiving end, the only way you might escape such inevitable destruction is to perform some mega-G manoeuvres by hitting the shift key to which you the thrust and hard to evade that any real fighter would find its bodyframe strain across these continents. Needless to say, the kind of evasive action is best left to those experts for whom Top Gun and Top Gun are lay-outings on a Sunday afternoon.



■ A near head-on collision between two MiG 27s at several Mach.

GRAPHICS AND SOUND

There are no 3D graphics here to give you a realistic impression of flight but that's not the real point of Sky Chase. What you have instead are smooth vector-graphics delivering fast screen updates of combat action. Speed, rather than realism, is being emphasised to compound thrills and spills.

The flat grid world over which you fly can be altered to display 49, 225, 961 or 3600 squares and, the nine-frame handling slows or quickens accordingly, with just a 49 square grid and a couple of F-16s, the action is very, very fast. However, because the world below is black and featureless, and for most of the time you don't look at the instrument panel for fear of missing a fatal shot, judging your altitude can be a touch tricky. At low altitudes, the only accurate measure of your height is whether you're still in one piece or not. Ground surface texturing would have improved this, to some extent but probably only to the detriment of speed. Alternatively, subtle warnings could have been used, but what TX are there are in no way functional.

CONCLUSION

Dual-screen aerial combat simulations are something of a rarity on any machine. On 16-biters, Sky Chase is a first. If the graphic detail were more substantial we'd be dealing with something very special. As it is we're looking at an above average proposition employing smooth screen routines to convey the performance capabilities of a range of advanced fighters, whose Sky Chase really scores though is in its provision of one-on-one combat for two players. When you're up there with a friend as your foe you won't have time to analyse the graphics.

static graphics

5 4 3 2 1 0

moving graphics

5 4 3 2 1 0

sound/music

5 4 3 2 1 0

testing tolerance

5 4 3 2 1 0

overall 78%



■ You're just for your opponent with a spray of cannon fire.

ARKANOID - REVENGE OF DOH

PETER JOHNSON/IMAGINE

ST - \$19.95, Mousse

The original 1986 Taito coin-op conversion convinced an awful lot of people that Breakout had really broken out for the final time. Yet Arkanoid's appearance on the 8-bits did more than spare

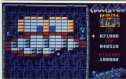
Crack, Impact, Twin Tiles and, more recently, Giganoid. It paved the way for video and sonic overhauls on 16-bit reimaginings that transformed Breakout beyond all recognition.

Amiga - \$19.95, Mousse. Don't miss this.

GAMEPLAY

In traditional style, you use your mouse to move a ball from left to right to deflect an enemy ball which will gradually break down the brick walls confining you. Certain coloured bricks must be hit more than once and some are completely indestructible. Some are hit and disappear only to return again later, others begin to move from side to side. From the top of the screen emerge a host of animated obstacles which serve to act as random deflectors - sailing Saturns, moving molecules and bouncing balls among others - which are fortunately eliminated on contact with either the ball or bat.

You are aided in your attempts to clear the walls and proceed through the 64 levels by an assortment of capsules released upon destruction of the bricks they're hidden beneath. Most slide your ball to catch them and thereby benefit from their various properties. Each capsule is marked with an initial denoting its power. Revenge of Doh gets one over its illustrious predecessor in that there are now far more of these special features: if you're feeling really on form, you can have up to eight balls in play at once, have them break through bricks without bouncing off them, or split into three separate regenerating balls. In addition you can have twin and ghost balls in play, including a special pod which bestows a random effect, there are now 13 featured capsules.



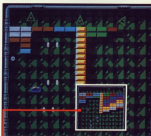
Shooting backdrops make Revenge of Doh a visual treat

GRAPHICS AND SOUND

Space-rod backgrounds and dense brick arrays make Revenge of Doh very high in the graphics stakes. Animation of the various moving obstacles is super smooth but the ball itself suffers from a slight wobble. However, up to eight balls can all move simultaneously with no apparent loss of speed, so the echo is a small price to pay for the vast amount of update information being processed

when all ball break, base on screen. It doesn't detract from the overall appearance or the game play.

Spot sound effects only add atmosphere to a game of this visual quality, and serve to excite you from complete and utter monotony. The world outside ends when you tune in to this one.



Here there's seven balls on the go at once, but if you collect the right capsule... The effect is immediate



These bouncing ball obstacles make the level almost impossible



Other capsules give you effects like multiple balls with auto.

CONCLUSION

The extra effects in the gameplay transform what would otherwise be a straight breakout clone into a thoroughly compelling classic. Every new game has orders of sufficiently random capsules to ensure a level of addictiveness that many games claim but fail to deliver. Revenge of Doh cuts code you'll come back to time and time again.

mini graphics



moving graphics



sound effects



loading interest



overall 80%

WORLD TOUR GOLF

ELECTRONIC ARTS

Amiga - £24.95, joystick or mouse

Amari BT - no version planned

The first golf simulator was a small tin tray seen to be lying around the carpets of executive offices. Later models got sophisticated - they shot the ball back to you. Which was all very well for your putting, but when it came to driving how could you possibly get into the swing of things?

Okay, so no golf simulator can really help you master your swings, strokes and putts, but it should give you a good idea of what club to use and when. World Tour Golf does this and more - better than you look off the screen than into the real rough.

GAMEPLAY

After choosing a course from the 24 available, you can select up to 4 golfers to take part in a 36 hole tournament. The default characteristics of all certain named famous professionals - Jack Nicklaus, Curtis Lewis, Fuzzy Coles and Arnie Furry - can be modified to alter their distance, accuracy, tendency and recovery skill. Random factors affecting wind speed and the state of the greens are then introduced which ensure no course is ever the same twice. In fact you can expand the possibilities further with the course construction menu, allowing you to add, delete and copy holes from other courses.

On the left of the screen is a bird's eye view of the first hole complete with fairway, greens, bunkers, trees and water along with a cursor indicating the default direction of the first drive. You can change this by simply clicking in an adjacent area of screen. Over on the right is a more detailed view of the immediate locality of the tee off, and also course, hole and club information.

Clicking once on the right window brings up the swing meter - the strength of your shot is determined by the amount of time you allow the swing bar to move. Clicking at the desired moment freezes the spinning and accelerates a further click to establish accuracy. Clicking too early means you will slice or fade the drive whereas if you're too late you'll hook or draw it. Once you've committed, you see the ball disappear into the distance on both screens.

The swing meter is an ingenious means of ensuring a strike although it doesn't teach you how to do real things (at least when a shot goes wrong, you don't have to crawl on all fours in the rough looking for the damned ball). Putting a meter since you just press a numeric key to send the ball a corresponding distance.

GRAPHICS AND SOUND

You wouldn't really expect sound on a golf simulator would you? Apart from the thwack of the ball being hit, the only other sound effects you'd be likely to hear in the real world would be of the fair water variety. That and the stamping of armadillos running for cover. It's no different here - the air around your monitor will turn blue too. Down on the screen, the predominant

colour is, of course, green. The courses are beautifully drawn, with the variety of trees and bushes particularly well crafted. The animated movement of the golfer flows smoothly as he swings a stroke and if you make a bad shot a 'grinace bubble' appears. Some of the more exotic courses - with names like Gully - have holes that could only feature in Disneyland.



■ You're just about to drive



■ The swing meter shows you're just about to hit that ball at full strength



■ Editing a course.

CONCLUSION

Definitely a game for those days when you've been washed out, which gain some conditions in the UK should be at least half the time, and a great way of practicing your theory without leaving your armchair. All in all, there's no faulting here to having a very enjoyable game.

3868 graphics	0 1 2 3 4 5
moving graphics	0 1 2 3 4 5
sound/music	0 1 2 3 4 5
testing interest	0 1 2 3 4 5
overall 78%	

OBLITERATOR



OBLITERATOR

You're Dead! The Last of the Obliterators, a genetically-engineered and extremely-dangerous mutant, has engineered the destruction of countless species, the ultimate solution for the most obstinate systems of extermination.

In the wilds of Federation space an alien invader has made itself at home. It is a cruel, cunning and terrifying presence. Federation colonists have been exterminated. Earth has exploded. There is only one way to stop this thing.

Developed by the finest game artists and programmers in the world, Obliterator is a masterpiece of computer graphics. The only fully computer-generated character, built with complete freedom from any possible limitations, with the most realistic understanding of destruction.

OBLITERATOR — £24.95

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MORTVILLE MANOR

KYLKHOR CREATION/LANRHOR

Amiga - £24.95, Mouse, Reviewed

ST - £24.95, Mouse, Due August

Francis' 1987 Game of the Year and biggest seller apparently shifted faster as many units as its nearest rival, and now hopes to pick up a few

accolades here too. If you've ever played and enjoyed *Demond's Time*, *Deja Vu*, *Witness*, *Suspense* or any other adventure, then *Mortville's* for you.

GAMEPLAY

You play the part of Jerome Lange, a fugitive doing private eye who's recruited (as initiation from an old friend) to join her at Clonus Mortville to help with a desperate situation. With a name like *Mortville* you might suppose something is seriously wrong and, yet, you're right. Your old friend Jala has already departed. To *Demond's*.

Arriving in a steam, you are met by the butler who gets into a car down the place and to the inhabitants before showing you to your bedroom. From there on it's entirely up to you. You may wander around the various rooms and the grounds outside, the idea being to search for evidence and find a variety of objects which may lead you to the murderer in your mind. There are eight characters on whom to pin Jala's murder; you may question these suspects directly about the background to the case and, as you progress and locate evidence, grill them about their alibi.

Discourse will make your task a bit easier. It's best to extract evidence secretly before confronting your presumed killer as, of course, everyone's golly will prove innocent and it's quite easy to have a knife plunged in your back when all you're doing is exploring the attic.

So, who did *demond*? (Like any good thriller, it's got to be the one person it couldn't possibly be.



■ You've just awakened and where to go first is a complete mystery



■ Someone's study... what we find a look in the desk drawer?



■ A parchment just happens to be conveniently useful in your hands

INTERFACE

Mortville is a mouse driven adventure using a unique method of conversing with other characters. Discussions are selected by clicking on the name of the person you wish to talk to, and a screen then appears showing a range of discussion topics appro-

priate to what you've discovered at that point. You click on one to hear the reply, and you really do hear it, in an outrageous French accent!

Actions are determined from pull-down menus. Enter a verb to understand and responded to



■ This screen appears each time you want to converse with a character. You just click on the topic of your choice and are returned to an animated talking head for the reply

GRAPHICS AND SOUND

Each location and object is depicted by simple but effective graphics, nothing as flat as many couldn't put on screen. What makes *Mortville* really unique is that the characters really do speak to you, complete with animated faces as they deliver their message. Nothing new about speech in a game, you say, but right characters talking clearly in thick French accents! *Genius*! There's a staggering amount of speech crammed into the disk, far too much for it to be listened - the game is entirely using the Amiga's speech synthesizer chip directly, so how will work on the ST is anyone's guess.

But to this a wealth of high quality effects to supplement animation - short musical events, doors swinging smoothly open, footsteps, changing clocks - and you're taking *Amnesia*, the big essential of any adventure.



■ Let paper up to speak

CONCLUSION

It'd be a sound decision to add *Mortville* to your adventure collection. Although the plot is a little cluttered, the method of interaction and variety of involvement are compelling enough to make up for this. And then again, it's great just to listen to all those lovely French accents. Just hope you end up in *Paris* and not *Clonus*.

scenario's				
1	2	3	4	5
interface				
1	2	3	4	5
innovative merit				
1	2	3	4	5
lasting interest				
1	2	3	4	5
overall 78%				

THE EMPIRE STRIKES BACK

VECTOR GRAPHICSDOMARK

ST — \$19.99. Mouse or joystick. Reviewed.

Amiga — \$19.99. Mouse or joystick.

So how hard does it strike back? You'd expect something coming out in league with its parent, Star Wars, the action is intense but relatively easy.

This time there are four levels of wire-frame icons; you have to blast various probes before they can transmit pictures to the indestructible evil Vader Blood Heat, blast two types of Imperial Starke, blast two of the fighters and blast and dodge an asteroid storm.

You have five shields for pro-

tection and a limitless supply of firepower to make up for the Force that doesn't seem to be anywhere around. There are three levels of difficulty — each requiring you to blast even greater numbers of Vader's minions.

The vector graphics have not been improved in any great extent. There isn't sufficient detail to make them anything more than passable. After the screen is full of small fighters the action is just by far but since screen update



■ Don't Force yourself

doesn't up considerably when you have more than a couple of the ponderous Walkers on screen, graphics routines may as well have been sold in the first place. They would have looked a lot better. And, yes, there's the old buzz of sampled sound from the fan between levels. But difficulty and being bored there isn't.

3D graphics 3.0
moving graphics 4.0
soundtrack 3.0
testing interest 3.0
overall 60%

BETTER DEAD THAN ALIEN

SCA CREW/ELECTRA

Amiga — \$19.99. Mouse, joystick or keys.

ST — \$19.99. Mouse, joystick or keys.

Not exactly Advanced Computer Entertainment but good fun nevertheless. Better Than Alien is a new wave reader clone if there ever was one, with some great variations on an original theme added with style and humor. Yes, some of those

alien really make you sick — literally — they're so damn ugly.

It features 25 levels of wacky and ridiculous situations coming your way, being included is they wonder why human skinneaps always takes the form of slaughter. Although they don't respect



■ This guy certainly looks under the weather — better give him a pain-killer to jettison him later

your precious humor they occasionally send you small power pellets to help you in your cause. Kamekacs to the lead, then gifts take the form of extra lasers, neutron bombs, stuns, armor modules, shields and, perhaps most helpful of all, auto-repeat saturation blasts. With enemies like them, who needs friends?

Each level comprises a couple of waves of hazy invaders leading to an encounter with a Bigger alien. Words cannot describe the fabulous mutants you'll confront, nor the difficulty of attempting to stay alive while you're dying laughing. Digitized applause greets your successes, and mocking laughter your object failures, together with loads of other wacky sound effects.

Once completed, you can return to a level by entering a code word thereby allowing you to find out just how ugly the later Bigger alien is without having to wipe the tears from your eyes. If wholesale slaughter is a favorite pastime of yours, you'll find Better Dead a rewarding and satisfying experience guaranteeing hours of savings in the name of beauty. A truly philosophical encounter.

