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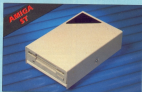
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Abstract

- [View all posts by Dr. David M. Williams](#)

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ST AMIGA FORMAT

The complete package for Atari ST and Commodore Amiga owners



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3D GRAPHIC WONDERS!

Over the few months since the launch of ST Amiga Format one of the most noticeable changes in the software that has flowed through the office is the improvement in the quality of game graphics. At the start of the year a lot of the games material was based around conversions from successful programs in the eight bit world. Too often the graphics were direct copies of the sprites and backgrounds used in the earlier versions. This automatically meant that the full potential of the ST and Amiga was rarely realised.

Recent releases have looked more and more to the native digital memory and solid 3D graphics, all of which are totally suited to the increased processing power and higher graphics resolutions of the 16 bit machines. No longer are games limited to a few board and arcade sprites or wireframe boxes and eight colours

on screen at once. Current games like *Carrier Command*, *Streets of Rage 2* and *Predator* of *Final Frontier* show just what can be achieved and approach true high resolution quality in both frame rate and scenery mapping. Although there's something of the future in the use of Lightsource 3D, the graphics routines used in these programs are far ahead of the cutting edge of even a few months ago.

The best part of all this is that we're still a long way from the best these machines can achieve. Remember when Clio first showed us the BBC Micro? It took programs on that machine into a new realm. Six months earlier, no-one would have believed it possible on an eight bitter. On current showing, we'd like to guess at what will be making its appearance on the ST and Amiga in six months time!

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91

Become Surgeon General of the Amiga's internal engine with these vital tips for users of all skills.

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See the great reviews in PCW June 88, Atari ST User June 88, ST Amps Forum July 88

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NEWS

Low-cost Laser launch

Thinking of doing into ODP, but worried at the cost? Green Computer Products hope to help you make up your mind by offering the Copyright Pageprinter II laser printer at a new low price of £3975, including VAT. This slight price cut results from new features (Epson 10, Datas, and 8000 Pageprinter simulations, and half a megabyte of memory as standard. For proper ODP use this increased to just high-quality text. We printing a further £57.50 (plus another 1 Mb and 8000 Pageprinter Plus emulation, giving you a fully functional ODP printer for only just over £4000.

The Pageprinter comes with a 1-year warranty, and on-site maintenance is available from Logitech for a further £132.50 per annum.

■ Green Computers, 210 West Lane, Barnburgh, Leeds LS40 4AF (0534 695813).



■ Copyright II - a state-of-the-art laser with all the bells and whistles you need from Green

FAST scuppers Scottish pirates

FOI, the Federation Against Software Theft, working in collaboration with software houses Electronic Arts, Datas, Ocean, Microprose, US-Go! and the boys in blue from Glasgow's 'G' Division, have conducted their biggest raid yet against alleged software pirates. In a set of simultaneous raids at the beginning of August, 3214 disks were seized from a number of sites. The disks contained over 6000 programs, ranging from business and utility software as well as a large number of games, and the haul has an estimated street value of over £200,000.

It is alleged the piracy gang had for some while been selling low-priced duplications of well-known games and business software from a stall at a local Glasgow market. It was only in March of this year, however, that they expanded their operation to offer a postal copying service to customers. It is understood that they were advertising in a number of computer magazines and national dailies. The 'company' changed its name several times in the last six months.

During the operation, Green Jeffrey of Electronic Arts spent some time in Glasgow helping to co-ordinate efforts and was 'blacked at the extent of piracy' which had been unearthed. He's now convinced that a major factor in the current wave of piracy is the 'loading errors' operating from within user groups. By removing protection from programs and photocopying manuals 'on loan' from groups, these users can duplicate even UK's top loaded software, normally protected by its complexity and the need for a manual.

Later this year the Copyright Design and Patents Bill is due to become law. The Bill will outlaw 'under' copying devices, through a new offence termed 'Trade Mark Infringement', which will carry a maximum penalty of 10 years imprisonment.

They is the first big anti-piracy raid in Scotland, but it seems likely to lead to follow-up action in other parts of the UK. Roy Hay of FOI confirmed that police reports had been handed to the Procurator Fiscal with a view to prosecution.



Only 2447 more disks to try...

■ Format note: With all this talk of the law against copying of software, some thought must still be given to the user of that software who has a legitimate need to copy a program to guard against disk corruption or cassette rejection. It's not really enough for software houses to offer a return of lost replacement service for damaged disks (and we know of none at yet who advertise such a service). How about

providing a properly labelled second copy of business and leisure software to legitimate 'backups'? By all means number them and mark them 'Backup' to discourage passing on. This would at least give the end user, who is the one to have put them in 'back up' in the first place, adequate protection against the untoward. Why comment on this idea in our letters page please.



GAMES GIANTS SPURN PC SHOW

This year's PC Show (formerly the PC&A show) is scheduled to be the biggest and greatest ever, yet many of the big names in games and leisure software have chosen to do their own thing. Some have pulled out completely and have their own mini-shows in outlying hotels or halls, others have small 'point of collection' stands from where VIPs from the trade (that means no journalists, of course) can be whisked off to special presentations at alternative venues.

As the leading show in the computer calendar reaches its eleventh year, and moves into its fifth venue, each larger than the last, the event of names like Mediaspace, Inter Activision, Electronic Arts and Creative Graphics, represents quite a hole in the show's alternative facade. As the stands get bigger and more expensive, software companies have to look more and more carefully at the effectiveness of spending on large stands. Inter Activision, CEO of Creative, put over \$40,000 into their stand last year and feels that the 'glamour' of the show has surpassed the industry'. The company is putting on its own presentation at 'Computerworld' right in the night before, which Interactiv believes will make more of an impact on the people that count. Don't bother to go if you haven't got a ticket!

Software houses are thinking more and more about where to put their money. Many now concentrate on magazine advertising (Magnum) - Ad Dept or Point of Sale promotions through dealers. As Lenley Marland of Electronic Arts puts it, "the people we need to see are a relatively small band of trade and press figures, who are often most effectively attracted through a separate presentation". This idea is reiterated by Larry Sparks of Mediaspace, who outlines their three-pronged marketing strategy: to be more cost-effective, to generate a higher profile and to tailor marketing to specific groups. Mediaspace are concentrating on trade and press at the show with a separate presentation and a headline shuttle to and from the show. They have a TV promotion scheduled for November to keep their products at the customer's eye.

The outcome of this policy of targeting specific areas of the industry is great for handwriting dealers and journalists, but is likely to result fewer and fewer mag-stands at the main computer show, and less direct contact with the people who actually pay for the products - you lot.

■ The Personal Computer Show runs from 14th to 16th September at Earls Court. Admission is £3 on the door. Why not drop by the Future Publishing booth and meet some of the ST Amiga Forum staff? We're on stand 17.

Barbaric use for new software

The best advertisement for a new piece of programming software is to have someone other than yourself really putting it to use. It just so happens to be the same with one that wrote the programming software, and that someone is Barbarian II, the follow-up to the best selling video text game, it all goes very convenient.

The software in question is Outlaw Productions' Shoot 'Em Up Condemners. All game writing packages, and Outlaw's Barbarian II is currently being programmed using it. MUCH is available on both ST and Amiga and offers full gameplay design as well as editors for graphics and sound. If you too would like to try your hand at writing games, cross your local dealer's palm with \$24.99 and walk away with Outlaw's latest.

■ Outlaw Productions, The Old Forge, 7 Cambridge Road, London NE1 9EX. Tel: 0753 278 8750



■ A Barbarian designing. At Wyke II, or was it Jo Miller...?

Atari launches Micro Micro

Keeping their high profile of product announcements in recent months, Atari have announced a tie-in with Cambridge-based OIP Computers, whose pocket PC they will market worldwide. While this might not appear directly relevant to ST or Amiga owners, there's actually a lot to be said for featuring a micro-micro with an 8x40 LCD screen, 512Kb of RAM, 256Kb of application software in ROM and credit card based memory cards for storage. The key feature of the new machine, which should be available next after Christmas for under £200, is that the included software includes a communications pack, and presumably some kind of facility to connect it to the outside world. This opens the opportunity of recording data on the pocket portable and transferring it onto its user's home micro back at base.

The pocket micro also seems to be a word processor, takes 1-20 lines per line spaced-out, address books and various other bits and pieces. It could be very handy in its own right, assuming you can get your fingers on the minuscule keyboard. And the thing for showing off to fellow train passengers.



■ Laptop ST or pocket PC? Which will hit the market first

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Apparel	Women's Dresses	\$60.00	10
Apparel	Men's Coats	\$80.00	5
Apparel	Women's Coats	\$90.00	5
Apparel	Men's Sweaters	\$20.00	40
Apparel	Women's Sweaters	\$22.00	30
Apparel	Men's Vests	\$12.00	20
Apparel	Women's Vests	\$14.00	15
Apparel	Men's Belts	\$5.00	50
Apparel	Women's Belts	\$6.00	40
Apparel	Men's Scarves	\$4.00	30
Apparel	Women's Scarves	\$5.00	20
Apparel	Men's Gloves	\$2.00	60
Apparel	Women's Gloves	\$2.50	50
Apparel	Men's Mittens	\$3.00	40
Apparel	Women's Mittens	\$3.50	30
Apparel	Men's Socks	\$3.00	120
Apparel	Women's Socks	\$3.50	100
Apparel	Men's Underwear	\$4.00	80
Apparel	Women's Underwear	\$4.50	70
Apparel	Men's Hats	\$8.00	30
Apparel	Women's Hats	\$9.00	20
Apparel	Men's Shoes	\$40.00	20
Apparel	Women's Shoes	\$45.00	15
Apparel	Men's Suits	\$150.00	10
Apparel	Women's Dresses	\$60.00	10
Apparel	Men's Coats	\$80.00	5
Apparel	Women's Coats	\$90.00	5
Apparel	Men's Sweaters	\$20.00	40
Apparel	Women's Sweaters	\$22.00	30
Apparel	Men's Vests	\$12.00	20
Apparel	Women's Vests	\$14.00	15
Apparel	Men's Belts	\$5.00	50
Apparel	Women's Belts	\$6.00	40
Apparel	Men's Scarves	\$4.00	30
Apparel	Women's Scarves	\$5.00	20
Apparel	Men's Gloves	\$2.00	60
Apparel	Women's Gloves	\$2.50	50
Apparel	Men's Mittens	\$3.00	40
Apparel	Women's Mittens	\$3.50	30
Apparel	Men's Socks	\$3.00	120
Apparel	Women's Socks	\$3.50	100
Apparel	Men's Underwear	\$4.00	80
Apparel	Women's Underwear	\$4.50	70

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Category	Item	Unit Price	Quantity	Total Price
Food	Chicken	10.00	10	100.00
	Beef	15.00	5	75.00
Food	Pork	12.00	8	96.00
	Fish	18.00	3	54.00
Food	Eggs	2.00	20	40.00
	Milk	3.00	10	30.00
Food	Yogurt	1.50	15	22.50
	Cheese	4.00	5	20.00
Food	Butter	2.50	4	10.00
	Flour	1.00	10	10.00
Food	Sugar	1.20	8	9.60
	Salt	0.50	10	5.00
Food	Spices	3.00	5	15.00
	Herbs	2.00	5	10.00
Food	Oil	4.00	5	20.00
	Vinegar	1.00	5	5.00
Food	Soy Sauce	1.50	5	7.50
	Ketchup	1.00	5	5.00
Food	Mayonnaise	1.50	5	7.50
	Mustard	1.00	5	5.00
Food	Hot Sauce	1.00	5	5.00
	BBQ Sauce	1.50	5	7.50
Food	Teriyaki Sauce	1.50	5	7.50
	Worcestershire Sauce	1.00	5	5.00
Food	Apple Cider Vinegar	1.00	5	5.00
	Lemon Juice	1.00	5	5.00
Food	Lime Juice	1.00	5	5.00
	Orange Juice	1.50	5	7.50
Food	Pineapple Juice	1.50	5	7.50
	Grapefruit Juice	1.50	5	7.50
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Food	Pineapple Juice	1.50	5	7.50
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Food	Apple Juice	1.50	5	7.50
	Orange Juice	1.50	5	7.50
Food	Pine			

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NAME	RELATION	REL. TYPE	DATE
J. J. Jones	Manager	1990-01-01	1990-01-01
J. J. Jones	Manager	1990-01-01	1990-01-01

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SNIPPETS

■ **Wile** software have acquired the licence to BBC TV's **A Question of Sport**, and claim to be producing a game with all the features of the long-running series. BBC is, like football, 'a game of two halves', all the green background scenes make you 'be both as a player' and will 'like reproduce the world's most momentous into fun! Only time will tell. Meanwhile, here's what it will look like.

■ The latest **Jumpdisk** from **Georgia Thompson Services** includes a handy title utility for anyone worried about virus attacks. **DISK 2.2** will scan all the bootdisks from your Amiga chain to a separate 'safekeeping' disk, from where you can reinstall them should the worst happen.

The procedure will recover most infected disks, though there are rumours of a 'real beast' virus which writes random meaningless errors all over the disk surface, rather than replacing itself to the boot block. The jump disk also

includes a copy of **MRISK 1.5** to help trap them before they can strike. It costs £8.50 from **IDS, Fingers Lodge, Capen Road, Irvine G82 7BQ, Scotland.**

■ There is the market for **800** hard drives will so doubt be delighted to hear that **Frontier Software** have introduced a new **120Mb SuperDrive** into their product range, to slot in neatly between the 60Mb and 150Mb units. Price for this speedy little data-eater is a mere £1950. Phone Frontier on 0423 631160.