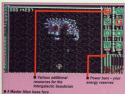


■ Collecting the right capsule gives you double the fun



■ Beady lies in the eyes of the beholder of an Auto Repair Saturation Bomb

3D graphics 4.0
moving graphics 4.0
soundtrack 3.5
testing interest 3.0
overall 75%



■ Various additional resources for the intricate beautiful

■ Power bars — your energy reserves

■ If Bigger Alien loses face



■ How Bigger Invader comes meet Superstar Master (M)



■ Picking up that capsule makes meaningful contact a little easier



COLOUR SCOPE 3?

Trip-a-Fron has taken over a year to write and has succeeded Colourscape 2, long promised but never seen in production. The idea of the new program came during collaboration over a light-based video called MR 100. Its 25000 lines of assembler have been written from the ground up, and it's not intended as an extension of the earlier video. It takes 200K 2000, or Amiga version this fall.



THE ULTIMATE TRIP

A year in the making and now a product which firmly refuses to be categorised. Trip-a-Fron, from the keyboard of Jeff 'thanks to all the sheep and goats in a thirty mile radius' Minter, promises to establish the 'light synthesizer' as an essential tool. Simon Williams, a hippy at heart, gets thoroughly pixelated.

TRIP-A-FRON
48 colour STs (Average version being considered)
£34.95, Lisianski, 48 Mount Pleasant, Reddy, Hants
(07735 4476)

The idea of sound synthesizers is now firmly established, and few self-respecting rock bands would be seen on stage without one. Their accompanying lightshows, however, are largely down to banks of high-powered spots, the occasional laser and someone at the back with a video mixer. There's no reason, though, why light shouldn't be moulded in much the same way as sound, via a computer keyboard or MIDI drummy keyboard. Using this concept as a design basis, Jeff Minter has created a light synthesizer for the SE.

This is no sound to light unit, and Minter is at pains to retail the virtues of a 'live' performance in which light effects are put together with the same virtuosity as the two-line of

Comfortably Numb (Pink Floyd). The trick, so what has the 'he who gave us Revenge of the Motor' Carnes provided in his latest package?

The effects

It's very difficult to describe the images you can create on screen with Trip-a-Fron. Some of the shots on these pages may help to convey the colour and variety, but they can do little to bring across the dynamics of the program. Because there's a decay built into each pixel's life and because the colour palette cycles through from light to dark and back to live, the image is forever changing. Just when you think you've spotted some form or shape, it metamorphoses into something else.

As with a sound synthesizer, which builds up its sounds from basics, such as the sine, square and triangle waveforms, so Minter's light synth starts with effects like the dot pattern, starfield (stars moving past from a vanishing point in the corner of the screen), laser writing and geometric shapes. On these basic effects you can superimpose others, the most notable being particle scattering. This can generate some spectacular and very featuring patterns.

Laser effects are very cleverly disguised, though they completely slow down the running speed and is best left to comparatively simple shapes. Once you've designed a laser pattern using the synth named 'shyshape' (most things in Trip-a-Fron have an, or at least silly, name) the program will happily manipulate it for you in the same way as you may have seen business ads floundered by fast moving laser beams.

Once you start playing the synth with the mouse, you realise just what potential the system has. Small lateral or circular movements translate into the most phenomenal patterns, slowly decaying into the next wall or gale force. A quick flick of a couple of keys and the screen is full of flowing lines or shooting stars apparently moving across the screen as the colour palette is switched through the displayed shapes. What appears to be a single pixel moving with the mouse is transferred into a flourish of dots, lines and patterns when you hold down the mouse button.

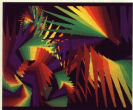
As this is without a single sound registered, Trip-a-Fron is intended to be played by a dedicated performer who would see it in a bar (bar that is a sound synth player uses his keyboard. This doesn't mean that light shows are impossible, though. A 'recorder' is included in the system so that tracks can be saved to disk and superimposed, one upon another.

■ The main control menu can be used to set-up many auxiliary ones, controlling aspects such as...

Left: the shlyshape, a design tool for laser effects

Centre: the color palette, where you put together palette changes...and

Right: the event sequencer, used to program sets of pre-defined effects.



Forget the technology, this is the kind of image you can produce with the mouse

From VSEQ to KML

Trpa-Ton is packaged in a binder, designed to appeal to anyone with a taste for personal organisers. The manual runs to some 140 well-printed pages, bound together in tasteful hardy covers complete with synthetic materials (which evoked the death of a rooster). The program can be run on any ST, though extra features are available on machines with a framebuffer or more.

Maker's main programming strength has always been in squeezing speed into the graphics of whatever machine he's working on, so Trpa-Ton this time displayed an lightning fast sprites (covering everything in sight), but in the number of points he manages to manipulate in real time. Plying with these demo files (packed with the program) immediately reveals the variety of effects you can produce with the system. The demo thumbnails are presented for the various effects supported by Trpa-Ton, and are surely of several hours' play just familiarising yourself with the concept and controls.

Macros and sequences

All the light effects can be executed in real time by calling up the appropriate menu and selecting parameters from it, but for live performance there may well not be time to go through the process. For this reason, and also because it makes the program far more versatile, Minter has included a Keyboard Macro Language (KML). As the name suggests, the language lets you assign small program segments (limited to just about any key on the keyboard).

What the name doesn't suggest is that these program segments can control just about any facet of the

program. As well as the standard loop and conditional structures of a high-level language like BASIC or Pascal, there are many specific commands for controlling the programmer directly. The demo programs are all short KML macros and it's instructive to read through these listings to see how they work. This is not to say that the manual has shortcomings, as the commands are well covered with many program snippets.

will to get the full effect from it - one 14" monitor at a local shop is hardly going to set the village alight.

There's no doubt Minter has an innovative product in Trpa-Ton, it remains to be seen whether he can persuade the world it's really what they need. So buy one, if only to fill a few hours of relaxation, but then for a production for amateurs, tutors and most things sticky. Trpa-Ton could be the start of something bright.

WITH HAND ON MOUSE

Control of Trpa-Ton is almost entirely by mouse. Though a graphics tablet is an alternative for the wealthy, keyboard control is mainly restricted to entering KML programs and entering specific effects from menus assigned to single keys. The mouse does once again how good it is at translating subtle movements of the hand into precise effects on the screen, and the program is sensitive to the dynamics of movement, reacting differently to slow, small movements and large, sweeping ones.

The subsidiary mouse (powered liberally with cheap, games and yard) cover disk drives, MIDI set up, the sequencer, the cityscape, waveform gener-

ator, pattern-creator, colour picker, startfield editor, KML keyboard assignments and other organisations of sound pretty obscure, but are well explained in the manual, and even seem to slot into place in the overall system.

When actually 'tripping', the colour palette can be controlled from the mouse's pad and the degree of pattern symmetry from the cursor cluster. Other special effects can be assigned to keys on the main keyboard from one of the menus. The overall technique is both reasonably easy to remember and very versatile. Quite commendable in such a complex system.

Coupled with KML, it is the occasion which allows up to eight light channels to be set going and controlled independently. This is effectively a simple multi-tasking system, and means that separate effects can be viewed on screen simultaneously.

So what?

Having bang Trpa-Ton's prisms in a window and very well installed piece of software, you're still left wondering who's going to buy it. There must be a certain market for just by rock groups, in videos and perhaps in TV production. In these fields the program may perhaps suffer from the 'It's too cheap to be any good' syndrome, but home users would have to invest in a projection TV or a video

for

- Easy to use systems, but not open to experimentation
- Very fast and sophisticated graphics displays possible
- Comprehensive macro language for pre-setting effects

against

- Large screen needed for full benefit in performance

Features

1 2 3 4 5

performance

1 2 3 4 5

ease of use

1 2 3 4 5

macros

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

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1 2 3 4 5

format
value



DISK EXTRA

ST Amiga Format's unique dual format disk gives you the best of both ST and Amiga worlds!

ST

64 POWERDROME

Electronic Arts' brand new jet-racer game must be the one to end all racing sims. Check it out with our stunning magazine.

66 CHESSNUT

One of the more serious gamers, this, with some excellent 3-D graphics of the chess



board, Chessnut isn't just a pretty face - it plays a mean game too.

66 SPRITE EDITOR

Sprite Editor is a program designed specifically for those of you who program in SPA Basic. Designing sprites has never been so easy.

66 DC CLOCK

DC Clock is another one of those incredibly useful programs that make you wonder how you managed without it. Keep track of time without ever having to take your eyes off the screen again!

66 CHEATS!!!

Stuck on Star Wars or Xenod? Beat the games with this month's cheats. Who ever said defeatology gets you nowhere?

AMIGA

64 KIND WORDS

Everyone needs a word processor - try out this exciting new WP in the comfort of your own

Amiga, and see why everyone's talking about it.

66 3D ARM

You've read the article in robotics in this issue (you have, haven't you?) - with this fascinating program you can flex your own robotic muscles on your Amiga's screen.



haven't you?) - with this fascinating program you can flex your own robotic muscles on your Amiga's screen.

66 FPIC

Doctor your beloved picture files and forget the wife's fees. FPic allows you to enhance your Amiga art using the excellent image processing tools offered within the depths of it's menus.



68 DROP SHADOW

3D displays are all very nice but with this program your Amiga can master the third dimension. Dropshadow automatically adds very convincing shadows to all Workbench windows.

68 CHEATS!!!

Now Amiga owners can be as dishonest as their ST brethren with patch programs for StarGliders, Amiga Karate and Source Manager. Refreshes the levels other players can't reach!

**WE'RE PAYING
£800!
FOR GOOD
SOFTWARE ON
OUR COVER DISK**

We're looking for good quality software to fill our cover disk each month. If you're a witty programmer you could earn big bucks from your software - games, business applications, utilities, or anything of general interest. We're also interested in any especially original graphics you may have created with art packages, either for inclusion on the disk or printing in the magazine.

Turn to the end of this section for more details on how to get your software onto the Format cover disk.



POWERDROME DEMO

Colour STs only
FILE NAME:
POWERDROM.PRG

Suddenly you're in the hot seat of a pilot in the Powerdrome 3DV championship, up against four top pilots from other galaxies. Your mission, should you choose to accept it, is to scorch around the course faster than any other being, and capture the coveted Optomaster Trophy.

Powerdrome is the hottest new game for the ST from Electronic Arts, and their first product written solely in the UK. We've seen hints of 'Raid Hellfire' in the background, it's due for release in late September, with an Amiga version in November. The final program will have a unique two-player option allowing you to hook up two machines together and 'blast a friend' from the skies. In the full game, you've got a number of via points to negotiate on different planets around the galaxy. The service timing is the key to success; a timing-up screen allows you to tweak the brakes, avionics, fuel choice and engine to perfection.

You can join in to the Robocops for repairs - the pits are fully automatic, but if you're too busy dam-



■ Handling round a corner faster than you thought to in Powerdrome - the 3D walls help and sure impressively fast - 30fps and you could be a case for the escape squad.

aged you may have to call the intergalactic AA for a few home (3D, you're a nice android, a vmp, very nice android, etc.)

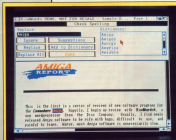
It's the 3D action graphics and scoring sounds that power Powerdrome to the front of racing sims. But don't take our word for it,

sit back and let the action speak for itself. To spare your nerves unnecessarily trying, the demo doesn't ask you to do anything - it shows off its muscles while you sit and gape.

Electronic Arts tell us that the music on the final game will be vastly improved over the demo version.



■ Michael Powell, author of Powerdrome



KIND WORDS DEMO

All Amigas
ICON NAMES:
KINDWORDS, KINDWORDS.DOC

This is a demo of the elegant Kind Words word processor from the Doc Company Marketing.

Kind Words includes everything you'd expect to see in an Amiga word processor, and many extras. The full version of Kind Words incorporates a 90,000 word spell checker and mail merge facilities as well as the ability to report printers into your documents.

If you've ever used an Amiga word processor that allowed you to include graphics with

your text, you'll know that although it looks lovely on screen, once printed out the results can look delightfully grubby. To overcome this, Kind Words uses high resolution 'Super Font' that have four times as many dots per character as the standard Amiga system fonts. Another powerful feature of Kind Words is graphics manipulation - since you've loaded a picture into your document, it can be stretched or cropped to size.

The version on this month's cover disk is complete except for mail merge and spell checking. It also doesn't support saving or printing documents. If they left these features in, there'd be no reason to buy the full version, would there? What you can do is load text or PG graphics and manipulate them within the program. You'll soon see what a joy Kind Words is to use. You'll also notice that some of the fonts are missing - a reflection of available space on the month's disk!

As Kind Words uses disk based fonts, our demo will only load when the disk is inserted at the 'Insert Workbench' screen. If you've already got Workbench or another program running on your Amiga, press **Ctrl+Shift+Amiga** and insert the Cover Disk into your Amiga's internal drive. The Kind Words demo then loads automatically. As a final note, during the loading of fonts into the screen will act very strangely indeed, don't worry about this as it's only not very clever de-compacting program doing its stuff.

■ Contact HB Marketing at Brookline House, 22 The Green, West Nyatton, Midsx, if you want to purchase the full version, at a mere £49.95.

ST

First, copy and load the disk as described at the end of the Disk Extra section.

CHESSNUT

by G. Frankie

Colour 51k

FILENAMES:

CHESSNUT.PRG,

CHESSNUT.DOC

Last issue's cover disk contained Megaplay for those of you who enjoy a good board. This issue it's time to bring a bit of nonviolent gaming to the cover disk in the form of the excellent 3D chess program, Chessnut.

Chessnut can be run by either double-clicking on the Chessnut icon on the Desktop or by selecting the Chessnut option from the menu program, **CLICK_ME**. A detailed documentation file called **CHESSNUT.DOC** is also included on the disk. You need



■ Chessnut getting out to play a mean game

to read this before you can play the game properly.

The most impressive thing about Chessnut is the excellent 3D graphics - definitely on a par with commercial-quality chess programs such as ChessMaster 2000 from Electronic Arts. If 3D doesn't appeal to you, you can easily switch to a 2-dimensional view with the click of a mouse button.

The first thing you do to play Chessnut is to select which colour you want to play by pressing either 1 or 2. You then select a computer or human opponent from the Game menu. All moves are entered as algebraic notations such as **g1-g2** - this particular move would take a piece from position **G1** two squares forward to **G2**.

COMPUTER GAMES

If you thought Space Invaders was the oldest computer game, think again. The basic methods for playing chess by computer were described by Claude Shannon in 1949, and the first programs ran on IBM mainframes in the 1960s. In 1977, a computer programmed for Northwestern University in Canada became the first to beat a Grandmaster in a competition. Even so, top players still refuse to compete on computers because of the inaccuracy of matching the Response and Response of the world. It's a 30-year-old, and it's still here.

SPRITE EDITOR

by Stephen Kendrick

All STs

FILENAMES: DESIGNER.PRG, DESIGNER.DOC

Calling a GFA Basic programmer. As many of you will know, designing and incorporating multi-coloured sprites into GFA Basic can be a rather long-winded process - to say the least. Well, at last help is at hand in the form of Stephen Kendrick's incredibly useful GFA Sprite Designer.

Until now there have been several ways of designing and using sprites, though all require a fair amount of luck and perseverance. You could either load a picture file into your program, cut out the area of the screen you wish to use as a sprite and save it to disk. Alternatively, you could use GFA's own sprite editor, but that only runs in high resolution. Multi-colour sprites are still a problem.

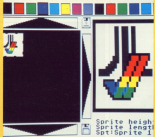
Loading and naming the sprite designer is simplicity itself. The first and easiest method is to click on the **CLICK_ME** menu program from the cover disk. Alternatively, you can double-click directly on the **DESIGNER.PRG** icon.

Also on the disk is a file called **DESIGNER.DOC**, which is the author's own instruction manual for the program. Although the program is pretty self-explanatory, this file is recommended reading for any who wish to use the program to its full.

As with many programs, the best way of starting Designer is to play around with it, but here's a quick run-down of what it has to offer. When you first load the designer program you notice 26 boxes representing the current colour palette. Obviously in medium or high resolution modes only some of these will show colours. Below the colour palette are two boxes, the left-hand one showing the entire work area of 128x128 pixels, with the right-hand one giving a magnified view of a small section of the work area. At your editing is done within this box and your sprite is automatically drawn to actual size in

the left-hand box.

Branching off from this main screen are several menu screens that allow you to do such whimsical things as defining a custom colour palette with the full 256 colours in the ST's repertoire. Another screen lets you set a mask for a sprite to mask it with a transparent border which stops the sprite from interfering with the background screen, or vice versa.





DC CLOCK

Public Domain

All 512

FILENAMES: DCLOCK.

PRG, DCLOCK.DOC

Remember the last formatter we included on cover disk 1? DC CLOCK is another gem (S from the same authors) and once again proves available. How do you ever learn working away on your 512 only to find that what seemed to be ten minutes keyboard tapping was, in fact, much longer? DC CLOCK puts a digital clock in the top right-hand corner of the screen (as needed) even takes your eyes off your monitor to be able to keep track of the time.

Install DC CLOCK either by clicking on its program icon from the Desktop or by selecting it from the CLICK-MS menu. When it has finished loading it prompts you to enter the current date and time. Do this and click on OK. As if by magic (and clever programming), a clock appears on the screen happily ticking away. The clever thing about DC CLOCK is that it is independent of anything else on it. Since it works using interrupts, however, some programs may slow it down or even stop it all together.

If for any reason you'd rather not be reminded of the steady advance of time, run DC CLOCK a second time to remove it.

CHEATS

By B. Sanger

All Colour 512s

FOLDER: POKES

Once again we bring you some of the best 512 game cheats. You'll find cheats for Melbourne House's Xenon

and Donkey's arcade conversion Star Wars. If you're fed up with getting blown up, shot or eaten, simply follow the instructions in the above explanation files. Each documentation file has the same name on the disk, but a .DOC suffix to load and edit our three excellent games clearly. Make sure you also read our facility provided disclaimer and never use the original copy of a game to try a patch out on. See 'Gamesnotes' on pages 74/75 for more details.



AMIGA

First, copy and load the disk as described at the end of the Disk Extra section.

These programs run on both the Amiga 500 and the 2000. We have been unable to test them on the early versions of the Amiga 1000.

3D ARM

Public Domain

All Amigas

ICON NAMES: ARM,

ARM.DOC

On your way to these pages, you may have noticed a robotic theme featuring strongly within this month's Format. Like it or not, the use of

robots in all areas of life is becoming increasingly common. We thought you might like to experiment with the theory behind robotic control and have included 3D Arm to help you do just that.

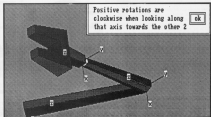
In the words of its authors, 3D ARM was designed to study 'goal-directed animation of articulated objects'. For those of you who didn't undertake a word of that, articulated objects are those that have got joints like wrists and elbows, but are constrained by attachment to other objects, like the hand, forearm and upper arm of a robot, for instance. If that last sentence sounded tricky too, it's because it was again stolen from the author's documentation!

You can load 3D ARM by double-clicking on its Workbench icon or by selecting it from the CLICK-MS menu program. Also included with the program is a short documentation file describing fully all the functions of the program. Once loaded, a wire frame 3D view of a robot arm is displayed. The arm itself is split into three parts with fully articulated joints at the wrist, elbow and shoulder. All three joints can be assigned movements independently or, for more robotic action, can be made to move all three.

NEXT

MONTH

Remember all players of Microsoft's Sanger's Master? Or next month's disk will be a charming program from reader Howard Fennell to completely customise your own disk game. You can write a new map and change any of the characters or tile sets - in short, it gives you a whole new game!



■ Not quite 3D, but nevertheless a real robot arm on your Amiga, courtesy of the 3D ARM program.



FPC
Public Domain
All Amigas
ICON NAMES: FPC,
FPC.DOC



■ FPC can enhance your Amiga picture files - here's a sample for you to get up.

With the arrival of machines such as the ST and Amiga, graphics techniques that were once the domain of dedicated graphics workstations are now within the grasp of the home user. 'Digital Image Processing' is one graphic technique now available to Amiga owners. There is no denying that the Amiga is starting to make an impact in the video industry and with this success have followed several professional quality image processing

CHEATS
by A. Grift
All Amigas
ICON NAMES: PATCH.#1,
PATCH.#1.DOC

Or don't you feel badly a nice quick way of getting the better of those of the Amiga's big games? Quick says round - *Blaster*, *StarBlade*, *GoldenEye's Amiga Karate* and *Mastomarc's* excellent *Space Amiga*.

The patch program does not work from our disk menu to you have to doubleclick on its icon instead. You'll find *Patch.#1* in the Games/Action drawer in the root directory of the Laser disk. It's very straightforward to use, but if you do get stuck you'll find a documentation



file in the same directory as the program, but with the usual .DOC extension. You'll also find further info in the 'Games/Action' topic on page 74/75.

FORMAT WARNING This program directly modifies the games on disk, so only use it on a BACKUP. If you can't copy a particular game disk, don't use the patch on your original disk unless you want to have the cheat on it for good! We've been unable to test these patches so you use them at your own risk. ST Amiga Format cannot be held responsible.



packages. Packages such as *Butcher* and *Warlord* are excellent examples of the high quality of Amiga programs of this genre, but to be left out, Format presents FPC, a public domain image processing package.

You can load FPC either from our **CLICK_ME** menu or by directly clicking on the FPC icon. Sitting next to the FPC icon is *FPC.DOC*, a file containing the author's documentation. Read this first for full instructions.

Once loaded, FPC displays a blank screen. The first thing you should do is to load a picture - any low resolution Amiga picture file should do (such as last month's Double picture). All popular Amiga art packages support this 'FF' format (Fast, Amiga Images etc). If you aren't the owner of an Amiga art package, the 'Tool' public domain disks are a good source of FF artwork from some of the Amiga's top graphic artists.

All functions within FPC are accessed from the pull down menus. It's worth experimenting with all the offered processing tools to get an idea of what's on offer. A word of warning though; as FPC was designed primarily for use on mono images, some of the tools can cause drastic results if you're not careful; if you do completely touch up your

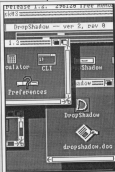
work of art, it is not too late as you can restore your picture to its former glory by selecting *Revert Image* from the *Project* menu.

DROPSHADOW
Public Domain
All Amigas
ICON NAMES: DROPSHADOW,
DROPSHADOW.DOC

How many times have you been working with the Workbench and chafed at the screen with lots of windows? As you probably know, all these windows overlapping each other can get a little confusing. DropShadow helps you get over this problem by attaching shadows to every window. Not only is this very useful, but it looks a lot better than the standard workbench display.

For those into the technical side of the Amiga, DropShadow works by adding an extra bit plane to the workbench screen that is completely transparent to all other programs. This doubles the number of colours used by the Workbench to eight, the extra four being used as darker copies of the first four.

Once loaded, DropShadow opens a window containing two slider pots. One controls the depth of the shadows and the other, the darkness.



■ Dropshadow adds shadows to Workbench windows. Simple but effective, eh?

HOW TO USE THIS DISK

The ST Amiga Format cover disk is a special format disk which both the ST and the Amiga can read. Even if you use a formatted computer, you please read these instructions carefully or you could permanently damage your copy of it.

The first thing you need do is make a backup copy of the disk. Because of the special format, the normal disk-to-disk copying methods, as recommended in the Amiga and ST manuals, won't work. Instead you will need to format a blank disk and copy the files individually. Don't panic, this isn't as difficult.

ON THE ST (assuming a single drive machine)

1. Format a blank disk in the usual way.
2. With the blank disk still in the drive, double click on the A disk icon to open up the blank contents window.
3. Now drag the icon for disk B into the open window of disk A. This will copy all of the files one by one all the master disk to your new disk. Make sure that the master ST Amiga Format disk is write protected (the sliding tab should be back on the hole in front and put it in the disk drive when asked for disk B).
4. You will now be prompted at various times to insert disk A and disk B while copying takes place. There will be a lot of swapping to do on a single drive ST Disk B should be the master disk, disk A your newly formatted copy.

If you want to cut down on disk space and understand enough about the SCIM, you can set up a hard disk using the utility provided on the July 1988 disk and use that as an intermediate step.

Note: our special format packs these programs onto a disk that would normally fit on a standard single-sided ST disk. We may not be able to fit all the files on one backup disk.

ON THE AMIGA (assuming a single drive SCSI)

1. Start your Amiga up with your normal Workbench boot disk.
2. Take a blank disk and initialize it in the usual way.
3. Make sure that the master ST Amiga Format disk is write protected and put it in the disk drive. Double-click on the disk icon that appears. Drag any icons you like in the icon menu window onto the 10MB disk icon.
4. When the disk activity light has gone out, put your newly formatted copy disk in the drive instead. Double-

click on the 10MB disk to open its window up, and drag icons from that onto the new disk icon. This will copy the files one by one.

The programs may not all fit in the 10MB disk at once on an SCSI - do whatever will fit, then after step 3 delete them from the 10MB disk by clicking once on each and holding the right mouse button down, selecting Deleted from the Workbench menu. Repeat steps 2 and 3 for the rest of the icons.

USING THE PROGRAMS

ON THE ST

When you turn the ST on and get your working copy of the disk in the drive, you will see a window opened with the contents of the disk displayed.

One of the icons is called **CLICK_ME.PRG** - just do what it says, double-click on it. Up comes a list of the disk contents. Type the number of the program you want to run, and you are asked whether you want to read the disk help file or not.

You will now be asked whether you want to run the program or not. As an alternative to using **CLICK_ME.PRG**, if you know enough about SCIM you can click directly on the icons for individual programs. These normally end **.PRG** with the documentation files having the same name as the program to which they refer, but with a **.DOC** suffix. Always read the documentation before running the program.

ON THE AMIGA

Most of the programs on the cover disk are run from the Workbench, which must be loaded first from your normal startup disk. Once at the Workbench, put the ST Amiga Format disk in the drive and double-click on its icon to open it.

Two months since the introduction of an cover disk menu program. Click on the **CLICK_ME** icon to run it. This requires a couple of disk swaps, so just follow the on-screen instructions.

Most of the programs on the disk can be executed from **CLICK_ME** by selecting them from the menu and choosing either to view the program's documentation or load the program. If a program fails to load from this menu this sometimes happens through shortage of memory on unexpanded systems; you can load it from the Workbench instead, by clicking on its icon.

To load a program from the Workbench, you must first click open the drawer which contains it. For detailed comments from the program's author click on the **DOC** file icon in the same drawer, to run the program click on the main icon.

When you click on a documentation file, a new window is opened and the text is displayed a screenful at a time. Press any key to move from one screenful to the next, or click on the close gadget in the top left-hand corner of the window to cancel the display.

The **READ_ME** icon gives you a brief summary of the disk's contents and how to use it.

ST MEGABIT MINIBOOB

There's a small problem with the ST Megabit program from issue 27's cover disk. Although the program works well happily with Degas files and creates its own graphics file in the processed manner, it won't read a color file that it has previously saved. For those with colour monitors, who are experiencing difficulties, we've included an empty Degas format file on this month's disk.

Make copies of this file and load it into Megabit before you start work on a new picture. When you come to save the picture, give it a different name and you will then be able to reload the file normally at a later date. Full instructions are included as a help file on this month's disk. Sorry for the inconvenience - as we tested it with Degas files and on most monitors!

WE WANT TO GIVE YOU MONEY!

If you've got any programs for either ST or Amiga which you think other readers would like to use:

1. We'll give you a free international travel for yourself!
2. We'll send you programs on 3.5" disks, as usual, except formatted Degas.
3. Make sure your disk is clearly labelled with your name and address and the program name(s), and is marked 'ST or Amiga'.
4. Make sure there's a documentation file on the disk called **README**.
5. Enclose a clear covering note explaining what the program does, and if you possibly can please also send a printed or any printed documentation file. Remember your address and telephone number. Include a stamped return envelope for the disk if you want it back.
6. **This is IMPORTANT:** There must be a signed statement that the program is yours and that you

are prepared to assign publication rights to ST Amiga Format. See the following wording:

"The program is hereby the title being in, is my submission for publication by ST Amiga Format magazine. It is my own work and has not been submitted for publication elsewhere."

7. Sign!
8. If we accept your program, we will get in touch with you before publication to agree terms and payment rates. We will exclude all submissions in a batch once a month, so please allow up to 60 days for return of your disks. We will only send back disks with adequate return postage and packing.
9. If you need us to deal with a drive in it, we reserve the right to send round the floppy disk in the usual hours in an unexpandable thing to your post address. In summary, after we've already given you other better programs for July's disk, please do check your disk very carefully.



PUBLIC KNOWLEDGE

The ST has a growing corpus of Public Domain programs from Britain, the States and Europe. Picking the best bits can save pounds, as Elliott Stein discovers when he ventures into the libraries.