■ **Triango** have two audio options, put out for the Amiga. The **Mixamp 1**, at £14.99, is a small audio amplifier which plugs into the stereo output of the Amiga and draws its power from the serial port. It outputs to a pair of Walkman-style headphones which you supply for only 'Triogo' a further £4.99 each. The **Mixamp 2**, which costs £19.99, is a pair of small speakers, again drawing power and audio from the mono, but playing it in full stereo to the outside world. Telephone 0274



■ A Question of Sport screen.

604115 for further details of either.

■ **New Catalogue: Silica Shop**, the main UK Atari Distributor, has just released its new catalogue describing literally hundreds of Atari-related products. These range from machines, drives and laser pointers to games, business and specialist software. Copies are free and gratis, given a phone call to Silica on 01-509 1311.

Specialised musical software is what **Audio Software** is all about. Their first catalogue lists hundreds of products for a wide variety of machines, though the **50** and **Amiga** take the lion's share. Each item is given a brief descriptive paragraph, most have screen dumps and all, surprise, surprise, have prices. Audio Software is a new venture worthy of music musician's support. Ask for their catalogue on 01-732 4655.

Low-cost Amiga short-wave link

The Amiga's highest graphics are being put to more and more varied uses these days, and **IDS Electronics** of Anston in Salford has come up with a novel way of grabbing pictures straight from the ether.

The package is aimed at ham-radio buffs or anyone else with access to a short-wave radio receiver. By connecting this into **IDS's** analogue to digital converter and hence to the Amiga you can capture live-type transmissions used by radio amateurs and by press agencies worldwide. A typical high-resolution black and white picture will take around 10 min-

utes to receive, and the software can convert them to **PF** format for further processing or printing. If you have the equipment and the licence you can also transmit pictures using the same software and hardware package.

The controversially named **Amiga-Pac 90** doesn't connect to the standard **Pas** network costs £299.95 from **IDS**, who intend to expand your potential still further by releasing a satellite receiver for yet more pictures by Christmas.

■ **IDS Electronics, PO Box 2, Anston, West Salford M614 0XG 02047-595555**



■ The power in the crown of your Amiga, captured from the airwaves by **IDS's Amiga-Pac**

A new Acquisition



■ It looks like you can even store made-made figures in **Taurus's** new database.

Version 1.3 of **Taurus Software's Acquisition** database has now hit the streets in a flurry of specifications, which would knock the stuffing out of many a competent package. With a text size of 10 Mb and a file capacity of 1 Gb, **Acquisition** has to be one of the largest systems available for the Amiga.

The database manager is fully relational, can handle several separate databases at once, stores text, graphics in sound, and even has its own **BRUC** file language. It comes complete with a text editor, applications generator and password protec-

tion system, with a 200 page tutorial guide as an optional extra. **Acquisition** requires an Amiga with two floppy drives or a hard drive and a floppy, but at least it only needs 512Kb of memory. The big sticker, unfortunately, is the price, £249. While big businesses may regard this as a snap, the rest of us will have to wait in hope for the best features to filter through to lower price packages.

■ **Taurus Software, Taurus House, 3 Bridge Street, Guildford, Surrey GU1 4BY 02462 579399.**

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FUTURE PERFECT?

Andy Storer anticipates an autumn avalanche of action with previews of the hottest upcoming games.



■ B.A.T.

B.A.T.
INFOCOM ■ ST & Amiga ■
£24.95

A graphic adventure set in the 21st century where you find your self working for the Bureau des Affaires Temporelles, a secret organisation responsible for enforcing justice and tracking down subversives. What's more you're undergoing a new modification - like you have a computer in your forehead working on blood power. You decide when you all want to the new multipersuasive controls, all depicted in really brilliant graphics.

ZORK ZERO
INFOCOM ■ ST & Amiga ■
£24.95

In the beginning, there was Zork. Zork sold a million copies and became history's best selling entertainment software. So here comes the high priced in Zork, featuring Infocom's new adventure system. Who exactly is Lord Omoot? What's it really like to play Double Parrot? How did the Great Underground Empire collapse? Where do Spuns come from? When and where can I buy this? Soon, Everywhere But! anywhere.

FUSION
ELECTRONIC ARTS ■ Amiga ■
£29.95

An arcade strategy title developed in the UK and employing some very pretty animated graphics with

selectable paralytic scrolling, set levels, and digitised sounds. And Fusion sounds great - the penis release suite clearly states, 'The objective is total annihilation'. Bridge forming monoids, plasma saucers, who race and explode - a mission as one try to collect and relay the remnants of an ancient bomb and figure out what electronic snappers actually do. All you in a user-friendly sort of way?



■ ELITE

ELITE
PUBLISHED ■ ST & Amiga ■
£24.95

Possibly the only game to have ever achieved that cult status makes it's solid 3D appearance on our 16 bitters. Do you know any one who hasn't played it? Featuring 5 missions, 3000+ planetary systems and hordes of pirates, police and bounty hunters you even get to see the faces of the stars in these versions. Looks as though there'll be enough enhancements and updates to them to make the wait more than worthwhile.

CHRONO-QUEST
PUBLISHED ■ ST & Amiga ■
£29.95

At the head of a new generation of adventure games from Paganini, ChronoQuest is a time-travelling adventure which looks just great. Your father has been murdered and you're the prime suspect. But it's not one of those hair-raising scenarios where you're called back in time and killed your father dilemma. (This) uses the

sound too. In fact there's 400k of it in there along with 4 Meg of animation and 3D or 2D screens of the 10 level action kicking off with an opening history of 30,000 years.

MAFDET
SOFTWARE ■ INFOCOM ■ ST & Amiga ■
£24.95

The first of three releases by a brand new company offering its wares at a refreshingly low price but hopefully delivering power too. Mafdet is set in Egyptian mythology and you, believe it or not, are Mafdet the cat goddess! Snap up! Transmuting left, right and centre you're on a search for the Book of the Dead. Somehow it sounds as though you could be wandering around the labyrinth of quite a few pyramids.



■ SPITTING IMAGE

SPITTING IMAGE
GOLDBAR ■ ST & Amiga ■
£24.95

The senior scriptwriters have collaborated on this one is hopefully all the acid humour will ever come of its edge. Popstar, Politician, Sexman, Gaffer, Roomie and, of course, The Thatch all want to take over the world. The madcap combat relies on you destroying their credibility - after all, character assassination must qualify as a shoot-'em-up somewhere along the line.

Format price for the biggest leg-male-hyphenated phrase or sentence in a years price in the magazine - £24! You have to flip into the future to find the real murderer after first finding a machine to take you there. As there's always to time like the present you should have bought this tomorrow.

BATTLE CHESS
ELECTRONIC ARTS ■ Amiga ■
£24.95

Real graphics, huh? Battle Chess puts a little arcade action into the greatest strategy game of all time and throws in some digitised



■ FUSION



■ BATTLE CHESS





MOTOROLA COASTER

The 68000 heart of the ST and Amiga is only one of a range of super-chips in the 68K series from Motorola. Richard Monteiro looks further up the range at the high speed mega processors that give a good insight into the mighty micros of the future.

There's one catch phrase that applies to the ST and Amiga micros: it has to be 16-bit, which is generally taken as an indicator of a computer's power. To an extent this is correct. The device that actually gives a machine its 16-bit, 16-bit or even 32-bit rating is the microprocessor. The heart of the machine. You're probably aware that the 68000 chip is used in several micros, ST and Amiga included. What you might not know is that the 68000 processor family drive devices as diverse as digital cell phones, equipment for monitoring Florida sea drilling platforms and electronic controllers in car engines.

Motorola, founded in 1929, introduced the 68000 to the world in 1979. While the 47 processor is commonly branded 16-bit, it is in fact 16/32-bit. Partly 16-bit because it can only communicate with the outside world using 16-bit paths (in the '70s chip packaging hadn't developed far enough to allow more than 16 pins along two sides of a chip) and partly 32-bit because its inner workings are 32-bit wide. The 68000 was the first microprocessor to boast a 32-bit internal structure.

The bit count actually tells you the largest number that can be handled by the chip in one operation. For instance, the 16-bit data path of the 68000 can operate on any number between 0 and the largest binary number that will fit in 16 bits - which happens to be 65,535. However, the 68000 can cope with 32-bit numbers internally, or any number from 0 to 4,294,967,295 (or 4,294,967,296 if you're a mathematician). All these figures actually do is to give you a rough idea of processor power. Generally the larger the number that can be manipulated, the more powerful the processor (hence a 32-bit micro will usually be much faster than a 16-bit one).

68000s have a 24-bit address line (even if Atari's internal address bus is only 23-bit) which means they can address memory in the range 0 to 16,777,215 (16 Megabytes).

Neither the Amiga nor ST micros exploit this to the full. Although the Amiga can address the full 16Mb, only 8Mb can be RAM. The rest is reserved for custom chips. The ST is allowed to access even less: 4 Mb maximum. This is a restriction of the memory management unit.

68000 Plus?

The 68000 was released shortly after the 68010. This really-cool-chip was the brain of the QL, although it claims to be 16-bit, it only has an 8-bit data bus and 20-bit address bus (accessing 1Mb of memory). After that came the 68010 and 68012 - almost identical to the 68000, but with additional instructions and registers. The microcode, which determines what particular 68K instructions do, is also

more efficient in these chips, thus 010 and 012 processors are faster (see margin note on upgrading your computer's 68000).

In 1984 Motorola shipped the first full 32-bit processor, the 68020 (which will now cost you £130 for the lowest-speed, 12Mhz chip). It's a full 32-bit chip because its data paths and processing elements are all 32-bits wide. Late last year the 68030 made its first appearance. With 32-bit chips are compatible with earlier 68K processors, but typically offer twice the processing power.

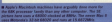
Apart from the obvious advantage of a huge memory address range (4Gbytes), Motorola's 32-bit processors now offer on-chip instruction caches. The 030 also has data caches - small, on-chip memory arrays that give the processor rapid access to



■ Motorola's 68020 microprocessor: the mean, mean number of the 68K family. 'On the fly' it often described as a mainframe on a chip, the processor boasts a clock rate of 25Mhz, instruction and data caches, powerful processing facilities. Barely 160 (in method of speeding up information transmission from main unit) and 68K series compatibility. 4,800 if you want one!



By replacing the 486000 in either the Amiga or G3 with a 66000, it would greatly reduce the expense. Estimated 486 and 66000 prices. The 66000 is not compatible with the 68000, which means increasing the chips or completely retooling. Software which runs 68000 68K as coprocessors, and is not in the 68000, but it is possible to install a program to detect this and other common file conventions. But Intel's compatibility with the 68000. Price for the Amiga chip is around \$10.

[illegible]

100

Figure 1



■ East Kilbride. Home of Motorola's Scottish semiconductor plant which produces microprocessors, single-chip computers, custom crystals and memories.

offered by a 68K processor. Advanced telephone switching circuits manufactured by Northern Telecom and Sangoma can 68020s. AMT's T30 central office switch uses the 68000.

Anything the T30 can do, the T20 can do faster. It's particularly biased towards graphics-intensive operations. Hence its use in remote TV, desktop publishing outlets and design systems.

Life begins at 040

What's in the pipeline? Well, there's Motorola's third-generation 32-bit processor which is due later this year. The 68040 virtual memory chip, as it is to be called, claims compatibility with the existing 68K range, a floating point unit, 16 instruction and data caches, and paged memory management.

The chip is firmly aimed at multi-processing applications - a high degree of parallel processing capability and support for spinning several (the System 9 software tend to require five).

By the mid 90s Motorola will undoubtedly have an 68000 on offer. But what type of chip will it be? The 68030, and to a lesser extent the 68020, already suffer from an identity crisis. Will the processor be CISC (complex instructions sets) or RISC (reduced instructions sets) or a future? Will 64-bit be the next thing? Or will parallel processing and transputer circuits be the order of the day? Whatever direction Motorola's chips take, you can bet powerful macros, tools and manufacturing will follow.

COMMODORE CHASE 32-BIT SCENE

Random after random has been blurring Commodore's actual move into the 32-bit marketplace. Now there are plans to produce a 68000-based upgrade system for existing 48600s. As there aren't any 68000-based Commodore machines in Britain.

The first phase of 32-bit action to reach 48600 owners will be in the form of an expansion board. This board will contain a 68000 handling around a 14880, the Amiga's 68000 processor runs at a comparatively leisurely 10MHz, a 68681 or optional 68682 cache co-processor running at 10MHz (can be configured to run at 10MHz or 20MHz) and the 68010 memory management unit. Up to four megabytes of fast memory, which is accessed by the 68000 via a 32-bit data bus, can be added. It is estimated that the Amiga's performance will be increased four-fold by this board.

All this extra power means you can run Unix - an operating system that could well be the forerunner of the 1990s. Am's main claim to fame is that it is a true multi-user, multi-tasking operating system. It is used in main computers and mainframes where the operating system's networking abilities are exploited to the full. For those interested, the Unix software will be system 3, release 1, version 1.