A ten ST Public Domain software is a potpourri of programs, varying quite dramatically in quality.

Some PD software was actually sold commercially once. Typing Tutor, an excellent educational package from Academy Software, is very effective at teaching and reinforcing touch typing skills. This is supplied with another program, called Word Reader, a game to test your touch-typing skills.

Other PD titles are the beginnings of commercial products. Jet Word, a GEM based word processor at some time bundled with early STs, later evolved into the best selling Jet Word Plus. Though Jet Word has been superseded by more powerful (and more expensive) WPS, there was a time when it was one of the best available for the ST and widely used.

ST Public Domain is finally at a point where it warrants a serious look - and where else to begin a serious look like the group of titles which may be the most useful of PD software: Utilities and Disk Accessories.

Utilities and disk accessories

RAM disks, print spooler and QA utilities appear to be the first step-off for ST Programmers, and there is a notorious overabundance of them in the Public Domain.

The best RAM disk out of the dozens is Interest by Randy Moore, an impressive program which cleverly sits in the disk accessory window and can therefore be turned on or off or resized at any time during a session. It is far more versatile than most of the others which have a fixed size and can only be removed when the computer is switched off or reset.

JC Format by Paul Lee and Keith Spinks is probably the best of all disk formatting and copying programs, but only will it format a disk in an extended format, pending more space, but, though it will allow you to freely shell, it even formats and copies disks in PC or Magic-Sac formats (Magic-

Sac is a Mac emulator for the ST). More Emulator by Mark Ward (as provided on Format's issue 2 cover) did not save users of colour monitors the price of a higher monochrome one, as it persuades monochrome programs to run on a colour monitor. Though not as good as the real thing, it's certainly better than not being able to use more programs at all.

There are several multifunction SA programs, like the well-designed System by Paul Carden, which features Printer configuration, DOS2.22 setup, colour palette, notepad, mouse and keyboard speed, clock and date set, disk formatter and even a command shell.

In business

Unlike PD for PC compatibles and the Macintosh, the ST has set to establish a wide selection of quality word processors, databases and financial programs. The best of PD word processors on the ST include Jet Word and ST Writer Lite, an updated and altered version of a non-GEM WPS originally bundled with early STs. Since the original ST Writer's release, programmer Bruce D. Norman has added a GEM interface to it and cleaned up some of its early bugs. ST Writer is also available in French, Spanish and German versions.

There is one PD Database of commercial quality - DB Master 1, a program also originally bundled with early STs. It is a fully GEM-based program in two shells, MANDONE and USCDONE, and features many of the facilities you'd expect from a good database, as well as some you wouldn't. Because of its convenient scrolling, its ability to handle large amounts of text and print out in ASCII, it is a perfect tool for authors who wish to outline and break down a novel or script.

Graphics

How few is an area where PD certainly holds its own. There are several

programs which rival commercial titles like Degas and Art Director. Resochrome is a foreign only program which was originally bundled free with the ST. The latest version 1.0 offers

DEMOS

Let's face it - some commercial titles are pretty expensive, unfortunately, you may often buy a title before discovering its worth - and in order to discover its worth you must see it - AND BUY IT.

Not always so.

A large number of companies place demo copies of their products into public domain. These are often copies of the actual program with a few of its features disabled (often the "Save File" option). This allows you to have actual experience with WPS Professional, Zoom Reader, Tempus, Translucor, Et Track, Bill Blue, Superbase, Trowick, Graphic Artist, Campus GMS and many other commercial titles, all of which offer demo versions.

Many games also do this, such as Time Bandit, Flight Simulator II, Shanghai, Dark II, Arkad and Star Wars, all of which offer limited game play to help you get the feel of them before you fork out your hard-earned money.

Perhaps the best demos come from graphic packages which merely display slide-shows of work created from the actual program. The best of this type must be DSD 3-D 3.0, Cybercolor, Holo Viewer and Magic Animator, featuring stunning shows of various moving images.



Paul Formatters' standard PD - DCFORMAT allows you to squeeze more space onto your disks by putting more tracks per side and more sectors per track.



ODDITIES

What do you call a PC program which reads an ASCII file using a software voice synthesizer? Program or Delroy? Marka called it a "Speaker" and placed it in an eight-frame ASCII frame-work.

For Mac is a color-plate map of the solar system which allows you to zoom in on planets, obtain information about them and scan the stars. For musicians, there are PC programs from Berkeley audio keyboards to sound file editors. In ST 7909 IBM computers.

many new features, including shape generators, palette, rotation and flip. There is even the mysterious animation facility which can only be obtained by first selecting "The Gabbler" icon and using the right mouse button to click the pointer in the loop of the second "F" in the word "Gabbler". When this is performed, an icon of a film camera appears at the icon selection window.

Master Palette is a colour program which lets you set up to 512 colours on the screen at the same time just like Spectrum 912 and Quantum Paint. Though its features are limited, it's perfect for altering the limited colours of works originally created on Digas or Macintosh. There is also a wealth of graphics utilities which support and enhance well-known graphics packages, as well as programs which convert files from one graphics program to those of another.

IBM (Real Image Master) to Franz Geisen from The Applied Physics Department of Delft University of Technology isn't a drawing program but a technically advanced image manipulation processor of industrial quality. Running under GEM and featuring multiple windows and importation of Digas and Macintosh pictures, it is a must for any graphic artist interested in getting the most out of his/her art. (IBMPC) This is a very complex program and its use is made more difficult by its highly technical documentation.



■ The title screen animation feature of Resurrection



■ The Deluxe game with a all-purpose desk accessory, CONFOUR, running over it.

LIBRARIES

Lucky for PC enthusiasts there exist several libraries which specialise in collecting the best PC and Macintosh software from around the world.

For a reasonably fee of £6 the sites mentioned in the article and readily available. The libraries which have proven reliable and which consistently stand for the best in ST PC software are: PLUMPTREOF LTD, 80 Street, Cessnock, North Wales, Aberystwyth SA8 2AR (0244) 691804 FAX 61, PO Box 34, Bedford 2122 126 (0455) 21 9648

SOFTVILLE, 81 Brighton Avenue, Weymouth, Mass 01978 (0208) 260000

THE SOFTS BEST SOFTWARE LIBRARY, 5 Barn Hill Way, Suite 20000, Bristol, Avon BA1 1 6SE STAFF OR SOFTSIVE Direct, Weymouth, Avon BA1 2AR (02022) 882224

There's no recognized cataloguing system for ST PC, so there is no the Amazon Fish Club. You'll need to contact a supplier and request the programs you're after by name. Please tell them where you heard of their services.

To complement the wide variety of art packages there is a good supply of landscape pictures in Digas and Macintosh formats, as well as plenty of digitised images.

Games

One of the most popular areas of ST PC. The more advanced features make it an attractive challenge to any games programmer. There are many ST versions of traditional games: Backgammon and other card games, Connect 4, Backgammon, Tetris, Othello, Tic-Tac-Toe, as well as a realistic simulation of the popular board favourite Monopoly.

Shadix is an excellent chess program from Germany, featuring attractive board icons, mouse operation, GEM menus and varying levels of difficulty. Though the documentation is in German, the program is easy to use and compares well with commercially produced computer chess games.

Leashtech is a two player variant of chess, featuring chess pieces armed with lasers and other weapons to deflect the beams. There are also ST versions of popular old computer-video games: Magixtris - a superior version of Asteroids (as supplied on the first Form Cover disk), Pacman: the best version of the grand video game yet, Diamond Digger - a 3D rockfall clone with 25 levels, dozens of Breakout type games and traditional space shoot-em-ups such as Asterix, Demosud and Orion's fire.

As well as the games, there are utilities for commercial games, such as the Advanced Construction Set which lets you design new enhanced versions. There are also special "cheat" utilities for popular titles like Clusters, Barbarian and Time Travel.

Another fine selection of PC games are the infocom-style text adventures like Merry Puffin and the Holy Goat and there's a King. For those who don't want to play other people's text adventures there is The Adventure Writer system by David Bell, a complete programming language to design text adventures of

your own.

Many of the PC games are of excellent quality and would probably be used commercially on 8 bit computers. Though many PC titles like Labyrinth, StoneAge and Archon are challenging and well thought-out games of skill, they haven't the dazzling graphics and innovative play of the more popular commercial ST games.

Languages and comms

You can find a PC version of most computer languages: BASIC, Logo, Lisp, C, Fortran, Pascal and others. Many with helpful documentation on disk. There are also assemblers and disassemblers, text editors for programmers and other utilities, such as a one to convert IBM BASIC to ST BASIC or just BASIC and vice-versa. In addition to the languages themselves, there are hundreds of sample source programs. For modern users there are full-featured communications programs like Golem, which contain most of the features of commercial programs. FST104 simulates Pentel graphics and ETE is a VT100 terminal emulator for Compaq or - protocol. In addition to the more terminal emulators, there are versions of Hexedit, utilities for compressing and decompressing files and even full-featured RMS programs like StarNet 800 for those considering their own bulletin boards. In short, there's everything you'll need in PC for communications except the modem itself.

Others

There are also animation programs, children's games, label makers, text construction kits, hard disk utilities, magazines on disk, ham radio utilities, horoscopes, multi-tasking, sign food menu, fractals, 3D-MMO fonts and many others. The best way to find out for yourself exactly what is available is to send for the catalogue offered by the PC suppliers.



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NEW NEW NEW



GAME BUSTERS

When the play's so frustratin, ya feel ya gonna burst; when your teeth start gratin and ya desperately need a first, where ya gonna go? Gamebusters! More thrills and exposes than Lady Godiver's trot down Coventry high street.



STARBLAZER ■ Amiga

For invisibility, launch your ship, press [F3A] for fixed cross hair, slow down to zero velocity and press [Backspace] to pause the game. Type **JS ANG 5**. Pause the game again and type **JS ANG 5**. You can tell if the cheat is active as all the instruments will go to the centre position. You can move it around and blow things up without worry.

Press [M] if you want to be really lazy. This turns the aliens allowing you to give them hell. Another stab at [M] will restart the things from outer space.

Missiles are topped up by pressing [P], an object editor is reached by pressing [X] (which allows you to spin and zoom in on any of the vector graphics).

Jamie Searns
Portsmouth, Hants

LEATHERNECK

■ ST

Type in **OUTHERNECK** then press [F], all your men will have protective shields. Nothing can harm you now except your buddy's bullets in your back.

C Warren
Yarmouth, Norfolk



SAPHERS ■ ST

Starting Out - when creating your character it is best to drink a lot of vitamins. This should make it easier to find a companion (you'll need one to complete it). Once you're used to the odd controls, talk to the cleric using the 'What do you want?' option. He will tell you of your first quest.

Food and Water - food can be obtained by killing rabbits, wolves, chickens and bears. Water skins (very valuable) can be obtained by trading other items. Water holes are dotted about the landscape. There is one towards the southern edge

of your village. As soon as you see 'the gurgling of a spring', press the right mouse button. Use the 'Talk' option.

Trading and Conversation - be nice to other members of your tribe. You'll need items from them, such as water skins, flint knives, food and other weapons. Always tell them your name and end the conversation with 'Good Evening'.

Combat - stand down and let your attackers come towards you. When they get close, hit 'em. Remember you can change weapons by pressing the right mouse button. It's a good idea to carry a hatchet and several



SINBAD AND THE THRONE OF THE FALCON ■ Amiga

When earthquakes or storms occur, double click on the quit box in the left corner of the screen. Double click on the 'Resume Game' option from the Game Options menu when it appears. You will find that the earthquakes or storms has disappeared.

Fred Wilson
Reading, Berks

arrows.

Movement - always use the 'Landscape View' for travelling and the 'Lateral View' for reading messages. If you're travelling straight and press the left button, a map will appear.

The Quartz - these are obtained from your tribe leader. Once completed, you have finished the game. For the first you must sit as many wild animals as possible and take the meat back to the chief. Quartz too has got travelling to the Eagle Eye tribe and swapping a robotron for a magic potion. It's good that you must reclaim a stolen jar from the Stone Arch tribe. Finally for

HOLLYWOOD POKER

■ Amiga

Load the game as usual, when the drive light goes, but press [Ctrl]AmigaAmiga to meet. When the game loads for the second time you will find the two grips in the first round are very easy to beat.

Jason Fox
Middletown, Cleveland

INTERCEPTOR

■ Amiga

Load the game normally and asked for LOG ON. Remove the original disk and make sure it is write enabled. Replace original disk and press return. From now on you have access to all missions.

Angus MacFie
Middletown, Scotland



quest for you must recapture the Holy Well from the Gray Hymns. Take the Rod back to your chief, but make sure you have 12 or so arrows. And that's it.

Tribe Locations - while plenty of smoke rises from the 'Landscape View' mark tribe locations. They appear grey on the map. Eagle Eyes are situated north-east of your tribe. Gray Hymns involve a long journey north-west of your tribe. Stone Arch are south of the Gray Hymns.

Mark Rutherford
Buxton, Cheshire

CARRIER COMMAND

■ ST

When the game is passed type **ORION** (D) **5.0000** (with M) - include the quotes. This will put you in a cheat mode. Pressing (+) on the numeric keypad will make your Marlin and Orbus advance to invulnerable and collisions. The manual key (L) deactivates the Laser Opener (Laser Op)



FLIGHT SIMULATOR II

■ Amiga

Landing the plane in a short space - for instance, on a runway - is considered to land as normal. Just before touching down, keep your fingers pressed on the brakes

FANTASTIC GAMES UP FOR GRABS

Tip, cheats and game-loading tips. Yes, we need the lot. If you've discovered a secret password, written a game, created a game, completed an adventure, found ways of getting high scores or know of any other hard material that lets you win, send us details. By doing so you could win a collection of the best new games for your machine. ST or Amiga.

Interested? Mail stop gaming. Get your game letters to us. Send them, with your full name, to: Gameletters, ST/Amiga Forum, 4 Queen Street, Bath, BA1 3JZ. Please state whether tips are for ST or Amiga. Try and make tips short and snappy - we want to have fun in completing the game, not a bore on those boring armadillos. If you have the three-volume edition of *Ultimordia* (1984 creation), *The Sky Armadillo*, already - £6 (50 for key saving) - Other £20. Prices can be any length as they will be included on the cover disk rather than printed. If a prize is very long please send it on a 3.5" disk, and enclose a zip bag and return envelope if you want it back.

We have had to reach good stuff that we've had to hold a bit of it back. Don't worry, it will appear eventually. Keep sending in those letters.



key (L). The plane should virtually stop dead when the wheels touch the ground.

Overhauling - to prevent yourself landing in the drink, select the time on the dashboard and after it is fully running manoeuvre around 1.5bars. The

plane will roll off the runway and into the sea without crashing. This gives you another chance to taxi onto the runway.

Carless coordinates - San Francisco area: 5113209-546, 1-5074-8619, A 1.7 2000 W-north, E-west and A-Atlantic.

Changing plane colour - select the multi-player option from the file header and change the colour in the box by clicking on the appropriate box icon.

Getting fuel - fuel can begin to leak forcing you to land during a Russian game. If you are close to a depot, but do not have enough fuel to taxi in other words you have come to a complete standstill by the following: very quickly tap the up/down gear toggle (left key). The nose should drop as the wheels are lifted off the ground, and then lift once the wheels drop. The plane will start to move. Continue doing this until you reach the depot.

Shane Parits

Llanelli Hill, Gwent

ARKANOID ■ Amiga

Pause the game and type **BARBAC**. 4 cylinder will fire down, catch it and type (L) for score, (C) for play and so on. Pressing (F) takes you directly to the final screen.

Janis Ramirez

Portsmouth, Hants



STAR QUARK ■ ST

Input: names: 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 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PROGRAMMING

LEARN BASIC

Loops and branches this month, and who better to lead the way than our very own BASIC horticulturalist, Richard "Green Thumb" Montano

No time for introductory waffle this month; there is much to cover and little space to do it.

When it comes to repetitive tasks or testing for particular occurrences, nothing does it better than a command. Especially a computer with BASIC in control. Say you wish to print a character 5 times. You could write a program like this:

```
PRINT "A"
PRINT "A"
PRINT "A"
PRINT "A"
PRINT "A"
```

You can, by using what is known as a FOR...NEXT loop. You could replace the previous five lines with:

```
FOR I=1 TO 5
PRINT "A"
NEXT I
```

The variable following FOR is used as a counter; in this case it will hold in turn the numbers 1 and 5 (as the command says I=1 TO 5). PRINT *** is executed once for each value of I (a 5 times). The NEXT command sends the program back to the matching FOR at the start of the loop, where the counter variable is incremented. The sequence repeats until

Of course, the variable doesn't go as low as 0, 1, 2, 3, 4 or values are other valid examples. You don't have to count from 1 to 5, either, of course:

```
FOR count=1 TO 5
PRINT "A"
NEXT count
```

```
FOR I=1 TO 214047
PRINT "A"
NEXT I
```

```
FOR count=10 TO 34
PRINT "A"
NEXT count
```

Counting backwards

Almost anything can be included in a FOR...NEXT loop—there is little restriction. Even other FOR...NEXT loops are acceptable:

```
FOR I=1 TO 10
PRINT "outer loop"
FOR J=1 TO 10
PRINT "inner loop"
NEXT J
NEXT I
```

When one FOR...NEXT loop is put inside another, it's referred to as "nesting" the loops. The important thing to remember is that the last loop to be opened should always be closed first. The following example is wrong and the computer will normally report an error if you try and run it:

```
FOR I=1 TO 10
FOR J=1 TO 5
NEXT I
```

So far all the loops have counted up, with the counter variable increasing in value as the loop repeats. A FOR...NEXT loop can be made to count down, though, by using the STEP command. For example, the command FOR I=10 TO 1 STEP -1 will repeat down from 10 to 1, using the variable I as the counter. I can be followed by any positive or negative number within BASIC's



As shown, here, a short database showing the power of loops and branching

it works, but what a waste of time, space and energy. Wouldn't it be simpler if you could issue the command once and computer tell the computer to repeat it a given number of times?

The value of the counter variable exceeds the finishing value (5 in this case). When this happens, the program continues from the instruction immediately following NEXT.

FIRST TIME FOR BASIC

Using BASIC for the first time? Here's how to get the program up and running.

Amiga BASIC first loads the computer and then your Workbench disk into a drive. When the Workbench appears, replace the disk with the Amiga Extra-Amiga BASIC disk. An Extra disk will appear. Double click on this icon and wait for the contents window to appear. Double click on the AmigaBASIC icon when you spot it. Amiga BASIC is now ready to use.

Now for Power BASIC: Insert either issue 1's cover disk or issue 7's Power BASIC disk and press the reset key. If you're using the cover disk, double click on the BASIC_INT.PRG icon when it appears and select Power BASIC from the menu. For the full version double click on the PRG60C.PRG file icon (or BASIC60C.PRG if using the retail BASIC package). You're now ready to go.

Read the rest of the article to find out how to create BASIC programs.

ended, so you count up or down in steps of more than 1:

```
FOR I=40 TO 10 STEP -2
  PRINT I
NEXT I
```

```
FOR I=1000 TO 2000 STEP 10
  GOSUB 1
  PRINT I
NEXT I
```

The STEP command decides the exact increment or decrement of the counter variable. In the above examples, I starts at 40 and then takes the values 38, 36, 34 etc. and it starts at 1000, increasing in steps of 10 to 2000.

There have many uses other than printing. These are useful for things, searching, printing - in fact anything that requires a lot of repetition.

Over and over again

In longer programs it is often necessary to execute a particular set of instructions from different points within its body. For instance, you might want to test the screen colours at the beginning of your program, change them at some other point, and then return them to their initial values. You could write the lines of instructions to do this at each of these points in your program. If you do though, your program will get very long as you increasingly find to follow. There are three programming structures which help to ease this problem: GOTO, GOSUB...GOSUB and CALL...GOSUB. The simplest of these is the unconditional branch command, GOTO. It's also the one least liked by theoreticians because it's so easy to abuse.

```
PRINT "Hello"
GOTO 1000
PRINT "Hello 1. I won't sleep in 1000000"
GOTO 1000
PRINT "Now"
```

The parameter following the GOTO command tells BASIC where to jump to in the program. There must be an equivalent 'label' command also in the program with the same name, and followed immediately by a colon. In the example, BASIC prints the word 'Start' and then jumps to the label 'Here', so the GOTO command tells it to bring us, it means, up to the middle PRINT line. Finally, BASIC prints 'You'll underestimate use of GOTO, although it allows precise control of the flow of instructions, can make a program very difficult to follow.

GOTO is altogether a much more powerful structure, as it provides a way of branching to another section of a program and then returning to the place from where it branched.

The section of code referred to by the GOTO command is called a 'subroutine', and is marked off by a label at its start (much like the label used with GOTO) and the word RETURN at the end. Sounds confusing? Have a look at the following example:

```
GOSUB my_hello
PRINT "and again..."
GOSUB my_hello
PRINT "and again..."
END
```

```
my_hello:
PRINT "Hello!"
RETURN
```

Subroutines may appear anywhere in a program, but it is best to distinguish them from its main body by putting them at the end of the program. As BASIC normally moves automatically from the current instruction to the one below, it will run straight into the first subroutine unless you consider it off with a STOP or END statement. You can call subroutines from within other subroutines, and even nest them, though nesting can lead to readability problems like GOTO.

An alternative to the subroutine in modern BASICs is the 'subprogram'. The structure is similar to a subroutine but uses the keywords SUB, END SUB, CALL and RETURN.

```
CALL print_label(1,10,1)
PRINT
END
SUB print_label(n1,n2,n3)
PRINT "label"
END
```

```
END SUB
FOR I=0 TO 9
  PRINT I*I * " * 100" +
  " = " + I*I*100
NEXT I
END SUB
```

Anything between SUB and END SUB constitutes the subprogram. CALL causes a jump to the start of the subprogram, but also saves the contents of a list of variables in it. These values can then be used within the subprogram.

The values themselves can either be passed as numbers, as with 1, 10 and 1 in the first part of the example, or by assigning the values to variables and passing the variables to the subprogram, as in the second part. The variables won't have the same names as those used in the subprogram, but they must be in the same position in the list that's passed, and in Amiga BASIC they must be of the same type. You can't, for instance, pass a string to a numeric variable, or even an integer to a real variable. The example used all those percentages to ensure all variables are treated as integers.

The SUB instruction is particularly powerful when used with BASIC. Amiga BASIC demands the keyword as a sub-program header as any variables defined within that sub-program are then treated separately from any used in the main program, even if they have the same names. By adding the line ON/OFF before either of the CALL instructions, and RETURN after it, the value returned will still be 100, even though the subprogram uses a variable called I for its own purposes.

The independence opens up great possibilities. Boxes of routines can be written and later merged with other different programs. The variables used in the binary system are guaranteed not to interact with those in the rest of the program.

As well as forcing programs to branch with the GOTO, GOSUB and CALL commands, they can also be made to branch depending on the results of a test. But now we're heading in deep water - something for next issue.

TROUBLE WITH LOAD-SADOLLARS\$

Did you get any better errors when trying the file LOADSADOLLARS\$?

LOADSADOLLARS\$ is probably a bad label (most months' charge card). You will have done it if you entered it exactly as printed - that's 'you're' wrong. To remove the problem of 'D' and 'L' to get LOADSADOLLARS...LOADSADOLLARS\$, you'll have to type:

LISTINGS ON DISK

To give you more of a feel of branches and loops, we've included several programs on this month's cover disk which use these commands, as well as those covered in the first issue.

LOADSADOLLARS\$ - a demonstration of loops and branches

CONCAT.BAS - works out multiplication tables and shows that too many accounts can be bad business.

CONCAT.BASIC - the same program as **CONCAT**.BAS, but with the SCREEN stripped. Much shorter, much more readable and much faster.

CONCAT.BASIC - a shell database with jumps and loops patterns. Also several comments you may not understand. Don't worry, they'll be explained in future articles.

Leading listings into AmigaBASIC: Read your Amiga and insert a Workbench disk. When the BASIC environment appears, replace the Workbench disk with your AmigaBASIC disk. Double click on the

AmigaBASIC icon after clicking on the Extras disk. AmigaBASIC then loads. Go to the Project menu and select Open. Click on the filename requester box, scroll the drive disk containing the BASIC files, open the required filename (CONCAT.BAS, CONCAT.BASIC.BAS or CONCAT.BASIC) and press [Return]. You can run the program by clicking inside the BASIC window and typing RUN (not forgetting to press [Return] afterwards).

Leading listings into PowerBASIC (super demo version only): Press your [F] and place the pointer disk in the drive. Double click on the cursor on the icon when it appears. Choose Power BASIC [F] from the menu. When it has loaded you can load one of the sample programs by selecting Load from the File menu and double clicking on any of them (loaded as loaded.BAS, loaded.BAS or loaded) and that appear in the file selector box. The option file loads ready for running (not Run from the Program menu).

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REVIEW

SUPER TOOLS

Richard Monteiro Twists again as he gives the Weros to a couple of ST programs designed to take the pain out of WIMPing, and Jason Holborn looks at Turbo Print and K-Gadget for the Amiga. Plus the pick of the best new technical books.

TWIST
£38.95 ■ ST only ■ HiSoft, The Old School, Greenfield, Bedford, MK49 5DE (0525 718181)

Fipping between applications or programs is nothing new; commercial packages (R-Soft's J and Apple, for instance) and even PD offerings have been touting such features for a long while. So why are HiSoft flagging it as a novel 'innovation'? Put simply, to improve and expand on existing offerings.

The ST - or rather its operating system, GEM - can normally only keep one program running at any instant. Enter Twist: its role is to act as a window for a grid of programs. Twist allows several programs to be stored in memory with just one of them active at any time. The active file can be swapped at any moment for another of the files held in memory.

So what makes Twist special?

Well, the ability to flip between anything up to 14 programs (memory permitting, of course), keeping track of resolutions and colour settings, install VBM discs, and create complex configuration files that will automatically load files into memory or RAM disk ready for loading, most make it the most powerful application switcher around.

Programs are installed by picking 'twist' from Twist's menu bar. An alert box requests a memory allocation for the program (usually 50K more than the file size, although this varies from program to program). And that's it. The program loads and runs as usual. The only difference is that pressing a combination of keys either switches control to another application stored in memory or passes control to Twist.

Most programs that stick to the constraints of GEM will work without trouble. On a 44kg ST we managed to swap between QFA 2000C, QFA 2000C Compiler, Power 8000C, Demos ST, Protect, First Word Plus, Digas 516 and First Street Publisher. HiSoft's interface won't work with commercial games, accessories or programs that create their own custom screens. For program development, desktop publishing, reviewing (text processing) and other applications that require much fiddling and fong, get down to the Twist.

Features	4.0
performance	3.5
ease of use	4.0
manuals	3.5
format verdict	3.5



Twist in operation, switching from one application and jumping straight into another.

EARLY BIRDS

The earlier versions of Turbo and HECX were primitive, and we did encounter one or two 'too slow-to-start' 'initialisation' errors with increased letters/lines. What we can say, though, is that we're pleased they should be very good.

TURBOPRINT
£29.95 ■ Amiga only ■ George Thompson Services, Dippes, Brodick, Arran, KA27 8HW (077 682 234)

Those who do a lot of printing on their Amigas will be pleased to hear about a new utility called TurboPrint. It claims to speed up the printing of screenshots by up to ten times, through the use of custom written Turbo printer drivers.

Loading TurboPrint involves loading your Amiga from the TurboPrint disk, whereupon it installs itself automatically and reboots the machine, so fitting you carry on as normal. The nice thing about TurboPrint is that it remains active even after a soft reset in a game area.

TurboPrint's main claim to fame is that it enhances printing from any Amiga package with no modification to the program. The package achieves this by having all the printer drivers and the printer device

program written completely in 68000 assembler.

Now on the TurboPrint disk are two other programs, TurboPrints and TurboPrints. TurboPrints is a separate preferences program written to complement TurboPrint. From TurboPrints, you pick the particular Turbo driver for your printer from an extensive list which includes drivers for Star, Epson and NEC machines. The TurboPrints program, as the name suggests, allows you to turn off TurboPrint.

TurboPrint works via 'hotkeys'. For example, pressing Ctrl+Shift+space skips the current screen, regardless of format, to your printer. The speed and quality of the resultant dump is very high. For example, printing the same graphics file to a 4-pin printer took these times:

Wordwatch 1.2 drivers	7:06
Wordwatch 1.3 drivers	1'51
Turbo Print drivers	1:30

Turbo Print performed two passes on the print head, ensuring the printer's apparent quality. The TurboPrint 1.3 drivers are slightly faster but poorer quality.