Also on the way is the much-rumoured Amiga 250000. One possible configuration is an AT25000 shell with a motherboard housing a 68020 and 4MB of RAM, 300MB hard disk. This operating system, tape structure and monitor file must be that little bundle of 4 whole meg of 48000. Around 6300 for a configuration like the one mentioned, say where else in Commodore.

What about 68030 developments? As Dr Raymond Robinson, Commodore's Technical Support Manager put it 'I would be lying if I said Commodore weren't considering the 68030 and I would be lying if I said Commodore have definite plans. So you get the picture...

ATARI MOVING UP A GEAR

According to Atari's technical support manager, Les Player, a 68030-based line engine will be available early next year. The system will run at a snip, giving 20MHz, four 64Kbytes of memory, come with standard 640 x 400 bits and have identical graphics capability to the their latest transputer machine. The operating system will be the system 5, release 1, version 2 which is currently under development.

Some rumours indicate that Atari might be planning an ST Plus Amiga System. While Atari won't comment on this, they have stated that announcements will be made at the PC Show. Speculation has it that the machine will offer 4096 colours, better resolution and stereo sound. One train of thought suggests that the 68030 processor could make an appearance in this machine.

ROAD WARS

Motorola's chips soon make it into electronic engine control modules fitted to many premium European cars. These modules often determine how long a top-fueled engine can run at full load. The information is stored on EPROM and, yes, hackers have managed to remove these EPROMs with the data forcing the car's computer to run the engine at full load for longer periods. The effect, says a dealer, can be fatal for the engine.





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RIDING THE WIRES



Mark Higham navigates the electronic ether and presents a sink or swim guide for those still wet behind the ears on the subject of communications. What do you need? What can you do? All is revealed.

Back in the good old days when "hookups" was on the TV at 5.05 every Saturday and most people thought that a Postel machine was something you pay for outside their front doors, it revolution began to take place. It began relatively quietly - a handful of enthusiastic programmers with access to a telephone line were just the start. Postel grew gradually more popular and in its shadow a small army of bulletin boards (BBS) began to flourish.

Then along came the fax, the Wargames, and the revolution to the masses. Suddenly every DB was a front for the state and bigger underworld of computer hacking. Nobody could own a modem without being accused of tapping into top Government computers.

Although public opinion has hardly changed, the world of communications has altered a lot since then. There are now many opportunities to be gained from owning a modem, and the serious computer users would be without one.

Getting started

For those of you thinking of buying a piece of hardware to fit the RS232C socket on the back of your main, there is a legion of excellent modems to choose from. Modems are the boxes which convert computer data into audible signals that can be sent down phone lines. Many, many years ago, shortly after the New England was added to the Bible, most home modems used "acoustic couplers", which fitted over an ordinary phone handset and waited down the mouthpiece.

However, nowadays modems plug directly into a DB-25 male socket, and there are modems which can

do the phone number for you if you prefer to reserve your index finger for other purposes.

Modems basically fall into two categories - automatic and manual. The cheaper of the two, automatic modems automatically configure themselves in the right speeds, and with the right software they can be used to dial the number and repeat it

the line is engaged. The Marantz multi-speed modem lies in this category. It offers very reasonable options from listening to the telephone line through an in-built speaker to answering calls should you wish to tell your own mind.

The manual modems are more complicated to use, but there is often something reassuring about

COMMS SOFTWARE

Most of the commercial services offer special package deals, bundling a modem, software, cables and subscription for a fair discount. There are all good deals, and your best way in. If you go your own way, you'll need to buy COMMS software as well as a modem.

■ **HiCom 2** is an adequate package, and is the one chosen for the ST. Microsoft packages. HiCom is available on both ST (£49.95) and Amiga (£29.95) - the Amiga version is cheaper because it can't work at 5000/70 baud, and so is unsuitable for Wordstar applications. Even the ST HiCom is a bit slow loading up Wordstar files, which is frustrating as it's your phone not main's modem. Contact Kuma at 12 Innovation Park, Pangbourne, Berkshire RG8 7JH (07357 41008).

■ **FastCom** is recommended for the ST power user. It costs £49.95, and is available from *about* themselves.

■ **FastCom** is generally reckoned to be a good common package for the Amiga, and unlike much Amiga software is British. It costs £39 from V2 Computing, 121 St. Albans Road, Watford, Herts WD17 3JH (0843 55444).



■ Modems: the Tandy 1600, on the left, with Marantz's intelligent modem (next to it). On a manual modem you have to set the speed from a panel on the front, plug a telephone in the back and dial by hand. Intelligent modems are controlled directly by your computer.

Compared that, taken the Windows graphics of Pentel one stage further. In most people, the philosophy of an OS or Amiga creating a Commodore 64 is, about as sure as driving a machine like a road car. However,

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Figure 1. The relationship between the number of species and the number of individuals in the samples. The number of individuals is plotted on the x-axis and the number of species on the y-axis. The data points are connected by lines, showing a positive correlation between the two variables.

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CONCLUSIONS

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TABLE 1

Table 1

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Again, from the usual technique, "I'm a contractor, we're doing painting renovations, in other words, a lot of structural work. I'm not doing any of the heavy heavy construction, so I'm not the damage liability" (in Birmingham). It is designed primarily to cater for damage payers, not the insured actually. Insurance is not an average, it is an insulating damage cushion. It has special interest groups, which bring various benefits (those with rights into the claim). These are: those who provide the risk capital (usually a parent, plus the capital in form of options from the risk bearers) to an unknowingly "deluded" and proud entitled "the freedom fighter." We're sure you get the message.

ing is what Computer demands of its users. Despite this, Computer is based upon very sane principles. All of the other systems discussed, most especially the bulletin boards, expect your software to convert your computer into little more than a dumb terminal. Computer, on the other hand, demands that your processor does some work. For this reason, the software supplied to access the system must be sophisticated.

Because of this, CompuNet is an impressive system, far more appealing than ProNet and almost that good. It is especially aimed at Commodore owners - 654 and 486s, but a new ST section has just opened too. It is arguably set out to encourage communication between its users, with the result that subscribers can do everything from staffing their own interest groups to selling their wares. The "Info Line"

and established to promote conservation, and a special 'Brooms' facility gives you to call people into our nature live a little closer.

Behind the advantages of the CompuNet system lies one very major drawback. Because of the nature of graphics and text as well as an error-checking routine, CompuNet is slow, about nine to ten times. It runs at 1200/95 baud. By the very nature of CompuNet you are encouraged to send a lot of data. At a transmit baud rate of 75 you could die of boredom, find yourself flooded into a coffee jar, or created before a page of text was transmitted.

Public Health

Myralex is a unique tool system, and it lacks the basic graphics of Compuserve or Myra.com, but it has come a long way in its three-year life. Now it provides the most business-

quantized system of these discussed but that is not to say that it should be dismissed. Moreover can be accessed through British Telecom's network of localised PSTN numbers, thereby permitting fixed rates from 200/200 to 1200/1200. These faster rates have a lot of time especially when applied on a downstream line.

Spending billions from John Deere's to Land's End, the use of Microsoft's features might not hold much appeal for those without offices near the Stock Exchange, and Microsoft has not forgotten that some people have other interests. Words from extremely powerful trading firms, influential lawyers and other financial players are being added to a gateway into Microsoft, a US bulletin board. Within seconds you can be linked, via satellite, to a computer in Spanish, New York. Microsoft is a popular American brand with 100+ interest groups ranging from literature to LGBT systems. In addition, you can chat to North American users. Interactive computer games are also available. Microsoft's "Crystal Ball" set in the year 2050 on a Star Trek-style vessel named *Conquest*.

How should the firm be

For those of you who didn't get a year's free subscription bundled with your modem, a telephone call to the nearest bulletin board - independent operators of the commercial network - is probably the best thing you'll do. Bulletin boards devoted exclusively to the ST or Amiga are now the only offering everything from help in running the North American "Amiga" to information about where you can lay your hands on the printed version of *AmigaWorld* in Japan (only as you know where to send the FAX? Anyway, send it, of course -

In addition to managing, and help sections, the majority of islands now offer the opportunity to download software. There was once a time when the software available on bulletin boards was about as useful as a 30 Meg hard drive for the IBM. However, most software now comes free and can be of interest to both the seasoned programmer and the local startup alone.

With a range of boards emerging which are devoted exclusively to individual computers, bulletin boards are now serving a very useful purpose. Of *the future*, a relatively new board, provides all kinds of help for Amiga owners as well as offering manuals of architectural software.

Trips around the universe

For ST users, the premier board of the Carulation Area (CA). ST content programs and pictures are available to the registered user. If the thought of downloading software from a CD compares up memories of floppy-pieces ST software, then the Screen is an

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1992	20	20.0
1993	25	25.0
1994	30	30.0
1995	35	35.0
1996	40	40.0
1997	45	45.0
1998	50	50.0
1999	55	55.0
2000	60	60.0
2001	65	65.0
2002	70	70.0
2003	75	75.0
2004	80	80.0
2005	85	85.0
2006	90	90.0
2007	95	95.0
2008	100	100.0
2009	105	105.0
2010	110	110.0
2011	115	115.0
2012	120	120.0
2013	125	125.0
2014	130	130.0
2015	135	135.0
2016	140	140.0
2017	145	145.0
2018	150	150.0
2019	155	155.0
2020	160	160.0
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2030	210	210.0
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2032	220	220.0
2033	225	225.0
2034	230	230.0
2035	235	235.0
2036	240	240.0
2037	245	245.0
2038	250	250.0
2039	255	255.0
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2041	265	265.0
2042	270	270.0
2043	275	275.0
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2045	285	285.0
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2049	305	305.0
2050	310	310.0
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2052	320	320.0
2053	325	325.0
2054	330	330.0
2055	335	335.0
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2057	345	345.0
2058	350	350.0
2059	355	355.0
2060	360	360.0
2061	365	365.0
2062	370	370.0
2063	375	375.0
2064	380	380.0
2065	385	385.0
2066	390	390.0
2067	395	395.0
2068	400	400.0
2069	405	405.0
2070	410	410.0
2071	415	415.0
2072	420	420.0
2073	425	425.0
2074	430	430.0
2075	435	435.0
2076	440	440.0
2077	445	445.0
2078	450	450.0
2079	455	455.0
2080	460	460.0
2081	465	465.0
2082	470	470.0
2083	475	475.0
2084	480	480.0
2085	485	485.0
2086	490	490.0
2087	495	495.0
2088	500	500.0
2089	505	505.0
2090	510	510.0
2091	515	515.0
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Dropbox	2.50	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Spotify	1.25	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Netflix	0.625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Amazon	0.3125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Google	0.15625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Facebook	0.078125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Twitter	0.0390625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
LinkedIn	0.01953125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Slack	0.009765625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Zoom	0.0048828125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Dropbox	0.00244140625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Spotify	0.001220703125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Netflix	0.0006103515625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Amazon	0.00030517578125	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Google	0.000152587890625	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Facebook	7.62939453125e-05	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Twitter	3.814697265625e-05	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
LinkedIn	1.9073486328125e-05	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Slack	9.5367431640625e-06	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Zoom	4.76837158203125e-06	0.00	0.00%	0%	0%	0.00%	0%	0%	0.00%
Dropbox									



■ Faxdata's The 800 is a very intelligent machine. With it must be, it doesn't have any buttons. The 7600R offers auto-dial, paper compatibility, 1200/2400/3000, 1200/1200/1200, 1200/75 and 75/1200, and all for £174.95.

ing to post software to your address if you send them a blank disk.

Those who like tramping around the universe or exploring the darkest corners of some mystical paradise may well find the Caribou Star 88 of interest. (It offers a list of all currently available multiuser games as well as a selection of puzzle games worth a multitude of MUGs.)

As with many systems, one telephone call to either of these specialised bulletin boards can provide you with the telephone numbers of several others. The majority now tend to offer features besides download and software, which appeal to a broader audience.

One of these is MILES Britain which, as well as providing ST software, has some excellent hardware deals, primarily for the Amiga. Everything from an £100 MEG interface to £41.77 right up to a 50 Meg Sparc hard drive for the £1000 at £580.00 is available.

However, if it's shopping by phone that you want then a few calls

to BDFIL with a credit card number can cause infinite harm to your bank balance. Purchasing hardware for any computer is quite literally as easy as pressing a few keys.

No place like Gnome

Without doubt, Novellate systems offer that hint of sophistication absent from your common-or-garden bulletin board. There was once a time when Prentel was the only system providing colour on the phone lines and that came at a price, but there are now many fine bulletin boards supporting Novellate.

The Gnome of these boards comes across with a penchant for test-retestable garden gnomes. Using a Novellate system, the board can take full advantage of colour and graphics with its landscape-oriented games which are used to guide you around the different versions. These services include a chatline, 2D and Amiga versions as well as its own game, 'The Swarrior'.

Prentel's 'Ten Issues' is not entirely free, although there are many features available to those who do not wish to pay, but at £4.50 a quarter, subscription is unlikely to cost too much of a dent in most people's beer money.

Back home...

The field of communications is a rapidly expanding one and it has a lot to offer anybody prepared to make the call. The times when all that bulletin boards had to offer was a list of other bulletin boards and a messaging section has long since passed; now Prentel is no longer a flaky way of reading the weather forecast.

From wide-ranging entertainment to sophisticated networking and useful downloadable software, the telephone lines are crisscrossed with information. There is a whole new world opening up out there. Whether you want to play multiuser games or prefer the steady delights of an adult bulletin board, there is something out there for you, pick up the phone and find it.