If you're after replacement printer drivers to speed up graphics printing, it may well be worth your while waiting for the official Commodore TurboPrint 1.3, which features enhanced printer drivers. If, however, you're after a fast screen dump utility for any Amiga program at any time, TurboPrint is definitely worth a look.

Features	3.0
performance	4.0
ease of use	3.5
manuals	3.5
format verdict	3.0



K GADGET

**£29.95 ■ Amiga only ■ Kama, 12 Horsehoe Park,
Pangbourne, Berkshire, RG8 7JW (07357 4395)**

The Amiga's intention was designed to be the most flexible RMP system on any machine, subroutines, dreams - all, for this flexibility comes at a price. If you've ever programmed intention you'll know that it involves writing a large number of data structures before you even start to get anything worthwhile. The more complicated your intention-based application becomes, the more data structures have to be set up and after a while all this can get very tedious indeed. To take the tedious out of intention, Kama has released K-Gadget, a program

that allows you to carry out all this setting up from within the comfort of a program generator.

K-Gadget is a Gadget and Requester editor that lets you build your Gadgets or Requesters on-screen and then save them to disk either as an ASCII file that can be included later for further editing, or as C source code for inclusion in your own programs. It file based as C source is automatically given a .ju extension. This file can then be called into your own programs with the C pre-processor command, #include. K-Gadget has the ability to edit Request, Proprietary and String Gadgets as well as all the attributes of a Requester, such as its position, size, name, borders etc.

When you create a Gadget or Requester, K-Gadget displays a small 'copy' window containing icons of all the different Gadget types and of a Requester. To create a particular Gadget or Requester involves clicking

on its icon and dragging it into the work area. Once this is done, all the attributes for that particular Gadget or Requester can be set from the pull-down menus. When all the flags for a Gadget have been set up, K-Gadget allows you to edit its appearance. Requesters too, are well catered for as K-Gadget allows you to edit their borders and text to your Requester will have that 'personalised' look.

If you already know intention fairly well, then the time-saving you can achieve using K-Gadget makes it a recommended purchase. If you are just starting out with intention, you should wait a while before buying K-Gadget as the package assumes you're familiar with the principles behind the environment. If you know nothing about intention and think K-Gadget will do all the work for you, you're mistaken.

features	4.0
performance	3.5
ease of use	4.0
manuals	4.0
format verdict	4.0



WERCS

**£29.95 ■ ST only ■ HiSoft, The Old School, Greenfield,
Bedford, MK45 5DE (0525 716181)**

Most things RMP can be built into any shape or size: menu bars can have any number of options, dialog boxes can fill a few square inches or the entire screen, alert boxes can contain icons, text or both, and icons can be any design. To produce this sort of environment requires a lot of work and a lot of data. WERCS - RMP Environment Resource Construction Set - allows you to create and edit GEM resource files which hold all the RMP data.

Doubtless you'll have seen files with the extension .RSC. These are resource files which contain the tree structures defining how a particular program interacts with the user. They are used by GEM RSC Application Environment Services for producing

menus, dialog boxes and other GEM-like things. Each resource file contains one or more trees. And each tree consists of objects of a distinct type, use and appearance.

The first stage within WERCS is to create a new tree. The choices are four: dialog box, Alert, String, Menu

or your exact taste. For instance, objects can be moved and sized, flags like ticks that appear in menus can be assigned to menu options, boxes can be bordered in various styles, text can appear in numerous colours and sizes, and icons may be added.

WERCS takes the format out of RSC programming. It's friendly, can produce in 8-bit text, creates your own objects and is the only resource editor available to the public (aside



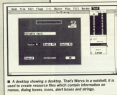
■ Icons can be created for inclusion in dialog boxes. Editing features include flipping, zooming, ANSIC, Oling and XBRING.

and image icons). From there you can add objects to the tree: boxes, buttons, icons, images, strings, text. Several trees can be held within WERCS, these may be altered at any time. When you're happy with your intention you can save it, along with a header file, and integrate it later with a program in a language of your choice.

That's a brief overview of WERCS; each object can be probed

being of an advantage in itself - Oh, strictly for technicians.

features	4.0
performance	4.0
ease of use	3.5
manuals	3.0
format verdict	4.0



■ A desktop showing a desktop. That's WERCS in a nutshell. It is used to create resource files which contain information on menus, dialog boxes, icons, alert boxes and strings.

BOOKSHELF

USING ST BASIC ON THE ATARI ST

Book Meadows ■ £7.95, paperback, 180 pages ■ Ginn Press ■ ISBN 1-85181-179-4

Book covered single BASIC and INTEL commands, drawing shapes, loops and jumps, mathematical functions, arrays and even writing full-length programs.



Book Meadows is credited with writing many research papers and articles - it shows. The programs detailed are perhaps too practical: measurement converters, income tax calculation and loan repayment. Gripping stuff that is bound to keep you interested in BASIC programming.

While the book is good for first-time and reasonably competent BASIC programmers, those wishing to access all things INTEL will be disappointed. There is no mention of how to interface with GEM. Perhaps the pages wasted on a forward by Jack Tramm, an introduction by the author and a preface by the editor could have been put to better use.

FIRST STEPS IN 68000 ASSEMBLY LANGUAGE

Robert Erskine ■ £12.50, paperback, 278 pages ■ Ginn Press ■ ISBN 1-85181-060-1

Many will spend hours arguing the pros and cons of BASIC and Pascal, C and C++, Fort and Prolog, but at the end of the day all they really want is something that produces fast, compact and usually machine-interchangeable code (usually the same process). None of the high level languages really deliver. Assembly language programming is the only way to guarantee that, speeds machine code programs. 68000 assemblers are available for both ST and Amiga, with the same syntax on both micro. Ginn's book doesn't assume you have any particular 68000-based computer which is good, but does mean you will need additional literature to access your

particular micro hardware.

Recommended to anyone starting the obvious assault on assembler: Register layout, register addressing, position independent code, addressing modes, exceptions and everything the learner 68000cooler needs to know.

C: A DABHAND GUIDE

Mark Burgess ■ £14.95, paperback, 300 pages, Date Press ■ ISBN 0-470326-16-2

One of the few books available that is as useful to the beginner as it is to the experienced programmer. The book takes you through the basics of C in a clear and concise manner, and it includes sections for all the popular machines: ST and Amiga included.

Scattered throughout the book are numerous examples that, are helpful but do suffer from typographical errors - unacceptable in C source.



although there are sections for ST and Amiga, don't expect the book to teach you all about C on your particular machine, these sections can only really be thought of as an added bonus.

AMIGA TRICKS AND TIPS

Book, Meadler, Wetton ■ £19.95, paperback, 140 pages, Abacus ■ ISBN 0-85436-68-7

This book incorporates a high level of technical content without losing the sanity of AmigaBASIC. Most reference books for the Amiga (and the machine rather than C or from machine-orientated) it is therefore nice to find a book that gets fairly technical without leaving the basic programmer in the dark.

It includes sections on AmigaDOS and the Workbench, and it comes as a pleasant surprise to see the ST format discussed in some depth.

If you program in Basic and would like to dig deeper into the Amiga without having to learn other assembler or C, Amiga Tricks and Tips could be just what you're looking for. A must for the AmigaBASIC programmer.



AMIGA MACHINE LANGUAGE

Stefan Dietrich ■ £20.95, paperback, 274 pages, Abacus ■ ISBN 1-85176-020-5

AMIGA ASSEMBLY LANGUAGE PROGRAMMING

John Commander ■ £13.95, paperback, 232 pages, TAB Books Inc ■ ISBN 0-8306-2711-1

Both books start by introducing the reader to Assembler and then move on to the 68000 and its instruction set. Sadly Meadler's book makes through it's aforementioned beginner's stage with only an overview of the 68000.

Meadler's book has the most Amiga-specific information, but sacrifices detail for content.

The problem with both books is that they list all the routines available in the Amiga ROM kernel, but make no attempt to explain what the routines actually do! Therefore you'll have to buy the ROM kernel manual, Libraries and Services (which will set you back £30) to be able to use the ROM kernel routine fully.

Both books will teach you 68000 assembly, but for your money, the John Commander book is the one to choose. Meadler's book, although packed with information, does not go into enough detail. It's better to know a great deal about very little, than very little about a great deal.



ORDERING BOOKS

If you want to get hold of any of the books mentioned on this page, why not book them in advance to order? For you if you can't find them in the UK, either publisher and ISBN number (or the standard book ordering system code).

Alternatively, you can get direct ordering via an 01493 4333. Abacus books are available through Precision Software 013 630 7150; TAB books are through John Wiley-Publisher 06371.





Autofiling stick friction

Often an OS will start to make files for no apparent reason. Typically the machine might refuse to drop menus, type most key-board input and even file loading files correctly. If you're gut an auto-filing system (debug it, and it is mostly auto-filing issues, then take it out or install it on a floppy. The computer receives a barrage of rapid input from the keyboard and has, consequently had difficulty acknowledging any other commands.

Jamie Williams
Greys, Essex

To close or to close window

File, located on the menu bar, has two very similar commands: **CLOSE** and **CLOSE WINDOW**. The first, **CLOSE**, duplicates the top-left icon of an active window; basically it moves up one directory level whereas if you click or close the window if the root directory is active, **CLOSE WINDOW** causes the window to disappear completely regardless of which directory level you're at. In a window you need to navigate this way round.

Jamie Williams
Greys, Essex

Big discs

Many spelling checkers come supplied with various help files and other utility programs all eating up space on our disk. This has the unfortunate effect of reducing the spelling checker's usefulness as user dictionaries can never grow to full capacity. Simple solution: copy the dictionaries onto a blank disk. This will let them grow unhindered.

Jamie Williams
Greys, Essex

Cadbury's caramel cursor keys

If you're using the Altimate cursor key combination to simulate mouse movements, try holding down [Ctrl] at the same instance. You'll find that the pointer issues in smooth pixel movements.

Sam Wilson
Whitshaven, Cumbria

The disc discovery

The device code for the IBM BIOS call **DISCOVER** (hex #13, function #5), according to Bentley's reference guide, should be between 0 and 4. However, if 5 is used, the output device chosen is the screen which enables the full Atari character set to be displayed, and not just ASCII symbols.

FILE NAMES

If you have investigated the contents of disks, you will have probably noticed that file contents of a maximum eight-character name, a full stop and a possibly forming three-character extension. The three-character extension can tell you a lot about a file.

.DOC - usually a help file which contains information about a program or disk.

.BMP - a IBM program file. Double clicking on this causes the program to start.

.TOS - a Franklin Operating System file. That is, a program that doesn't make use of the IBM's environment. Double clicking on a file with this extension causes it to start.

.TTP - TOS saves parameters for the disk just that. Clicking on this type of file results in a new page asking you to enter some information for the program to

use.

.ACC - an accessory file. These can't be run in the usual way, but will load at boot time if present in the root directory (see last issue).

.BIN - resource file which contains data and start information. Of no use to you generally.
.BRI - **BRIEC** files are used by BT BASIC.

Double clicking on any file with an extension other than **TOS**, **BMP** or **TTP** will cause a window to pop up asking you to show **Print** or **Cancel**. This will display the contents of the file on screen. **Print** sends the file to printer and **Cancel** takes you back to the Desktop.

DELETING FILES

Dangerous operation this if used carelessly. To delete a file, select and drag the required file or files to the trash bin and

dump them there. A prompt will appear asking you to confirm the deletion. Click on **OK** if you are positive you don't need being the file. Remember, once you finish something, it is gone forever.

RENAMING FILES

Select a file by single clicking on it and point a file on the menu bar. Select **Close Info** from the resulting menu. A dialog box will appear containing the current name of the file. Use the arrow keys to edit the name but modifying and its attributes (read, write, etc).

Change the name by pressing (Delete) or (Esc) and then typing in the new name. Alternatives can be up to eight characters, optionally followed by a full stop and a three character extension. Be very careful not to change the three character extension as you might not be able to run the file again. Press (Return) or click on **OK** when finished.



```

80000000 00000000 00 00 0000
1000000000 00 00 00 0000
00000000 0000
00000000 0000
00000000 00000000 00
0000 0000
0000 0000
  
```

Marie Pyrochod
Oxton, Peterborough

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WORKBENCH

Mystified by the manuals? Flummoxed by the files? A pair of pages to aid Amiga owners in their struggle against visits from the dreaded Guru. This month's £30 prizewinner is John N. Bloor for his multi-coloured tip on enhancing the look of text files on screen.

Multi-coloured bits

If you're a BASIC programmer and you're interested in getting the most out of the Amiga's graphics system, you've probably experimented with Sprites and Fonts. Amiga BASIC comes with a utility called the 'Object Editor' to help you design these handy little devices.

The standard version of the Object Editor only allows you 4 colours on screen at once. It is possible to get 8 or even 16 colours though, depending on the amount of memory you have. With 256K you can only use 4, 512K of Amiga's, including early 500K-disk, an A500 you can certainly get 8-colour screens, and maybe 16 if you're lucky.

What you have to do is edit the Object Editor program, which is itself written in Amiga BASIC. To remove the colour markers from a few vital lines in the program actually runs them. The extra colours only apply to Fonts, not Sprites, which are limited to four colours anyway.

If you've got more RAM, you could try using the Colour Control of Bits to 16. As well as uncommenting the lines as shown in Stage 5, change the line `Obj=1-3 to Obj=1-4`. This gives you 4 bit-planes, hence 16 colours. Be warned though that if the Object Editor runs out of memory on account of there being too many bit-planes, your Amiga will crash!

Hidden pictures and music

If you get your Amiga from the Sainsbury's, it's likely that you have 1.0 PD (Public Domain) disks as well. On PD disk it there are some hidden pics, and you can find them by pressing certain keys while the slide show program is



1 - Put the 'Object' disk in the drive and open up the 'TrashCan' drawer.



2 - Double-click on 'Options' to run it.



3 - AmigaBASIC starts up, and the program begins to run. Press (Ctrl) to interrupt it, then choose 'Show List' from the 'Window' menu.



4 - Resize the font window so you can see it all, press (Shift) cursor down to scroll the editor one screen-down, and you'll see six lines beginning 'if bits are to be treated...' with quote marks before them.



5 - Remove the quote marks from the bottom four lines, and choose 'Show' from the 'Run' menu.