BITE THE BULLETIN

If you're looking to those outside (and your phone bill) to the extent by exploring the nation's bulletin boards, here are a few numbers you could try:

NAME	PHONE	BAUD RATE
CHARGE Birmingham	011 430 3241	300
Caribbean Start 88	01 771 0488	300/1200/75
COM TEL	01 478 9181	300/1200
Comsat at Home	01 688 8984	1200/75
COMBAT Birmingham (Amiga)	011 444 8912	300/1200/2400
AMPA/Amiga	081 227 8888	300/1200/75
AMPA Britain	01 448 0018	300/1200/75
UK to Amiga	01 277 1388	1200

Get your mailbox to the correct local rate as shown, dial up, and you'll usually get a welcome screen asking you for your name. The first time you may only get a limited access, but once the keypad has had time to give you an account and password you'll have fuller reign.

If you're feeling benevolent, it's possible to log on to American bulletin boards, ignoring the cost of the call. The computer bulletin board in Connecticut, American boards is the different phone times your time.

The majority of all systems use 300 baud to transfer data. If this is your first time, try the Chicago COMS/CPM/CMS board, available on 04 61 404 434-41 88. It's one of the better US boards. American Systems have British users and this one is no exception. Tell him that you're calling from the UK and he'll give you a top access level.



CARTOON CAPERS

The Amiga is capable of some spectacular animation sequences, but unless there is some stimulus to create animations, the supply could dry up. It's great to see a British company, The Amiga Centre Scotland, sponsoring an animation competition to coincide with this year's Edinburgh Festival. Format's own Andy Storer was there for the judging.



■ There's looking at you - instant digitising of the entrance to the Animation

Between 11th and 20th August, those insatiable enthusiasts at the Amiga Centre Scotland played host to an exhibition of Amiga animation as part of the Edinburgh Festival. Up to 400 people a day were greeted by the local real-time digitiser displaying their entrance at 30 frames per second. The dozen machines on hand ran continuous loops of some of the more famous Amiga demos. The Juggler and Basketballer played alongside the Archies, Probe Sequence and Rhinoceros Newton's Cradle, whilst the new Fantastion package from Scotlandair showed off

its Demuscar and Porsche movies. A series of workshops organised by The Centre accompanied the exhibition and attracted over 200 people from around the world, giving many who'd never even seen an Amiga the chance to experiment with its various animation packages.

Among this unexpectedly hectic activity was an animation competition which attracted 11 applicants - there would probably have been more if word of the prize, coverage of the end of July deadline hadn't surfaced in August. Quality before quantity, though, and all the entries reflect the tremendous advances made in micro

animation since the arrival of the Amiga and illustrate a skilled use of the most popular packages - Scout, Animate 3D and Apertures Animator.

Submissions could be made on either disk or Hi5, video and prints were given for each format. Despite the presence of what looked like the 4th generation PS conversions issued with *Power Twice the Same Color* (MTSC) entries from the States, tape entries were more valued than those on disk.

As there were no stipulations on length or content, or even originator - the brief was to submit animation 'generated' by an Amiga - several entries simply used the machine to



■ Judges Brian Carroll (left) and Paul Marks (centre) compare notes with Ian Anderson (right) of the Amiga



■ Twice as eye-drawing - pairs of members display the entries.

only digitised artwork. Phil Gibson's tape, for instance, consisted of 10 entries featuring masses of guffin style music, interact with 200 left clicks dubbed over with an Amiga created soundtrack.

Screenplay Productions' 'Merry Christmas' on the other hand, animated puppets to create a surprisingly cartoon caper whilst Dan D. Nye's fiction Olympics, voted first. Tape entry despite suffering from MISC conversion, displayed an interesting mix of computer-generated graphics and digitised images without using joystick control. Although a lot of the American campaign humor was lost in the flight across the Atlantic, the

resulting slightly narrative was distorted facial and shoulder above the rest.

The winners

It was material widely expected: via software that capitalised upon Paul Merin of Scope Pictures and Paul Merin of Pioneer Computing Weekly and took the prize. Joe Benzing's Lampo collected a system up prize even though it represents work in progress. With key frame animation featuring fast disk lamps performing a short choreographed dance, Lampo is still at the wireframe stage of production. Given rendering and full ray-tracing the end result would have easily won the competition. Their enthusiasm are extremely hot and cool and time-consuming, though, so it's unlikely to make an appearance in real time before the end of the year.

Best Disk Entry was awarded to Gary Whithy for *The Moon*, a rotating wireframe lunar wheel with solid 3D head, hands and feet revolving within it. The complexity of interaction between the rotating parts of the scene must have taken a great deal of careful planning since the animation was very fast and involved partial object rendering or 'clipping' in its rotating motion paths.

Mark Merin's *MMA Logo* was voted Best Overall Entry. This was a key frame animated head featuring full ray-tracing. The moving green alien head in an animated sequence stored in memory is compressed from using a byte-by-byte compressor developed



■ The home colour rapping chair will give you an idea of things to come - developed using Render 3D on a borrowed workstation, using up to 10 million colours at a resolution of 10240 x 1024. It can be set on an Amiga but not shown in its full splendour.

by Scott Jön's *File Grapher* and placed in the public domain. The above compressed images to be expanded in real time and run at up to 60 frames per second. The *MMA Logo* was built up from a matrix of triangles before treatment by a smoothing algorithm and subsequent ray-tracing. The resulting animation includes not only simultaneous left/right/up/down movement but feathered/blends using changes along with a rotating logo.

TECHIES CORNER

Key-framing? Rendering? Once again the computer industry tries up to-it's name for totally combining the two key process. 3D design formats, championed by the cause of bringing plain English back into the industry, attempt to 'cut some light upon a subject' developed in Japan.

KEYFRAMING: Before the arrival of computers, animators had the laborious task of drawing every frame of an animation by hand. Each frame required hours of work meaning that even a few seconds of animation could take literally weeks. With the advent of computers, the animator's job has been made considerably easier. Using keyframing, the animator only has to produce the major frames of animation and the computer generates the frames in-between using a system called 'tweening' (inter-tweening, genial).

SPLINES/BS-SPLINES: Most solid 3D objects within animations on the Amiga are developed using splines as wireframe representations. Each spline has within it the framework of an object to follow a path. When an object is moved, its corners can be seen to move through a set path defined as a curve (spline line), or B-splines as they are properly known.

CLIPPING: If you've ever played *Starblaster* or any game with 3D graphics then you will have seen examples of Clipping in action. When a 3D object

appears in the distance, all of it can be displayed on screen at once. As that object moves nearer to you it naturally grows larger and eventually reaches a point when it can no longer be displayed on screen in its entirety. Clipping is deciding which parts of the object are visible on screen, and not bothering to draw the rest of it.

RENDERING: Once a 3D object has been built up into a wireframe representation, the next step is to build it up into a solid 3D object. The process of rendering is much like projecting a skin over the wireframe object so that it appears solid.

POUCHING AND-COLOR RENDERING: After filling the surfaces of a 3D wireframe object, you can still see the edges of the wireframe structure supporting it. Using 'pouch' or 'face shading', it is possible to smooth out the edges of an object. This process is carried out during the rendering of the object.

RAY-TRACING: When the human eye sees an object, it is not in actual fact seeing the object itself but the light reflected by that object. This is why we are unable to see much at night. Ray-tracing works on this principle by calculating how light is reflected from all objects. The ray-tracing process can take a considerable amount of time depending on the complexity of the image, as the colour of each pixel and angle of each solid face must be calculated before the final picture can be displayed.



■ The Amiga Center logo - a budget 3D design

Animated future

Next year the organizers intend to repeat the event with Commodore perhaps taking a more active part in the publicity by arranging limited TV coverage. Animation techniques are advancing rapidly as 1989's competition should be worth seeing. At any rate, you now have a whole year's advance notice to get rendering and ray-tracing for the likely price of an A2000 and possible satellite TV coverage.



■ If things in progress using Render 3D - that the image is shown as a series of wireframe figures (1), then roughly classified from any viewing angle (2 & 3) and finally fully ray-traced (4). 'Wild Animade' can animate Render 3D objects with real-time wire frame preview mode and image compression and expansion.



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DATABASE EXHIBITIONS



REVIEW

STOS

Is games programming only for whizzkid propeller heads with high foreheads and acne, or can anyone have a go? Mandarin Software would like to persuade you that with an ST and STOS you can move mountains, or a few sprites at the very least. Richard Montano checks it out.

ST version reviewed ■ Amiga version possible ■ £29.95 ■ Mandarin ■ Europa House, Adlington Park, Adlington, Macclesfield SK10 5NP (0629 579000)

Yet another implementation of the BASIC language for Britain and Kaly is given over. For that is what STOS, the result of two years work by French software house Jani, is, for this country it is being sold under the title of 'Games Creator', and is claimed to take the first work out of game development.

Typists will have been treated to a kind of games creator, at one point it seemed the professional games programmer would become obsolete with so many utilities claiming to 'show' so much. How many titles produced with these packages have made it onto the shelves of Bambi and Sniffles? Yes, and the quality? Well, I'm, one of those programs perform to the expectations of users. So why are Mandarin quietly confident about their package?

What? Not GEM!

Remove GEM from an ST and you have a machine that really can perform. STOS BASIC replaces GEM functions - windows, icons, alert boxes, item selectors - with its own proprietary features. If you've ever tried to change resolution while working under GEM, doubtless you will be aware of the confusion this causes the system. No problems with STOS. Forget that in a command and it will be happy from 40 columns to 80 columns and back. Furthermore, as STOS ignores GEM, you have more memory to play with.

If STOS is loaded directly from disk rather than from GEM, you will find an extra 32k of program space - some freeing, particularly on 10.5k models. If you've had any previous experience with BASIC then STOS will look familiar. It's the most interpreted BASIC instructions are executed immediately or at a particular instance (usually when you type RUN) if preceded by the number.

The editor, which is the first part of STOS you see after loading the package, is used for editing pro-

grams, sorry, games. Most things expected of a text processing tool are present. Particularly handy is the ease with which function keys can be assigned commands. Details of these are conveniently displayed at the top of the editing screen. Extra options are themselves held in a BASIC file, which can be edited. Hence, you can determine which resolution and colours STOS looks up as it, define function keys to store your most used BASIC instructions and even load accessories into memory (more on these later).

The system can hold up to four programs in memory at once, completely independent of each other. You could be writing the next *Dynastar Gold* game, switch to another program (opened for a quick game of *Breakout* and then resume your programming. Memory is allocated dynamically to ensure that there is no space wasted. Even better is the fact that you can display all four programs today on the screen at once.

STOS includes some very powerful functions for manipulating sprites, screens and music. Each BASIC listing uses special areas of memory known as banks dedicated to data handling, each bank, of which there are 16, has a unique number. Most banks can be used for all types of data, with a few dedicated to just one sort.

Making music

There are numerous commands for arranging the ST's sound chip. The easiest is to type a command such as `80000, 50000 or 60000` - pre-defined and rather basic sounds, but ideal for the beginner. More complex effects and tones are just as easily produced. Music can be composed with one of the STOS composers. The resultant data may then be played and manipulated by STOS BASIC commands. The music plays in the background (under interrupt) which means you, or your program, can get on with other

things, including editing the rest of your program.

As STOS isn't GEM based the manual makes sure you are aware of that, it should have been easy for Jani to provide all 512 colours on screen at once. They haven't allowed this, but as some compensation you can alter the height and width of the screen, and there is a command for cycling through the entire 512 colour palette. Graphic functions are plentiful with many GEM-like instructions. Shapes in rectangles, circles, polygons and lines can be drawn in any size, style and colour. There are 65536 combinations of line-type ranging from dotted to dotted and thick to thin. Similarly, shape patterns are almost endless.

One of the biggest headaches facing programmers is writing efficient graphics routines that will work in precisely the same way no matter which mode the ST is running in. STOS overcomes this by providing the programmer with `CHS` and `CHV`. These hold values denoting the current width and height of the display area expressed as a fraction of those used in mode mode. Thus `8000 1.0`

GAME CREATORS

So what's out there to compete with STOS? Well, you can always take there are two: *Power BASIC* (SEA BASIC), *CHS* (BASIC), *ST BASIC*, but its other competing is not with these packages as its commands are hidden

inside the graphics handling and other individual menu keys for game creation. There's *STBC* from Invision, but that's specifically for adventure creation and (more quietly) is limited to 256 graphics and text manipulation. Perhaps the closest one is *Conductor* 65 on the way and *CHS* are seen to release the Sports Factory but in the meantime STOS is unique on the ST/STC front.



■ STOS's other feature in action. All the ST's 512 colours can be cycled through using just one command.



TO 525-DW/DA/DRY would print out a full-screen test tape in any raster mode.

Left, sprite, left

Probably the most difficult aspect to creating a game is designing and animating sprites. STOS comes with a sprite editor — an accessory item — that is good enough to be sold as its own problem number one solved. As for animating the sprites, well, up to 15 moving sprites can be placed on screen at any time. You don't have to do any work just specify the flight path, speed, number of frames and the sprite will work away independently of the rest of the program. That's right, under interrupt, it's fantastically easy.

Two screens are held in memory at any time. The first, the physical screen, is what is displayed on your monitor. The background screen, however, is buried somewhere in memory and is used by sprite commands. Anything that requires redrawing is done on the background screen where it can't be seen. Extra screen data can be reserved in memory which can be put to good effect in slide shows.

Other screen tricks include zooming, reducing and copying sections of video memory. Also, screens or sections of screens can be loaded into BASIC string variables and then handled as such. The possibilities are staggering — but the most used is to contain complete background arrangements out of several defined screen strings.

Scrolling, which is another area of interest to the games programmer, is provided as a STOS function with options for moving portions of the screen in any direction. Up to 16 different scrolling zones are permissible at any time.

Did it move for you?

There is much to STOS that is good. It's a competent version of BASIC with some magnificent commands for doing the games designer. The idea of keep graphics, sound and sprite data in banks really does make it easy for the programmer. And the accessories brilliant. But will it work for you?

Manyen hope so. They seem keen to publish games that are created with their system. We've heard that one before — I'd. To prove that they really are serious about STOS.



LOADING AND SAVING

Power is what STOS operations offer. Most BASICs allow you to save data in either ASCII binary or formatted format. Depending on the extension given to a file, STOS knows the data is a particular manner.

BBC — standard BASIC program.
ACC — STOS accessory.
PRG-2-D — Digipe-format screen.
PRG — Macintosh screen.
BIB — raw data.
BIB — all banks.
BIB — defined variables.
ACC — ASCII file.
PRG — executable file.

Run-only programs can be created simply by saving standard STOS BASIC files with a PRG extension. These files can be executed from the GEM Desktop-like all PRG programs. Files created this way aren't compiled (unless STOS makes

editing facilities) and the BASIC programs are saved together.

Most programs written in a high level language will fail to boot from an floppy if the STOS doesn't indicate properly in this situation. For such problems with STOS programs if they don't require GEM STOS extensions, the things with ACC extensions, are special BASIC programs that do download in the ST's memory until invoked. They can exist with the correct bank file being edited and are, in fact, actually BASIC programs themselves. They work in much the same way as GEM accessories and can be anything from screen converters to sprite designers. A caveat: understanding you can have (if necessary) the being edited and, as a GEM-like program can be saved in accessory format simply by adding an appropriate extension.

THREE DISKS WENT SAILING BY

STOS comes with three disks. One contains the BASIC language itself, another contains accessories and demo files, and the last holds three STOS-made games.

The games: Bullet Train (horizontal scrolling action), Zulu (shoot 'em up action in three days), and (Machinist) while they are all accessible, you wouldn't want to pay for them. But it, as Manyen say, the games were written in a short space of time that there's reason to be impressed. The games are not that large either (between 50K and 100K).

Seven accessories come with the review version, although how many come with the final version is anyone's guess. They're all either designed to make the most out of your system, included in a screen compressor, font generator, font editor,

memory monitor, pointer finder, music composer and sprite creator.

The music composer allows you to assign notes to notes. Three notes are present, one per channel. Unfortunately notes can't be placed directly on the screen. Instead they must be entered in the form C4, E, F and G — very cumbersome and extremely clumsy for the learner.

Two sprite designers are available: one for monochrome use, the other for colour. These accessories really are cheap. Options for flipping, rotating, animating and grabbing sprites exist. Sprite data can be ported from commercial software and used in your programs. Flipping, but also, backgrounds may be loaded so that sprites can be checked for colour clashing.



■ Sprite objects can be moved around the screen with ease.

Manyen are setting up a club for users to swap ideas and programs. They also intend to add extra features to STOS like 3D vector graphic routines, landscape generator and graphic extensions that will give you loads fun for loading and stitching images. These additions will come as files which simply slot into the STOS folder, once they are there, the new commands become available. You will be able to add commands to the system, but the information will only be changed through the user data. STOS programs are by no means slow, but with the addition of a compiler (specified in the Manyen)

some incredibly snappy programs could result. Price for this will be around £20.

Less without these extra features, STOS is amazing. Price, power and performance guarantee its success. Whether you use STOS sticks on the shelves of fun or remains to be seen. That's up to you.

for

- Three packed disks
- Eleven banks and sub-banks concept
- Superior interrupt-driven sprite commands
- Shared sprite programs can be created

against

- Good command of BASIC necessary
- Several compiling access easy to pass

features

0 1 2 3 4 5

performance

0 1 2 3 4 5

size of use

0 1 2 3 4 5

manuals

0 1 2 3 4 5

format value

0 1 2 3 4 5

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DATABASE EXHIBITIONS



PD UPDATE

Every month dozens of new Public Domain programs are written for both ST and Amiga. How do you know what's out there and what's worth getting hold of? Ben Taylor and Elliott Stein begin a regular monthly report.

AMIGA

The ubiquitous Fish Public Domain Library has started because it is collected by the energetic Californian Fred Fish and keeps on growing. Since our last article in Amiga PD in issue 2, twenty more disks have been released, numbered 126 to 146.

Featuring strongly on the agenda for this new batch are demonstration animations from the latest 'Budget After Context'. For the graphically inclined, these are the results of an annual animation competition held by the San Francisco Bay Area Development Group (hence 'BAGD'). There's not much to say except that they're of very impressive, and particularly if you have aspirations to be a desktop graphics programmer you will find useful to get hold of **Fish #132** with the 'Berserk' animation. This is a complete arrangement of spheres and bodies, complete with the source code used to generate it.

Off on the animation/graphics theme, **Fish #146** carries a demo copy of *Light*, a commercial ray tracing program for calculating shading and reflections to add realism to your graphics. The demo version can only handle ten objects per screen, but is still useful for learning about ray tracing.

Here are some of the more noteworthy specific programs:

DROPCLOTH - Disk 128

Seen the boring cold blue background screen on your Workbench annoy you? Dropcloth takes a picture file and uses that as a backdrop to all your windows. The only restriction is that, because the Workbench only uses four colours, your backdrop had to be a four-colour picture, in low resolution 480x320 format. Most pictures, it has to be said, look pretty noisy when reduced to four colours, but it's an amusing novelty.



■ Starline (Amiga). Fish disk 128 with a Starline fighter as the Workbench backdrop.

PD OMOUSE - Disk 145

This little utility was written by an angry mouse user. When you have 25 windows open on the screen at once it can get very annoying to have to click on the scroll-to-front/back gadgets at each to find the one you want. With OMouse active, your mouse's operation is changed. Whenever the mouse is moved onto a window, that window becomes 'active'. You don't have to click the mouse button on it.

Clicking the mouse button anywhere in a window will bring it to the front - you don't have to find the tiny gadgets at the top right of the window.

PD BROWSER - Disk 134

If you could clearly see to use all the PD software you can find, but just can't understand how to use the GUI, then this could be for you. Browser is a program which can be run from a simple Workbench icon, which shows all the files on the disk whether they have icons or not.

When you first run it you get a small window showing all your disk names. Click on one, and its root directory appears. All files are in white, and subdirectories in orange - click on a subdirectory and its files are listed. You can copy files by dragging them to other windows, rename or delete them and create new directories all from a Workbench menu. What you can't do, unfortunately, is run them. You'll still have to open a GUI window for that.

SBPROLOG - Disks 140/141

A heavyweight entry for serious programmers here. This comes as two

SKULL CRACKER

The prep for the next issue: Amiga PD programs will soon go to disks 137 and 138. The first includes a Workbench icon which will, while the second is a utility window complete with sample icons of the skull, brain, heart and spine. Could be handy if you have already scanned in the last issue.



■ Browser (Amiga only). Fish disk 134 in action. You can even see files without icons from the Workbench.



PD PLATINUM

What is PD Platinum? PD Platinum is an accolade for titles of such quality, originality and commitment that you can't say "they're this long and consistently good" and cover titles which gradually become an indispensable part of your machine. Also you'll gladly pay a king's ransom for...

skill, one for the program itself and the second for the source code (Prolog, in case you didn't know, stands for "PROgramming in LOGic") it was a French invention, which is why it's back to front), and is the language much trusted as being at the forefront of Artificial Intelligence research. Although we haven't had time to test it thoroughly, it looks to be a full implementation of the language with some very useful extensions. It comes, courtesy of Arizona University's Department of Computer Science, so has a good pedigree. One warning though - don't over think of using it without a megabyte of RAM, and two a further.

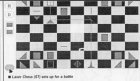
ST

MILEGAME

This month on the ST we'll concern ourselves with PD games.

Milegame is a car race with cars. The object is to be the first to accumulate 1000 miles per game and much over 10000 to win the lot.

To start out, you play a Red Card - and if one of the five cards you are holding isn't a Red Card you continue



■ Laser Chess (ST) sets up for a battle

to discard and receive another till you get one. After you play a Red Card, you can play a mile card - 200, 100, 75 or 25 miles, and you score that number of miles.

Instead of scoring miles, you can elect to prevent your computer opponent from racking up miles by playing a hazard card such as: Out of gas, Accident, Stop or Flat Tyre... to which your opponent must continue to discard and pick up another till replacing the correct corresponding remedy card: Gas, Repair, Spare Tyre.

There is also the 50 MPH Speed Limit which can only be remedied by playing an End Speed Limit Card and the Right Of Way, Extra Spare Tyre, Permanent Spare Tyre and Driving Ace which provides game-long protection from particular hazards.

If the rules sound complicated, fear not - after one game you immediately get the hang... you can also become very addicted to this one so beware you might be up to the early hours of the morning playing with it.

PD ROCK, HARD SOFT!

The next diversion is an intriguing game of wiles and guile. Using the mouse, you position the pointer on the table in the direction which you want the cue ball to go. A speed indicator at the bottom of the screen regulates the speed at which the ball will travel. By manipulating the speed of the cue with the pointer's aim, you soon acquire the skill necessary to reach corners over 1000.

A few games of pool and a demonstration to what a game of pool is really like. Skills, cue and chalk not provided.

PD LASER CHESS

What do you get when you take the age-old challenge of Chess and bring fantasy into it? You get Laser Chess.

Each side comprises a host line of Triangular Mirrors, a Diagonal Mirror, the Laser, a King and a Hypercube. The second line consists of Triangular Mirrors, two Blocks, a Beam Splitter, a Horizontal Straight Mirror and a Vertical Straight Mirror.

When your Queen would normally stand you have your laser; some of the other pieces act the laser by possessing a reflective surface. When properly aligned with your laser they designate an opponent's piece... when improperly aligned with the laser or opponent's reflective piece it can designate one of yours... even your laser or king, leaving you the game.

When a Hypercube is moved into another piece, that piece disappears from its original position and reappears on a randomly selected empty square. This is a double edged sword; it may relocate a piece to a vulnerable position or instead make it possible for the piece to capture an important piece of yours on the next move.

In the center of the board is a Hypercube. It absorbs laser beams and acts like a stationary hypercube - any piece moved to it disappears and reappears randomly on an empty square.

LaserChess is a thoughtfully designed game designed for two players only. Regularly a future update will allow one to pit their abilities against the computer. It is a must for any chess-maniac who wishes a slight diversion, mostly to the classic game.

THE SUPPLIERS

In the UK, the following companies that are known to supply ST and Amiga PD software, there is no ST cataloguing system like the Amiga Disk numbers, but the good ST libraries will carry a wide selection of popular programs including the ones in this article - list end.

GERARD THOMPSON ASSOCIATES, Glasgow, Glasgow, Bristol, Scotland 0457 660 (ST 0457 244). Amiga only £3.00 each.

THE AMIGA PD LIBRARY, 140 Rutland Road, Sheffield S1 2PP 0742 589425. Amiga only £3.00 each.

SCOTVILLE, 10 Highland Avenue, Waterbury, Texas 0457 777 0700 244600. ST and Amiga titles. £3.00 each.

FLORRY/STAMP (ST) 100 Newton Chances, Northfield, Aberdeen AB1 1SR 0456 89000. ST only.

PAGE 4, PO Box 84, Bannockburn 129 (0255) 21000. ST only.

THE SOURCE (ST) 607000 LIBRARY, 9 Stone Oak Way, Stone, Staffs. Bristol, Avon 0212 892 27 00.

TEAM UK, 10 Bridge Street, Aberdeen, Scotland AB1 2JH 0224 18000. ST only.

If you visit a Software Library and would like to be mentioned on this list, or if you are a library or programmer with titles worthy of mention please let us know.

For the Amiga, write to: Amiga PD, ST Amiga Forum, 4 Queens Road, Bath BA1 1EL.

For the ST, write to: ST&A Media, Ltd 879 Entertainment, 67 Tottenham Avenue, London W5 5NF.



■ The opening screen of Milegame (ST) only.

MACALIKES AND MORE

PD not only means that you're free to use the software but it also means that you're free to edit and modify it as well.

In PD, meaning the knowledge-based factors, are many potentially interesting programs and applications in need of modification to make them truly extraordinary.

Perhaps the most interesting which needs a Macintosh expert touch is MACCHARTOP - an alternative operating shell for the GEM desk top which in many ways is more your ST's own system than that of an Apple Macintosh. It is available from Software PD Services - disk ROM 20.

It looks truly impressive and is in many ways superior to the standard GEM desktop except for one important fact: most of its functions aren't actually functional yet!

There are other examples of different computers for the ST which could benefit from a programmer's expertise as well as dozens of applications and programs. More on those next month.



TRUE BASIC

BASICs come and BASICs come and sometimes you wonder if they'll ever stop coming. True BASIC claims a better pedigree than most, however, coming from the keyboards of Kemeny and Kurtz, the originators of the language, Richard Monteloro examines its lineage.