6 - Once you're into the program, type 'F' to select Font colour that begins editing, and you'll see the colour palette at the bottom of the screen now has eight colours.

seeing. Almost every letter from A to Z has a picture for it — there are about forty as many images as you could see if you let the disk flow-over normally.

Also, if you have OMC3 (Olivetti Music Converter) installed and wish to use the sound effects on the CD disk 4 then by this Load OMC3, pull down the Measure menu and go to SET INSTRUMENT. A window will appear. Clear the two boxes at the bottom by clicking in them and clicking any text. Insert PD disk 4 in drive C, click on the box which says OMC3, and a directory of the disk will come up in the window. Go to the bottom of the list and click on Sounds. OK. The sounds will appear by name on the screen — click on the one you want — say, MELO — and use this as a new instrument.

Some effects are great, but others can drive you up the wall!

**Andrew Ripoll
Barnes, Herts.**

These messages!

It seems to be almost common knowledge that the original developers of the Amiga — the Amiga Corporation Inc. — left some hidden messages in the system software when they sold it on to Commodore.

Just in case you get the urge to test these fabulous codes, here's what you have to do. Boot your Amiga up to you get to the Workbench screen. Click the pointer anywhere in the screen (not to make sure it's active — the amount of free memory shown in the title bar. Hold down both [CTRL] keys and both [TAB] keys at once. Press each function key in turn and you will see credits for the designers appear in the title bar.

Now for the sting; you might need the aid of a third hand for this, and with the four [SHIFT] and [TAB] keys still held down, hold down F1) and open the Workbench disk from the drive. Keeping all the keys pressed, put a different disk back in the drive and you will see a message which Commodore will probably never show from future releases of Workbench.

**Stephen Knight
St. Martin, Jersey**

More fonts

If you've managed to escape a disk with some extra Amiga fonts or a .font file from the Public Domain or from a commercial package with a variety of fonts, you may experience difficulties getting some programs to recognise the new character sets. This is because when the Amiga tries

to load its fonts it always looks in the 'typical device' called FONT:, which in practice means the desktop FONT: on the disk you boot or the machine with.

You can, however, make it look elsewhere for its fonts. For the sake of example, suppose that your new fonts are in a directory called FONTONS on a disk called MCDISK. You can set what a 'dummy' name is by loading under its name on the Workbench screen. Before you run a program — whether it's normally run from the Workbench or the CLI — open up a CLI window and type at the command prompt the issue: F for detail of how to open up a CLI win-

dow, if you aren't sure.

Now you can close the CLI if you want to and run a program which uses fonts as normal by clicking on its icon — this certainly

works if Deluxe Paint, as an example. When you choose the font fonts option from the relevant menu you will be asked to insert FONTONS in the drive and your new fonts will then be listed.

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works if Deluxe Paint, as an example. When you choose the font fonts option from the relevant menu you will be asked to insert FONTONS in the drive and your new fonts will then be listed.

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works if Deluxe Paint, as an example. When you choose the font fonts option from the relevant menu you will be asked to insert FONTONS in the drive and your new fonts will then be listed.

SCOUPED-UP TEXT FILES

If you're writing a text file to appear on the screen, for example as a set of instructions for someone to use your program, there is a lot you can do to make the presentation a bit snappier.

The trick is to embed ANSI codes in your text. These are special codes which, when the Amiga's screen controller reads them, cause the following text to be printed in bold, italic, underlined, or a different colour. The new information you need is hidden in the rather terse Appendix D, Printer Escape Codes, at the back of the ordinary Amiga manual.

You will see that the appendix takes the form of a table of lines like `ESC[3m` (ESC is the hexadecimal value 1B) in the first column headed 'Letter', the important information is that Escape (1B) is the hexadecimal command.

There are several ways to use these codes. The most straightforward is with ECHO comments in an Escape file. Using ECHO is any text editor you want, create a file called PRED containing the line:

`ECHO "Here is some text to be echoed later"`

Now when you run this file by typing `EXECUTE PRED` at the CLI

you will get 'Here is some bold text' appearing on the screen. The characters `$\backslash m$` are treated as 'Toggle' by the ECHO command, so `$\backslash m$` in the string is equivalent to the ANSI 'toggle' command in the screen and shows you will get quite an involved set of comments to switch colour, underline and so on.

Here is a list of the most useful ANSI escape commands. Note that not all the commands in appendix D actually work — most are intended for use with printers rather than the screen, so things like '15' line spacing, turn to tabulating:

- ESC Clear the screen
- ESC[0m Status on
- ESC[1m Status off
- ESC[4m Underline on
- ESC[5m Underline off
- ESC[7m Bold on
- ESC[8m Bold off
- ESC[9m Cursor up
- ESC[0m Cursor down
- ESC[C Cursor right
- ESC[D Cursor left
- ESC[2m Blue text *
- ESC[3m White text *
- ESC[4m Black text *
- ESC[5m Orange text *
- ESC[6m Blue background *
- ESC[7m White background *
- ESC[8m Black background *
- ESC[9m Orange background *



■ ANSI codes embedded within ECHO comments. Don't forget to put a ESC[0m code at the end to reset the text to normal.



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GOLD DUST

Transatlantic secret agent Steve Gold brings news of Atari's new factory, transputers, Macintoshes and more for ST and Amiga.

Some good news for ST users who had difficulty buying their machines during the ST shortage earlier this year. Atari is negotiating for the purchase of a 300,000 square foot video games factory in Houston, Texas.

If the deal goes ahead — and it looks like it will — the Houston plant will ease the load on other Atari facilities, thereby allowing increased ST production. For UK Atari consumers, this will improve supplies of the ST, which in turn will make for better discounts from dealers.

For those of you who already own an ST and aren't thinking of upgrading to a Mega, then again, US reviews suggest that a 68030-based super-ST is on the way. The 68030-based machine is scheduled for a September/October launch in the US (minimum \$1,100).

The super-ST is expected to be downwards compatible with the existing STs and, based on previous performance, there's every indication that the machine will be introduced in the UK (though not released at September's PC Show at Olympia).

Also on the horizon is a third-generation games console. The machine will be launched in January 1989 and feature an onboard 68030 microprocessor. The price will be \$200, which equates to about £129 at current exchange rates. As models will already have passed, the games machine will probably be a stepped-down 520SFM, mouse keyboard and possibly disk drive.

Alternating currents

Over at Atari's HQ headquarters, an interesting development is developing between Neil Harris and Sam Trammell. Harris left a message on Commodore's Atari team to the effect that Atari is reworking its US merchandising of the ST. Distributors are now apparently being left out in the cold, and the company is concentrating on employing sales reps in

the field. Understandably, this message has caused concern among Atari users, many of whom rely on distributors for technical advice and backup support when their dealers can't help them with their inquiries.

A week or so later, as pops Sam Trammell, MD of Atari, saying he was "disappointed by the negative letters and articles regarding comments made by Neil Harris."

The consensus of opinion in the US Atari ST community is that users cannot expect much assistance from ST distributors and, if they want support, they will need to buy their machines from full-price retailers. UK readers would do well to note this point, given the number of special offers in the ST which are currently being advertised.

Sac — the hit

These Amiga users who've been looking anxiously at David Small's Magic Sac Macintosh emulator for the ST will be pleased to know that it's now working on a Mac emulator for the Amiga. Unfortunately, Small is reported to have encountered a programming problem with the Amiga's memory map, with the result that initial versions of the Amiga Magic Sac for all almost certainly be limited to 256K internal programs.

There isn't much Mac software that will run in a quarter-Meg, so until Small is someone else (perhaps the memory map problem), it looks like a Magic Sac for the Amiga will only be of limited interest. Don't despair, though. Small says the memory problems only affect the A500 machine. As long as your Commodore gets around to increasing the Goby Amiga's system memory to 1MB, and/or users start installing extra RAM on their machines, a workable Mac emulator for the Amiga becomes viable.

Taking a realistic view of things, it seems unlikely that Small will market a Magic Sac for the Amiga until 1989. Amigas become available, 81000 owners will probably be disappointed when the

Amiga Magic Sac finally appears, since their machines don't have the necessary capacity to drive non-compact-disk drives.



■ In Apple Macintosh, could the Amiga run its software soon?

Software soon?

Meta Software, a doubt is raised in England's Atari Club. Cook source level debugging package for the Amiga. The 500 package should be available in the UK through a number of distributors by the time you read this.

Interestingly, although there are no current plans to release the Acyc debugger on machines other than the Amiga, Meta do say that the package will run on most other 68030-based models. This could be a chance for budding technical types to port the

package over to the Apple Macintosh or Atari ST environments.

Amiga owners will access to a system will be interested to find that Meta, a new US software house, is distributing a 586 communications package called Amicomm. Amicomm is provisionally scheduled for a very late "usually '89 release and seems to be way ahead of any other Amiga communications software. Amicomm features include 1, 1 and 2 Modern file transfer, as well as 8000 and Kermit facilities.

Also included in Amicomm's long list of features is a variety of formal protocols, including TTY, VT10, VT100, and APL0. In addition, the package includes a call logging facility so you can check your phone bills when they come in. Amicomm also supports remote program facilities. Put simply, this means you can dial into your own (or somebody else's) modem-equipped Amiga, and run programs on that machine. The resultant text-mode screen display is then echoed down the phone line, so it data is sent from the machine's screen, printer and/or also down. Answering rates at just \$26. Look out for Amicomm in the imported software lists soon.

Putting the Abaq back

On the computer front, the Abaq continues to attract interest in the UK. Sources suggest there are currently 50 machines in general use with abaqulators, and a further 200 are installed during July.

There are strong reports that the Abaq will be on sale in both sides of the Atlantic by the end of the year, although much rests on the work of Perihelion, the company responsible for the Abaq's multi-tasking operating system, Helix. A spokesman for Perihelion has been quoted in a trade paper as expecting Helix to be available by the October.



■ Atari's long-awaited Abaq. Perihelion is being held up waiting for Perihelion to finish the operating system, Helix.

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Getting more from RAM

There are a couple of problems with the RAM disk utility from Alan L. Firstly the loading message is wrong as it assumes you are in mode 640, which I am not. Also, it doesn't let me set my software to be run from mode the RAM disk. It is quite useful for copying though. While the fees I might as well ask software writers to add a bit more flexibility to programs for the ST. Take the RAM disk program, it just tells you that you have a 2048 RAM disk and if you want to change the size as well, sorry money you can't.

Why don't programs use the Dos and Xdos hook codes - it would save owners of the new ROM-machines a lot of bother?

Jonathan Small
Barnaby

■ The RAM disk program is PD and we pass the code and documentation on including instructions on changing the drive size to 'x', which we're obliged to do. It doesn't take a lot to switch installation from the preferences menu, though. Most games refuse to work from RAM disks as an arbitrary measure, but many applications have options to configure their programs to work with a variety of drives.

Printers on line

"Could you have a survey on printers in your magazine? I wish to purchase a printer (ideally a Star LC18 for my Amiga and I also want to use it on my dated CG4). Is this possible and if so, do I need any extra leads?"

How come that software for the Amiga is more expensive than

that for the ST? When I purchased my CG4 the software was a few pounds cheaper, now I have the same problem with my A500. For example, in your first issue Interceptor for the Amiga was £24.95 and Virus for the ST was £19.95. Surely a Commodore want to be No 1, then they should keep the prices closer together, to encourage higher sales.

J.L.Hocking
Tues. Connell

■ We'll be looking at hardware options during the coming months. You can use the Star printer with both machines, but you will need separate, plug, interface-cartridges for each: a Centronics cartridge for the Amiga and a Commodore-specific one for the CG4. You'll also need leads with the correct connectors for each. This system of cartridges doesn't apply to all manufacturers, so check before buying.

It's not really fair to compare different games from different manufacturers. Although there's still some discrepancy between ST and Amiga prices, more and more are being released at the same price. Commodore has very little control over the pricing of titles from independent software houses.

ST to BBC

I have an Atari 520ST118 and I am using a TV for the display, but want to use a monitor which has a BBC lead. I have seen advertisements for Philips monitors with Atari leads and I was wondering if I could buy a lead like that and connect it to the BBC monitor, therefore using it with my Atari. If I can, would it be a better quality of picture?

Ben Siskin
Cardiff

■ According your monitor is the standard Monochrome type sup-

plied with most BBC Monos. It won't work with your ST as it needs TTL level RGB input and not the linear levels used by Atari. You would also lose any sound output from the ST, as the Monochrome has no speaker.

Q and A

I don't own a 16-bit computer yet, but I am hoping to get an Amiga A500. I would be grateful if you could answer the following questions for me:

1. What is the Workbench and what is CLUT?
2. What is the RAM disk?
3. Why does the software for the Amiga and ST cost so much?
4. When you buy the Amiga, should you get the Workbench disk with the computer?

Fazwan Mirza
London

■ My dear:

1. The Workbench is the customised interface to the computer which uses Windows, Icons, Menus and a Pointer (a WIMP) to make working with the machine easier than having to learn a series of commands. The CLUT (Colour Look Up Table) lets you type in the commands that the Workbench has to send, if you're determined to do things the way.
2. A RAM disk is an area of the Amiga's memory set aside to mimic a disk drive. It's particularly useful for copying files on single-drive micros, as it's a lot faster than a 'real' drive. The Amiga's RAM disk is particularly clever, as it expands and contracts automatically to store whatever you put into it.

3. Because you're comparing it with a lot home-computer prices. Compare it with business software on the IBM PC and it looks cheap.

4. No.

AT SCREENING POINT

I have only had my Amiga for about two months, and bought it to do my husband's accounts on. Unfortunately, I haven't had time to do them yet as I am too busy playing games on it. At least it's a good fee while off. Next, let's get to the problem, when I first bought my machine, I purchased MicroMillions Guide to the Galaxy. I am stuck, and after two months of desperately trying to figure it out I've decided to ask your expert advice (cheap, cheap). When you are on the Board of Gold and everyone wonders off, what are you supposed to do? The star that Marvin keeps wandering off through will not let me through, I have tapped, poked and told it that I am a Superior Being, all to no avail - so please, please tell me what to do.

Barry Smith
Ceywood, Wales

■ You're not going to like this, but the screening door's a real bummer. Spend your time instead building an impenetrable shield. A nice cup of tea could help.



C compiles and dies!

Since my upgrade, last Nov, I have been buying every Amiga magazine that I could lay my hands on. When I saw your magazine with a free disk, for is it a disk with a free magazine for the same price, I thought, "Well, if the disk is of no use I can at least reformat it."