\$60.83 ■ ST and Amiga ■ Precision, 6 Park Terrace, Worcester Park, Surrey, KT4 7JZ (01-330 2069)

In the beginning there was only one and it was true. Now there are hundreds, some free and some not. The latest is definitely not free, but is listed as being 'The One. What are we on about?' BASIC? The creators of BASIC, led up with all the movement BASICs that fail to follow the straight and narrow decided to produce a language that is all things to all programmers. Or something like that. True BASIC is the result. It boasts portability, structure, speed and price.

The portability bit doesn't refer to the weight of the package (two 300 page manuals put paid) to itself, but to the fact that programs can be written on one micro — an Amiga, say — and run on another — an ST, say. Versions of True BASIC exist for Amiga, ST, PC and Apple Mac computers. One language guaranteed to be the same on any micro, an exciting prospect.

Truth dilates

The main editing window takes up the whole screen and like most editing software lets you move freely through out the file, cutting, copying and pasting, searching and replacing. The most noteworthy feature of the editor is its Mac-like cursor function: BASIC lines are highlighted by clicking and dragging the pointer and one click at the Outline key gets rid of the lot. It's a pity this wasn't taken further where highlighted text could be replaced simply by typing in fresh text.

Most features are accessed via drop-down menus or keyboard sequences, though some have become names. For instance, 'Show' displays files from a disk and 'Go Show' removes line numbers from a listing.

Powerful formatting operations are available from the Alter menu. The Go options are particularly useful, letting you run a preprocessor (formatting program over your current file, adding other things). These Go pro-

grams are True BASIC listings which means you can create your own. All manner of things are possible: you could convert programs from other dialects of BASIC, display your BASIC programs using a specific layout, force all variables to upper case and so on. Four Go operations — Format, Run, Show, Show — come as standard.

True BASIC programs are compiled before running — this doesn't mean you can create stackroutines (another package is needed for that), but it does mean that routines are reasonably fast. There's also a command window, though, which which accepts BASIC input directly: instructions are executed immediately as is common with interpreted languages.

Most menu options and other house-keeping directives can be executed from the command window, and several commands can be executed in one go simply by separating each with a semicolon. Longer sequences of instructions can be saved as script (batch) files and executed in one step from the command window.

AMIGA AND ST DIFFERENCES

While the layout and general working of True BASIC is the same for both machines, the ST version offers additional BASIC and command window instructions. For example, BPR displays file and directory information. RENAME does the obvious. DO TRACE keeps tabs on a program's variables. AVAL organizes files and directories.

Additional BASIC syntax directives ARE PRINT A, SET/END TEXT JUSTIFY, SET/END JUMP/FORM, SET/END NAME and SET/END.

Also for ST users are OPTION TYPE, LOCAL and OPTION RESULT. OPTION TYPE, which is placed at the beginning of a program, checks the syntax of every variable entered into the listing. An error occurs if a variable is opened that isn't declared by the LOCAL command. RESULT merely allows you to end LIST statements.

It may sound as though ST users are getting a better deal than Amiga users. Not true. The Amiga User Guide is a longer affair containing much more material. Also supplied with the Amiga package is a keyboard overlay.

True blue

True BASIC can handle robustly large numbers. The smallest positive number is 5.36288e-10th while the largest positive number is 1.70000e+00th. It's unlikely you'll ever write an application which comes close to these limits — it would take more than 10th lifetime to count to either limit. And, anyway, number accuracy is only guaranteed to 14 digits. Even still, it is the fact that an entry can have 255 dimensions. By creating a 255-dimensional array with bounds greater than one — two, say. That would require 255 bytes of memory (2¹⁶ is 1Mega) if such an array were possible, there would be enough room to log all the particles in the universe.

Only one command per line is allowed, shorthand for REM is the exclamation mark !. LET must be used to assign variables, WHILE loops don't exit through DO WHILE. LOG% calls 'N' coordinates strings, and 'right-justified' words end. Most other features are in line with current versions.

Mathematical functions are present in force: COS% (x) divides x by y and returns the quotient x and remainder r. EPS% returns the smallest number that can be added to x without changing x so that the result

Software from the Creators of BASIC

True BASIC™

The Structured Language System for the Future



BASIC BOOKS

Whether the Reference Manual or the User Guide will teach you programming. If you want a more gentle introduction to True BASIC by any of the following:

True BASIC — Programs and Algorithms, Artie Clark (King, Tap Books, ISBN 0-85014-550-5, £11.95)

True BASIC — A Complete Manual, Henry Simpson, Tap Books, ISBN 0-85014-570-4, £11.95

These are available from Artie Clark & Sons, Distribution Centre, 1 Oakley Way, Cowley Heath, West Sussex, PO9 1HQ. Phone 0243 779777.

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Image Works, Archway House, 40-50 The Green, London (N4 6AF) Telephone: 01-271 4645



K-MINSTREL 2

If you're trying out music on your ST for the first time you'll not want to spend a huge amount on software before you've got a feel for the subject. Chris Jenkins examines an entry-level music processor from Kuma.

K-MINSTREL 2

£29.95 ■ ST only, all models

Kuma ■ 12 Horseshoe Park, Pangbourne, Berkshire RG8 7JW (07357 43351)

Not everyone wants to turn an interest in electronic music into an all-consuming passion, yet much of the ST music software on the market is aimed squarely at semi-professionals with stacks of MIDI equipment, and plenty of spare cash to spend on complete sequencing and editing software. There's definitely a space at the lower end of the market for the dabbler with very little MIDI



■ The update menu gives you access to MIDI equipment



■ Composing and editing in K-Minstrel

using the familiar pull-down menus, mouse pointers and windows. The single unexpected dish comes with a megabyte XChange manual, and owners of K-Minstrel can upgrade to K-Minstrel 2 for £10. It's also possible to transfer music data files from the

original version of the program.

There's only one main display screen in the program. This shows a conventional music stave, with both bass and treble clefs. At the top of the screen are a series of pull-down menus, at the bottom, a series of

equipment, or even none at all, who wants to use his ST for music without spending a packet.

Kuma's K-Minstrel was one of the first 30-developed pieces of software to make use of the ST's MIDI facilities. Now it's been revised and updated, and the resulting package, most intriguingly entitled K-Minstrel 2, serves as an even better low-cost introduction to both conventional music and MIDI. As you'll see, though, there are some strange omissions which may make you think twice before adding it to your collection of music software.

Conventions

K-Minstrel 2 works in levels: notes or melodies, colour models, or a standard SCORE. It's fully GEM-based,

MIDI FEATURES

Composing pieces to send to a MIDI instrument can be carried out in two ways. With the MIDI power off, each note you press has the same preprogrammed time value, so you are really only entering the pitch. With the MIDI power on, you are in efficient recording in real time, with the length of the key depression determining the time value of the note. You can record on any Minstrel channel, though you'll be dismayed to find that K-Minstrel 2 can't cope with chords through MIDI; it only recognises the highest note played. If you want to get chords, you have to go back to the start and add another Minstrel channel, harmonising with the first one.

You can stop in and out of MIDI at will in the middle of a piece (though goodness knows why you'd want to) and you can edit your Minstrel piece afterwards using the mouse. To make your composition ever better, each Minstrel channel can be assigned a MIDI channel and patch preset number. Then it's just a matter of choosing whether to have the internal notes switched on or off, and selecting PGM to hear your piece.

The most obvious omission in K-Minstrel is the lack of any MIDI synchronization facilities. You can't make it clock at a standard MIDI device, nor can it be clocked from any MIDI equipment. This means that if you do decide to invest in a little more MIDI gear, specifically a drum machine, K-Minstrel 2 goes straight out of the window.

PRETTY POLY

To create polyphonic chords you need to combine notes of monophonic notes on different Minstrel channels. With 4 Minstrel channels you can create chords of 4 notes, for example. Start plan on writing any polyphonic thought, with the limitations described in the next line you're limited to a maximum of 10 pages of 16-note polyphonic music.

note names and indicators.

KMinot 2 can be used for on-screen composition with the mouse, or in real or stepwise with a MIDI keyboard. Music can be played using either the 20% button speed chip, obviously limited by its hardware to four simultaneous voices, or using external MIDI equipment. The number

leaves. You can add triplets and dots, to alter the length, and build up chords by combining several individual notes. When editing, you can delete either individual notes or complete chords, or change the pitch of a note or chord simply by moving the notes. It's also possible to add new chords in the middle of a piece, after opening

Created by Ben Schmitt



Completed staves can be printed out to an Epson-compatible printer. The one is courtesy of reader L.Y. Hoffmann of Germany.

of pages of music which you can compose depends on the number of channels you wish to have. You can choose 4, 8, 12 or 16 Minot channels, which are not the same as MIDI channels. The number of pages of music available drops from 200 to 50 depending on the number of channels - and unlike some professional MIDI sequencers, which have up to 64 polyphonic channels, KMinot 2's channels are monophonic, each capable of playing only one note at a time.

The particular layout of the bottom of the screen allows you to select notes and rest lengths, and such factors as accidentals, rests, slurs and triplets. If some of these musical terms mean nothing to you, don't expect any help from the manual: it assumes a depth of musical knowledge normally limited to serious music students. Bad timing, pity.

Editing

At the far left, in the edit box, which appears a note of the current value, the user changes value by clicking on a different note type. Also available are slide/move marks which increase the tempo of the piece by four units, double/move the tempo, four times for selected, crescendo marks which increase the playing volume by one unit, decrescendo marks (the opposite), and six lines, which control the lengths of ten separate notes. (But it is noted that six lines have no effect on notes of different pitch transcribed via MIDI.)

Also available are a number of different rest values, slurs and flats, and musical note stems. A scrolling pad in the middle of the display allows you to move the bar lines up or down to fit in values of almost the whole MIDI range, C5-C8.

There are six note lengths available, from demisemiquaver to sem

ibre. You can add triplets and dots,

to alter the length, and build up chords by combining several individual notes. When editing, you can delete either individual notes or complete chords, or change the pitch of a note or chord simply by moving the notes. It's also possible to add new chords in the middle of a piece, after opening

Getting it down

Composition is simple when you have the note you require displayed in the edit box. Copy it into the clipboard by clicking at the appropriate position. The drop-down menu to play the whole composition from the start, or from the start and end points of a shorter sequence and play that section alone. Marked sequences can be copied and inserted into the manual text, deleted, or moved to a new position. You can also save a marked sequence rather than a whole piece, or change a saved piece into any position after a marked point.

The 'Select' menu allows you to edit the parameters for each separate Minot channel. Volume can be varied from 1 to 127, affecting both the internal sound and transmitted MIDI key velocity data. Each Minot channel can be assigned a MIDI channel number up to four Minot channels per MIDI channel - confusing, isn't it? Each can also be assigned a preset number, which will select the appropriate patch on your external synthesizer.

The attack, decay and sustain settings of the 32 sound chips' four channels can be changed to give some variety to the internal sounds, but this will of course not affect any external synth. Under the 'Options' menu, the Channel Data window lets you call up all the settings for any of the four Minot channels, and amend



You can transpose the key of a piece, among other goodies.

the data in the window. This includes the choice for the notes on each channel, although only four different choices are available.

Also under Options, you can change the key of the piece at the end of any page load in the middle, change the name of the piece, transpose it into another key, switch a microphone on or off, or print out any page using a 300% Epson-compatible printer. The Set Selection options let you toggle the internal sound, playback scrolling, and MIDI file save.

Key package?

Though KMinot 2 has many good points, its price being the main one, there's public domain software about which seems better at a MIDI computer, and programs such as Music Construction Set from Electronic Arts, which offer better facilities for internal sound synthesis. MIDI also offers a block-composition system which requires no knowledge of musical theory unlike KMinot 2 which seems to assume that every one interested in music must be a music student.

KMinot 2 is pitched at a good price, and if you're prepared to put a bit of hard work into your compositions you'll get on well enough, particularly if you only want to use it for standalone ST compositions. A bargain then, but, if you intend to interface with MIDI instruments, one with some inconvenient limitations.

for

- One of the least expensive music packages
- Can be used with an external MIDI equipment
- Easy to use and fairly powerful

against

- Limited note storage capacity
- No MIDI synchronisation
- No real-time MIDI record recording

features

1 2 3 4 5

performance

1 2 3 4 5

ease of use

1 2 3 4 5

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READY, MIDI, GO!

So you've bought yourself a synth and you've got a MIDI interface. What on earth do you do next? Chris Jenkins presents the first in an occasional series on practical MIDI.

Over the last few issues we've introduced the theories behind computer music, and explored something of the concepts of MIDI and the arcane arts of sequencing, synthesiser patch editing, sampling and recording.

Now, month it's time to look at some of the hard practical details of setting up a working music studio based around your ST or Amiga. With careful planning you can make a start for around £400, and keep expanding the system as you have the time, space, and money. Let's assume for a start that you have an ST or Amiga - otherwise you wouldn't be reading the magazine. For ST users, who already have MIDI ports built into their machine, the first thing you might consider is a memory expansion. Some professional music software packages, such as Steinberg Pro 24 v3, need 1 Meg to operate. Others

will happily work on a 528, but tend to limit the extra music data storage space offered by a 1040. Consider the options of trading in your 528, or expanding its memory using one of the many RAM kits available.

Computer World

For Amiga owners, the first necessity is a MIDI interface. Though MIDI software is becoming easier to find, notably through De T. distributors, MIBSOS Q/MPH if you stopped type at school, you will have to make sure that the package you want to use is compatible with the interface you choose. Probably the best buy at the moment is the Dual MIDI Master, at £34.99. This is available in different versions for the A500, 1000 and 2000, and is compatible with a wide range of music packages including Electronic Arts' Serious Blues. It has a MIDI In socket, MIDI Thru and three

■ You too can have a front room like this if you want control.



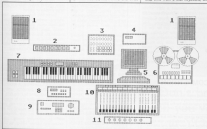
MIDI Out's - we'll explain the value of multiple Out's later on.

Oh, so you're set up to communicate with MIDI equipment. Now you want your MIDI music computer software.

There's a baffling range of music sequencing software available, but most packages have the same basic functions; to record in MIDI data how a sequence of notes or chords played in 'real time', or entered separately in 'step time' from a MIDI keyboard, and

DRY MIDI

Amiga owners notice of the ST's three built-in MIDI ports have most likely only a little longer. Even so, you need the three external buffers are working away behind the scenes - we'll shortly be publishing an article on how to build your own Amiga MIDI interface, saving you a few pounds on shop prices. Watch this space.



■ A schematic of a full MIDI setup. 1 - Monitor speakers; 2 - MIDI switching interface; 3 - MIDI drum machines; 4 - Two or more MIDI synthesizers; 5 - Computer; 6 - Eight track recorder; 7 - Keyboardless MIDI synth module; 8 - Keyboardless MIDI computer module; 9 - Multi channel mixer; 10 - MIDI digital effects unit.



■ Yamaha DX100 MIDI-controlled 'Inventor' unit. You get 88 preset sounds effects, for around £280

to allow you to edit, transpose, chain, copy and replay the data to produce a complex and professional-sounding composition.

THE CRACKDOWN

There are several traditional first-choice keyboards. The Yamaha DX100 features four octaves of miniature keys, pitch bend and vibrato effects, and 124 editable digital Frequency Modulation sounds, at around £1190. Roland's Alpha Juno II has more traditional analogue synthesiser sounds, with 80-of-a-kind full-sized keyboard, while the Korg Poly 800 M80 has a smaller split to the Roland, though the sounds are a little better.

The Casio CZ-101 features four octaves of miniature keys, a pitch bend performance wheel, 102 editable sounds, and powerful Phase Distortion sound synthesis at around £139. If you're happy to use uneditable preset sounds rather than further programming your own, you can try the Casio CZ-200, with 80 of the same kind of Phase Distortion sounds, built-in speakers and a drum machine.

Several points to note about these keyboards. Firstly, they're all no longer being manufactured, although they're still widely available second-hand or at reduced prices from music dealers. Unless you're a professional musician, second-hand is discount and equipment is a much better buy than the latest, most expensive gear. Secondly, none have velocity- or pressure-sensitive keyboards allowing you to play louder by hitting the keys harder, or to introduce effects such as vibrato by wiggling the keys. For effects like these you'll have to move closer to the £400-£600 market, looking at some keyboards such as the Roland K1, Yamaha DX11 or Roland D10.

There are several excellent pack-agers around the £80-£150 mark which allow you to make a CD-R without even owning a MIDI synthesiser. We looked at several in issue 2. Good examples include Electronic Arts' Music Constructor Set for the ST and instant music for the Amiga, and Microbeat's SuperConductor for the ST. All of these allow you to play music using the computer's sound chips (instant music uses Amiga FFT sample files). SuperConductor is a surprisingly powerful and versatile MIDI sequencer too.

MINI MIDI COMPETITION

(Electronic) music isn't just a home user's toy - professional musicians put their albums together using much the same techniques, albeit on more expensive kit. As a treat to editors doing what in the field, you can name the six artists responsible for the albums whose titles form the first paragraph headings and win five lots of six entries.

The first three correct entries drawn off of the list will win a copy of the AMF Synthesizer compilation LP of synthesiser, live (and ambient) music. Send your entry with your name and address to a postbox to: IT/Design Format Competition, AMF Records, PO Box 287, London N12 9SF. Closing date is October 31st.

Into Battle

Possibly the biggest choice involved in setting up a MIDI studio is your first instrument. You'll have to choose a keyboard. After that, if you want to increase the number of instruments you can save money by choosing keyboardless modules, since you've already got one keyboard with which to enter the notes to your MIDI system.

OK, you have your computer, software, and first synth (taking everything up going from fifty to 100 MIDI cables is straightforward - it's best to lay the main thing rather than cheaper audio equivalents). Unless you have a Casio CZ200, or any other MIDI keyboard with built-in amplifier and speakers, you'll need to link up the audio output of the synth to your best A/D IN sockets, or buy a cheap combination amp/speaker (a 'tumbler', about £50 for a basic model), to hear your musical creations.

Organisation

You'll soon see if the cheat's sounds on your synth, but in most cases you will be able to edit them using the panel controls. To make the task quicker and easier, there's a vast range of sound editing software packages for the ST and Amiga, which are looked at in detail in last month's issue.

Sequencing, editing and replaying your compositions using one synth sound becomes boring unless you're exclusively interested in, say, tape-based hardrock music. There are two ways to expand the complexity of your pieces. Multitracked synths, like the Casio CZ101 and Yamaha DX11, allow you to play more than one sound of the same tone (either from a sequence or sending messages on individual MIDI channels, or by digitally 'splitting' the keyboard into several zones each playing a different sound). Alternatively, you can buy more key-boardless MIDI synth modules, such as the Roland D110, Yamaha DX112 or Oberheim M16. These are normally manufactured in a standard 19-inch wide format suitable for mounting in studio equipment racks. Practically every MIDI synth now has a module equivalent (which is obviously a lot

cheaper). By selling each module to expand different MIDI channels, you can use a sequencer to play a complete multi-track composition. Once you have more than one synth, you will begin to appreciate the advantages of having a MIDI interface with multiple outputs (or a splitter box such as those manufactured by Akai or Phyllis Reed - otherwise you would spend hours, unplugging and reconnecting different MIDI leads).

Whether you have one synth or more, for the best results you will have to get into multitrack tape recording. Before you throw up your hands in horror at the prospect of such an expensive and complex process, bear in mind that, as with the synth market, there are great bargains to be had second-hand.

The Plan

The normal procedure for recording is to plan out in advance exactly what you're going to record (pretty easy if it's all done as a sequence), then set up the sounds using the equalisers, level controls and effects units on the audio mixer. Record the rhythm tracks (drums and bass) first, then, while listening to the recorded tracks on your speakers or headphones, lay down your chords and melodies on the remaining tracks. You'll realise that on a four-track system this doesn't leave any tracks for vocals or harmonies. There are two solutions, either learn the system's art of 'punch-popping' (immediately freeze-recorded tracks simultaneously onto the fourth, free among the original allowing the tracks to be used again), or buy an eight-track tape recorder for sixteen-track or twenty-four-track. If by the time you've got to the stage, you'll know whether music making is going to be a hobby or career!

Remember, if you hope to make anything worthwhile of your music, the final result should be a stereo master tape. From there you can explore the industries of commercial music, demo production, or even the CD business, depending on where you want your music to take you.

Dig It

MIDI equipment now comes in many power forms, such as MIDI guitars, drums, wind instruments and even microcomputers (the Digipops IBMPC-compatible MIDI controller, a MIDI-to-CDS digital voltage converter, such as those manufactured by Phyllis Reed or Tascam, will even allow you to reconvert your cheap pre-MIDI synths into synth systems, and as you expand you will find new uses for your Computer, such as automated mixing, score editing and sample editing. We'll be covering these subjects, and many others in future issues - meanwhile, if you have any queries on Computer music, drop us a line.



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■ Images of this quality and better are quite attainable on an Amiga or ST. A video digitizer, a video recorder or video camera, and a good subject are all that's required. This particular shot, captured with Digi-View, demonstrates the Amiga's 16M mode. More sophistication.

Doubtless you've seen graphics on your ST or Amiga. But no artist could ever dream of producing. The sort of thing that moves you with your tongue hanging out, and owners of laser machines in tears.

What is it about these graphics that make them stand out from other pixel portraits? Try this, my beleaguered, deflated. The sort of thing that just won't provide with an art package, no matter how large the colour palette.

These near-photograph quality images are only possible by grabbing a picture, minute object or live subject and reproducing it on a computer's screen. The hardware which does this is the video digitiser and the resulting pictures are known as digitised images. There is nothing mysterious about the way this is done: a video camera or video recorder sends signals to the digitiser, which assigns colours or shades of grey to each picture element (pixel) that eventually appears on the computer's screen.

Of course, once an image has been captured and transferred to the computer's memory, it can be manipulated like any other graphics. You can take the image and enhance it; by removing unwanted background, touch up bits that didn't come out as you wanted and alter the picture's colour palette. And then what? How about using the pictures for producing startling demonstrations like Half Mile Hill on the Amiga or Rescuing Clark on the ST, forming the basis of comical sprites for games, the backgrounds (essential) for games and adventures - in fact, for anything that requires graphic impact.

So what are you waiting for? Head on to find out what you need for your particular setup, which digitisers are available, the software to enhance and digitise grabbed images, and techniques for getting the best results.

DIGI-VIEW 3.0
Amiga only (\$129 min,
1Mb recommended) ■ All
screen modes supported ■
£130 ■ HB Marketing
(0800 444433)

If there's one product available for the Amiga that every Amiga owner has at least heard of, it must surely be Digi-View. Digi-View has been available for a couple of years and during that time has become one of the most successful add-ons for the machine. The manufacturer, Newtek in the States, claim to have sold units to nearly every country including the Soviet Union.

The first thing that strikes you when opening the Digi-View box is the



DIGI-TIGERS

Jealous of those sparkling screens you see on STs and Amigas in shop displays? Video digitisers aren't just a new way of taking photos - they open up a whole new world in image processing. Richard Monteiro and Jason Holborn polish their pixels in search of the ultimate.

size of the digitiser - to describe it as small would be an overstatement. DigView plugs neatly into the parallel port of the A3000 (but you'll need the DigView adaptor available for an extra \$13.95 to be able to use it on either an A4000 or an A5000). The actual video signal is fed into DigView via a standard phone socket on the front of the box.

The DigView software comes in two versions, on a single disk: an American MISC version and a UK version. To be able to use the UK version you'll need at least 1 Megabyte and even then available memory can get a little tight. DigView supports all the Amiga graphics modes and can produce from two to 4096 colours.

Version 3.0 of DigView incorporates several new features over its predecessors, such as automatic crop, extra half tone (yes, it is quite like that) and a line art mode. All these

are fairly new to Amiga users, as most art packages offer little if any support for them.

Enclosed with the DigView unit is a person's wheel organised in four different colours: red, green, blue and clear which is attached to your video camera and used to capture colour pictures. To capture a grey scale picture, DigView requires only one scan of an image. Colour grabbing involves taking three different exposures using the red, green and blue filters. DigView then builds the three exposures into a colour picture, holding them all in memory at once. This is why it requires so much memory.

The software includes a limited number of image processing facilities, such as changing the saturation level, brightness and sharpness of an image. Using these functions can sometimes have disastrous effects but thankfully the software includes every user's friend, Undo. The soft-

ware also supports printing but in practice this is not very practical as it's not possible to connect a parallel printer at the same time as DigView.

Overall quality of captured images ranges from extremely impressive to unrecognisable, but with a little tweaking most grabbed images can be made to look very good. The only negative thing about DigView is the amount of time it takes to grab an image. Grey scale images can take around 10 seconds while a colour image, requiring three scans, can take as long as 30.

features	4.0
performance	4.0
ease of use	3.5
documentation	3.0
format value	4.0

SCREEN MODES

So you've never heard of Oni? Sure, in the main most who use Oni will find Oni useful. But it's not exactly surprising at the maturity of Amiga software appears them completely.

Oni mode is a very handy tool to enhance the video screen as well, rather than a usual window in the system. Oni has a mode that allows for the creation of a screen's colour palette. In practice, the extra colours available are only those in support of the screen itself of the picture.



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DIGIPIC

Amiga (512k min) ■ Low res only, 32 colours ■ £299 ■ Precision Software (01 330 7166)

DigPic is a relatively new arrival on the Amiga digitising scene that boasts an impressive specification. While DigPic doesn't support fancy features such as OverScan, Extra half line and HAM, in terms of speed of operation it leaves DigView standing.

Included with the digitiser is a separate piece of hardware with the total guard name of Extended Grey Scale Adapter. This little wonder is connected between the Amiga and its master for modulation and doubles the number of grey shades available. The only snag is that the EGSA hardware must be present before an extended grey scale image can be displayed. DigPic supports full colour digitising using the same three digitiser method as DigView and a similar colour wheel.

Any form of hardware is only as good as the software that drives it, and DigPic's software is robust. Both DigView and DigPic use standard include pull-down menus to access all digitising functions, leaving the main screen uncluttered.