Surprise, surprise! Your magazine sure makes all the rest look like run of the mill rags guff. I am tracking myself to program in C using Lattice C 34. Although most programs work, I still get into problems.

One of my problems is that the program compiles, links and then uses for default values on such and such "MIDI". As I do not understand this, when the programs are run via the GUI, I have a responder telling me that I have a software error, and to stop all disk activity. Please help me!

Mr S.J.G.Paves
Latham

■ We've come across this problem, too, and like you are confused by it. Basically, you haven't got the correct libraries open when you link, if you use any floating point arithmetic or square roots and the like, you'll need to use an extra maths library, so that would be it, instead of typing `LIBRARY=` to `LINK` in the `LIBRARY` file.

Sounds good to me

I have owned an Atari 800X for 2 years now, and recently upgraded to an Atari ST. I was amazed when I saw the screen shots in Format and other magazines, and with a loan from my parents I purchased an ST. I was very upset at the way some of the games moved—in particular the scrolling on some games is very jerky (which I spent way on the 800X) and when there are several moving objects in the game it becomes very slow. Also, in your first issue I was very disappointed to read that the Amiga missed chip was far superior to the STs. Do you think I should sell my ST and buy an Amiga (as it stands I would rather have kept to my old 800X)?

Peter Brady
Wolgan Garden City

■ I don't know which games you're running, but try Return to Genesis or Solitaire to see examples of great ST scrolling. The graphical complexity of current 26-bit games is no much greater than anything on the

In sequence

I am at the moment toying with the idea of buying an Atari ST. My main aim is to use it for MIDI music, and therefore I would appreciate any information you have on MIDI expansion software. I want something decent but not too pricey or specialist — I would never make use of the 24 track Steinberg software. Ideally, I would like a program for the 52087 and one with not more than 16 tracks.

Nigel Wilson

■ Have a look at the Microsoft Super Conductor or the Hybrid Arts Easy-Score, both around the £50 mark.

Hitting the buffers

I have made great use of Amiga Sonic 2.0 software when I am composing on my Amiga 5080. I am quite pleased with the results so far but there are problems and despite writing to the American company twice I have received no reply.

I am using a Yamaha DX100 as all four MIDI channels but when I ask it to change patches on a long composition I get the message `MIDI BUFFER FULL` on the DX100 display. I have tried everything to get around this but with no success. I can make it change patches on short brief pieces of music but it will not

MUSICAL CHAIRS

work on proper songs. I am of course willing to 4 MIDI channels to the same channel and patch as the fourth is not multi-ported.

Ian Martin
Malden

■ Perhaps you're missing something, but we can't see any reason for naming a mono-channel instrument from 4 MIDI channels — surely one would be sufficient, and might not confuse MIDI so much. The `MIDI BUFFER FULL` message is not uncommon on MIDI cards, and reflects the fact that the transfer rate for MIDI packets is not fast enough to keep up with the data when complicated patches are being used.

MIDI muddle

I have recently become involved in a music application with a few friends. So I thought, MIP now I can utilize my potential as a recording engineering etc. studio. However, I could not make my Atari ST's potential since all MIDI information tends not to answer some obvious questions. For example, assuming you have software that will function in conjunction with your computer as an 8 track mixing desk, how long a track can one disk hold? How do you record to tape, for playback? Software shop assistants are not much help either, so in desperation my friends

gave up and purchased the finished bar track recording studio. So what's your advice?

Do be cautious, you don't normally hear about Cannon Computers! Sure the graphics are good and the idea is sound, but the game play is awful! Just a monotonous take-the-leadhere, take-the-leadthere etc. And you can't even speed things up in between travelling to and from islands. I feel that a potentially good game has been spoiled by lack of thought, on the part of its designers.

Mark Butler
Singapore-Vic-Thames

■ I think you're confusing mixing and sequencing. A sequencer which can be used to play a sequence of notes with specific sounds, tempo etc is rather different from a mixer, which takes the audio outputs from several instruments and integrates them all together for recording or live performance. The former is easy and well handled with an ST or Amiga through MIDI. The latter isn't, and at the time of writing and of the market the Amiga41 track is probably not a bad bet.

Tracks and pieces of length have similar lengths — the length of a track depends on the complexity of each note and how many instruments are playing on it.

80000 but you're not really comparing like with like. Although the Amiga sound chip is more sophisticated, whether it's worth swapping machines for depends on the importance you attach to sound quality.

Automating VirusX

I wonder if you could please help me: could you please tell me how to get Virus into the startup sequence so that when you boot up your Amiga it is already there to start checking disks? I've looked through the Commodore manual only to find 10 lines of meaningless information.

Janis Selby
Ripley

■ First, make room in your Workbench area for the Virus program (delete the Demos folder if you like) and copy it into the 'top-level' directory. Type `DO AUTOSTART` (displayed as `run` by the hot editor) and load the

startup sequence file into it. Add the line `DO VVIRUS` to the end of the file and save the file and exit by pressing [F10]. Restart the machine and Virus will be installed. You will have to resize the GUI window which appears during bootup though, as the Plus! task doesn't terminate and the window is left open. The Workbench screen is underneath the open GUI.

Format Français

First I must tell you I am a French student, so I do apologise for the mistakes I will surely make.

I think ST Amiga Format is a really great magazine. The idea of a cover disk is wonderful. ST Amiga Format isn't too hard to understand, and very interesting. That's why I want to ask you the question: what have I to do to get ST Amiga Format in France?

M-Ozanovic
France

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department at The Old Barn, Somerton, Somerset BA11 3PP or ring them on 0458 440311. They'll be happy to guide an overseas subscription sale.

Sallying Forth

Under the 'Getting Going' language list in issue 1, whatever happened to Fort? I suppose your choice is formed by whatever articles you read at the time you start, but I get the general impression that Fort was 'lost' because:

- a) it's easier — you can say if it's going to work out, debugging as you go along (unlike C, where I understand you don't feel out until the end)
- b) reasonable cool — cheaper than many BASICs and C's (including Pascal that I've seen. Very nice-looking literature too. I have 2 marvelous books.
- c) more compact and faster and more elegant than Basic
- d) easier than Assembly
- e) applicable to just about any pro-



pose, fast graphics, robotics etc. Why doesn't everyone use Form? Is there a snag I haven't come to yet? (You don't have to stick to 18 sections, and you can delete - I often run Form as first using a calculator works, though I have a desk accessory calculator, as the screen's more comfortable and it's quiet.

It only takes 3 or 4 goes before you have a mental picture of the stack popping up and down in your mind - it's easy! Sorry to go on but don't leave it out of your language features and program listings.

**Norma Wingham
Halswood**

Full bag

On which machine (and set of interests) were the icons used for the headings of the pages created, ST or Amiga, or was it another machine to save being accused of bias?

At the moment I am using a normal TV with my Alan ST386, which is adequate for all work, as red and blue are very dominant colours, and merge over other colours, making detail work practically impossible. I would like to get a monitor and wonder why Philips monitors are cheaper than Alan's own, are they less reliable? Which monitor would be the best for graphic work?

Also, I'm thinking of getting a second drive, is the one selling for \$99.99 suitable? I want to change the internal drive for a 1 Mb drive, but the ones I have seen have big buttons at the right hand side of the drive. The one in the machine at the moment has a big button in the middle and the case is moulded around it, the question is if I buy an internal drive will it slot straight into the place of the old drive or will I have to cut a hole in the case to fit the drive next to last? Help!

I was wondering if it would be worth getting a big upgrade? What will I be able to do with the upgrade? The only advantage I have seen is an AI package for £1 Meg only - it takes very sophisticated. Can you tell me of any more advantages of buying an upgrade, so I can tell if it would be worth it.

**Adrian May
Hilberton, Lincs**

■ How a far list of games? The disk number is rather strange than the Philips one though maybe not £100 cheaper, but the Philips one can be connected to both Amiga and ST, so could serve a double purpose

First, congratulations on your new magazine, it covers both the ST and Amiga without giving preference to one or the other, and with any luck you won't get too many 'My ST is better than your Amiga' letters in the letters page, or if you do, they'll at least be making constructive comments.

Just one major disappointment - no adventure section. We good advertisers often have to make do with an 800 page or two in a magazine but we tend read more in Format.

I know you had 'Go Brave New World' and a few Junior

TIPS OFF

Tip in Game Daters, but that's another reason why my writing - the tips are wrong. If you cut the wire, you'll lose luck and won't be able to complete the game. And the vice about the miller applies to Gold of Thrones, Magique Junior's second adventure.

**Joe Medley
Stokeup**

■ Rhinos, sorry about the test. Adventure/role playing game coverage is under consideration.

Next time, we'll try it without the tip.



It appears, we can only buy three items of software which will not get us a credit for one and a day.

**Mr. J.R. Thuring
Buckden**

■ Point taken, but there are plenty of people using both machines professionally, who can. We'll continue to cover software of a wide variety of prices.

It's impossible

Once upon a time, my bank every now and then, 1985 actually, I owned a Commodore 64. For that machine, at about the same time, there emerged a game that in my view at least, remains unparalleled in its high quality. It was the Dark Lairs of adventures, the best's best of Fighting Fantasy, the best's best of Dungeons and Dragons. It was in short, the most magnificent series of all equal value as regards excitement, atmosphere and originality.

The game was part 1. It is a series entitled Alternative Reality - a US Gold release distributed by Datacube. It's my money gives me better than my IBM 64's lot. Yes, I can recall the many small hours I spent wandering in The City, a world inhabited only by the click of swords in the Arena, the hammering of the blacksmith and my father's scolding in the next room.

So I waited with bated breath for part 2. The Dungeon to arrive. But it was not forthcoming. What happened? Not a word, not even a rumour have I heard since. Your mission, ST Amiga Format, should you wish to accept it, is to discover the real time preventing the release of the remaining 3 alternative reality titles. Should you or any of your mission impossible software squad fail to report, I'll be very disappointed.

**J. R. Worth
Manchester**

should you ever add an Amiga to your stable. The Philips monitors have no particular reliability problems of which you're aware.

If you're going to buy a second drive, why not fit it externally? That way you get the extra capacity and have the increased flexibility of a removable machine. An extra half megabyte of memory could be used as a RAM drive, speeding the operation of many packages which make heavy use of disks. Our icons are produced on an Apple II monitor, as is the rest of every page.

A500 to PC

I am seriously considering purchasing an Amiga for home use, so could you please advise me one learning question: is PC emulators only possible on the A500 or is there a suitable package/emulation that will enable PC software to run on a 500? If not why not?

**Steve Haines
Port Talbot**

■ The 'Transformer' package, bundled with the A500 in Commodore's summer promotion, emulates a PC in software. It costs about £30.00 at discount prices, and is intended to cover emulators for both machines in a forthcoming issue.

Price plea

Here in Buckden our nearest stockist is in St. Austell, 30-odd miles away, or it's sending to software houses, with the problem of buying a pig in the poke. It shows you can see what type of game you are buying, so it is important that magazines get a list picture of game and/or business programs, but please remember just because we have an Amiga, it does not mean we can afford £80-plus for software. However much

it appears, we can only buy three items of software which will not get us a credit for one and a day.

On the game

I enjoy programming my computer, as well as playing games. Up to now I have only bought ST BASIC, but I am just starting to assemble. I want to program a Commodore 64 in both BASIC and machine code. I am 15 years old and was wondering how to start writing games for a living. We'll need to write a good game before I get a chance to sell a software company like a look at my programming abilities in another way? How, what are my chances of getting a job?

**Paul Lavery
Stokeup**

■ Four best bet, tough though it may be, is to enter a game that fits that you can sell your knowledge and skills, as the software houses will have something to look at. If it's a good game, you may start coming royalties from that to fund the next game. Or you may be taken on as a full-time employee rather less likely.

Strange but true

A point or emulators. You may be interested to know the emulators is capable of going in air. The users of that, and in this way it can save lives.

**Geoff Hichens
Worcester**

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Winners galore

The closing date for our Euro-88 competition came and went and 1500 hopefuls had their postcards, envelopes, lots of cardboard and copiers stuffed through into the mighty Format's binocular drum. We were surprised most people hadn't discovered the right answers, which were A - Desk Top Publishing, B - By depositing toner and C - The UQ 250. Roughly one in three entrants knew the right answers, with many people convinced the post sample was from the last order.

The first two correct answers out of the drum were R. Tabbot of

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Issue 4 of ST
Anigma Format
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on Thursday
15th September
— order yours
now, you know it
makes sense.

Ami ou ennemi ?

I guess we should thank ourselves lucky Comscore (it has been very helpful to us during and since the launch of Format. This would not seem to be the case with magazines across the channel — a rather odd Steve Ledger, editor of the new French magazine Annes, contacted the trouble to mag has had with Comscore France.

It seems that the new magazine is not pleased

by Frank Laine, French boss of Comscore, who feels the market is as yet 'too young' for a dedicated fringe mag. Laine has got the weight of Comscore behind a real public plea, and when he was unable to stop Annes, he withdrew his company's press releases and professed amusement and forbade them to use the words Anige, Anicinet or Animaweb on their front

cover. This resulted in the rather peculiar cover line reproduced on this page.

We wish Annes well and hope they soon sort out their differences with Comscore. The company's approach seems an oddly negative way of establishing a name.



Cochester in Essex (who was the Q03500) and R. Pélus at following in Northamptonshire the Q0550.

The second competition in issue 1 aims to teach up the real meaning behind Anor's strangely named QWAD command in Protext. The two winners are A. Mace of Leicester for 'Questions that are fact Contents of Locations' and Trevor Coble of Leeds for 'Quick With Xact in Computer Literacy'.

And finally the results of the Price Questionnaire show there were over 600 returned, for which many thanks, and the first five listed from the top were Mark Gale of Bedford, Paul Ludford of Harlow, Paul McKelvie of Glasgow, Anthony Tarril of Stourbridge and Colin Brown of Perth. 425 software vouchers will find their way to you as soon as we've printed them!



■ Clive Priddy recently ran a competition for schools in collaboration with the newly renamed World Wide Fund for Nature (or the World Wildlife Fund), with the prizes going to projects on dental health and the ecology of school playing fields. Unfortunately, being a very hot day, a painting captain at the participating schools in Lane Institute State Linton for an ice cream.

Superheroes, Inc.

by Sarkis



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We'll just say "Quite possibly the best arcade action yet written for any micro"

Amiga StarRay contains 2 disks and an audio cassette for £34.95. Coming soon for the Atari ST and Commodore 64 at £19.95 and PC via £24.95



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