With DigView, the image processing tools are rather limited, but DigPic's are much more comprehensive, with a list including Quantise, Contrast, Threshold and Edge. The overall quality of grabbed images aren't really of the standard that you would expect from a digitiser costing £299, but if you require a fast converter then DigPic is worth investigating.

features	3.5
performance	3.5
ease of use	4.0
documentation	4.5
format value	3.0

TURBO DIZER v2.0

ST ■ Low and High res supported ■ £149 ■ Software Express (023-888 8885)

Turbo Dizer certainly isn't new, and now proudly proclaims a Ver 2.0 tag. The 2 refers to the software, not the hardware which still comprises a long thin interface for plugging into the ST computer ports. A 1MB-video mode socket in the digitiser's only digitising features, and the only way of boosting it to the real world.

You connect your head and take per source choice; either PAL-standard video recorder, video camera or

TV with external socket. Then an very few televisions with video-in to make sure you have another acceptable video source before buying this, or indeed any digitising product.

The software is responsible for deciphering the image the camera sees, or the video recorder outputs, and displaying it on your ST's screen. Color is translated to grey-scale which means the image on your ST screen can look garish when viewed in low resolution. From the main menu you can set the grayscale level (2, 4, 8, 16), toggle allowing on or off to active grabbed pictures, alter brightness and contrast levels, select colour settings, load or save images, determine picture format (Pico/Classic, Super, Art Director and so on), enter an animation section or commence digitising.

Not all functions are available for both high and low resolution digitising. For instance, colour is unavailable in high-res (fast motion) and normal, animation is only possible in low res and only highest pictures can be saved with an RGB extension for inclusion in BMP packages like Post Street Digitizer.

The time taken to digitise a picture is proportional to the number of grey scales used. For every grayscale add 0.025 of a second to the digitising time. At least, that's what the manual says. Going by these figures, it should take 0.2 of a second to grab a frame using eight grey scales. Wrong. Such a picture actually



■ What's this? Windows of Windows? Action and ACE loading the Format office.

TURBO DIZER FACTS

- It drives, showing what the animation section is capable of, is available from Software Express (023-888 8885) for £2.95.
- The digitiser is used by both the British Museum.
- It also uses multi-windows in Windows and Last Angel have applied the digitiser for use in schools.
- The picture resolution and speed rates a test file to keep information at two stages are displayed on screen.

FORTHCOMING ATTRACTIONS - AMIGA

There's a lot happening on the Amiga video digitising front and details of several impressive releases are appearing. Probably the most interesting new digitiser is the long awaited (LW) and the first of the new (LW) video digitiser combination and with the rather obscure name of Video Transfer.

(LW) which is already available in the UK, was originally developed to be a Commodore product but for reasons unknown was dropped by Commodore. (LW) has similar facilities to DigView but it's more than just a digitiser in that it can also be used as a real time video digitiser in real time. (LW) also has a real time video digitiser which means that it doesn't require colour. There is also a real time video digitiser which means that it doesn't require colour. (LW) addresses this by actually decoding a video signal's colour information and using it to reproduce colours within the resulting image. The (LW) version is still under development in the States, but should be available in the country sometime in the autumn.

Video Transfer, from the first of the new (LW) video digitiser is a complete Video Mixing Desk which is given thanks for work on. Transfer combines an industrial standard graphics, full video effects system and a real time video digitiser in one package, with a host of other add-on such as decoder and video compression via. The digitiser included in the Transfer package even costs (LW) to show when it comes to speed of digitising. The first claim it can digitise in 1000 real-time (1000 frames a second). Video Transfer has been demonstrated at several major Amiga events including the recent Amiga-Expo in Chicago, but even these demo systems are still only beta versions of the final product.

It will still all things, never without cost with a price (very high) and it seems certain that the Video Transfer undoubtedly can't be cheap if you're a video professional. Though, Video Transfer could be the answer in your drive.

For further information contact either Amiga Centre Scotland on 020 847 4490 or 01 588 933 780 or 0895 844433.

■ That's about it! I can just move my head then your software having a quick spin. Working special into mind (using a couple of microseconds) the in reality - 0.01, the just within in front of a very old black and white video camera and close the blue points, software and hardware did the rest.



takes between 1 and 2 seconds. Still, the manual could have a printing error.

Pictures take up a lot of room – typically 32K – which is why Turbo Dorr uses a compression technique for storing animation sequences. Rather than storing the full picture, the software simply stores the differences between each frame or picture. This can mean a 75% reduction in memory used.

Control over animation is good, but tricky to implement. Sequences

can be grabbed individually or automatically; the time between each shot being taken in auto mode can vary from seconds to 48 days. Animations can be played from within the package, but sadly the software doesn't allow you to create stand-alone sequences.

Documentation is poor, the C source files that end in the disk contain German comments (and the manual is in German). In the manual, digitising is slow and that works best with stills. Move it apart, with a little

padding, good results are possible. Pictures can be converted from one format to another easily and the price is agreeable.

features	3.0
performance	3.5
ease of use	3.5
documentation	2.5
format value	4.0

DO IT YOURSELF



REAL-TIME?

What's a real-time digitiser? Is there any video digitiser that doesn't do real-time (shouldn't) and digitise at a rate of at least 10 frames a second, so a live video picture is captured at the frequency 60 frames per second or the frequency 50 frames per second, but not to confuse matters, some digitisers digitise the video picture, but not the image. Some digitisers appear to process pictures in real-time, but can be adjusted to work slower frame rates.

If you've got the choice, always use a black and white video camera for grabbing images: they have a higher resolution than their colour cousins. Most digitising hardware doesn't require a colour camera to grab colour pictures, monochrome cameras are much cheaper.

The best images are always taken from still subjects. If your video is up to it, pause the picture before grabbing. With cameras work, you must ensure the subject is well lit; there's no such thing as too much light in the general direction as possible. For professional work use three or four spot lights.

Most photographs and pictures don't digitise well. Use glossy pictures for the best results.

Once you've grabbed a few images using your digitiser you'll probably start wondering what you can actually do with them. Unfortunately digitising software often lacks facilities for taking up pictures or modifying them in any way, the most you're likely to get is a

slideshow utility. What you need is an art package of sorts – and there are many – to clean up the image (remove stray pixels, perhaps), break the contrast or even change the colour palette and tailor it to your requirements.

Changing the palette is not as outrageous as it sounds. If you're creating a game set on an alien world you'll want the background in unusual colours – red sky and various shades of orange for the countryside (sounds like hell – but I experiment).

Look out for graphic packages that offer image stretching, shrinking and twisting. You won't always want to use pictures the size that you grabbed them; having the ability to change their height and width is essential. Don't increase picture size if possible as the results will be awful – poor mapping, pixels and lines, mainly ugly, looking an image has the opposite effect; it often enhances the picture. Most art packages come with horizontal and vertical flip which are ideal for creating objects out of hell or a ghost. For instance, if you digitise a disk and part of it looks odd, it is easy to copy the good half and flip it along the appropriate axis. Then it's simply a matter of joining the two halves.

Once you've got a clean image you'll want to do something with it.



■ It seemed impossible, but with a little help from Digit Plus, Master Paint and a 3 Meg Ntaps we did it.

OTHER DIGITISERS FOR THE ST

Mouse Animation Machine (SAM) from Smart Systems, available on 520K MegaRAM, is the only other video digitiser still sold in this country (plus the ST and Macintosh having long gone). SAM was going to be reviewed in this feature but didn't arrive in time. Still, here is what Smart claim it does:

SAM's great claim to fame is not its price – £249.95 – but its ability to grab pictures from video transmitters or video cameras in real-time. Moreover this means you can watch any thing and it will appear on your ST screen live-free and easy. Only 18-colour for resolution pictures can be grabbed though.

Instead of saving one individual frame of incoming video signal, you can save entire sequences. You can a 500, 24 or a 1040, 50 or a 1040 ST and 1040 on a 400K ST.

The software allows you to animate digitised sequences of any speed, forward or backwards, and in freeze mode.

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THANKS

We at Format would like to express our gratitude to **Joe Rowland** at **Sea Graphics** for the use of the digitised work in this month's Format. Joe can be contacted on 0209 733000.

CAMERAS

With all these digitisers, you still need to find out if a video camera is what you need. Generally, there are three types of video camera: still, video and digital. Still cameras take still pictures, video cameras take moving pictures, and digital cameras take still pictures and store them in digital format.

A good thing about digital cameras is that they can be used to take still pictures, but they can also be used to take moving pictures. This means that you can use a digital camera to take still pictures, but you can also use it to take moving pictures. This is a very useful feature.

There are many other things to consider when buying a digital camera. You should look at the resolution, the frame rate, and the price. You should also look at the features, such as zoom and auto-focus.

ST PARTY TRICKS

Engage (also distributed by **Electronic Arts**), or **PixelPaint** from **Share** are two alternatives for displaying digitised images. They have a good range of features, and are very easy to use. **Engage** is a good choice for those who want to play with their images in a more creative way. It has a good range of features, and is very easy to use. **Engage** is a good choice for those who want to play with their images in a more creative way.

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ACTIVISION - 23 Ford Street, Hampstead, London, NW3 2PL (01-431 1101)
ELABORATE SOFTWARE - 8 Green Street, Millington, Cambridge, CB2 3AA (0224 627000)
ELECTRONIC ARTS - 10-12 Station Rd, Leighton Buzzard, Bedfordshire, LU3 2PL (0455 44444)

CLEANING UP WITH THE AMIGA

If you need true image processing power, probably the most popular heavy weight package is **PIXmate**, which is distributed in this country by **PixelPaint** Software. **PIXmate** uses algorithms originally developed by **PAAL** for enhancing pictures scanned from space probes such as **Voyager 2**. The vast distances that signals from these probes have to cross means that the strength of any signal is inevitably weakened.

PIXmate uses the power of the Amiga's **BitMap** to speed up graphic processing by a factor of ten over conventional image processing programs. It uses a system called **Image-Filtering** to enhance images.

Effects include adjusting colour bias, colour extraction, **Pixel** dithering, **Local Contrast Enhancement**, **Median Filter**, **Pixel Randomising**, **Threshold adjustment**, **Laplacian convolution**, **Histograms** and **Image** rotation.

Probably the best all-round set of packages available for the Amiga is **PixelPaint** from **Shareware**. It contains **PixelPaint** to handle one and over where it has been a favourite of the Amiga team. The most powerful facilities within **PixelPaint** are its **Image** manipulation facilities. Using these facilities you can produce some unusual effects by picking up areas of the screen, stretching, shrinking and twisting to your hearts delight and then pasting the result back down onto the image.



■ The eyes, to begin the historic process of **PixelPaint** Art **Share** Garden Bruce into a pixelated face. Using a separate screen, the right-hand side of the screen face is pasted down, flipped, and pasted down again. The mouth is stretched and the eyes' looks of fear are reduced to mere dots.



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DATA MANAGER PROFESSIONAL

Ron Massey wrestles with fields and records to form an opinion of the new ST database release from Timeworks.

£69.95 ■ ST only, all models ■ Timeworks /Electric Distribution, 8 Green Street, Willingham, Cambridge CB4 5JA (0954 803388)

Every facet of daily living, both personal and professional, has a legitimate use for a filing system of some kind for the efficient management of daily affairs. Yet of the many database systems available, few are what the average user would consider user-friendly. Even those (a very few) systems encourage users to find "extra" applications for their...until now.

Timeworks' latest release, Data Manager Professional (let's call it DMP) is a big brother to their Data Manager '87, and should go a long way towards overcoming user reluctance to testing useful applications for efficient management of all information.

Open the box?

DMP is a full-feature professional grade data management tool which can be used with the ST's QDOS pull-down menu, or for the majority of its options, directly from the keyboard.

Once you have made the neces-

sitated working copies of your master files and got going, you will notice that DMP is designed around individual program modules, namely: DEFINE - For designing new record forms and editing or adding variables to existing records.

MANIP - DMP's operational module. Records are viewed, inserted, edited or modified with this.

REPORT - Used for designing the format of your output files, setting up the parameters for merging blocks of text with definable details from your records.

CONFIGURE - Allows you to alter the default options for data style, default drive for your data files, and printer configuration.

Relating to it

The most difficult part about using any database is the planning required to set it up so that subsequent use of your information will provide you with useful information about your data.

Data Manager Professional is certainly no exception, setting up a database is usually referred to as "defining its structure". The design of your records is partly determined by the type of variables you will be using.

A particularly important Data Manager Professional feature is that you are allowed to modify the structure of your data files, even after data has been entered.

Each data entry is a record (a "thing" and) is called a "variable" and is placed in a field (one or more lines in a record headed by a single label relating to the variable). Each field has a value for each record. Each variable also has a type: Text, Number, Block, Class or Date. TEXT FIELDS are represented by characters which are absolute, or are not intended to be modified by mathematical or other processes.

NUMBER FIELDS are used where mathematical processes may be involved. Timeworks recommend that text fields be used for telephone numbers.

BLOCK FIELDS are variables consisting of two or more lines of continuous text.

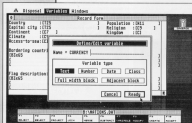
CLASS FIELDS - Are used where the range of data is limited to either pre- or a user-defined range of values for input.

DATE FIELDS are used as references to data field in a record and may consist of current reference dates (ie, subscription renewal) or dates of historical significance.

Before your eyes

Once you have acquired a degree of familiarity with the system, you should need to make very little reference to the extensive ring-bound manual because each program module includes its own extensive range of help pages.

Moving through a file is done in any of several ways. Once you select the "Display" option, you may move forward or backwards in a file, with the first and last records defined as



■ Adding a variable to a database form

file terminations, by using the up/down cursor keys.

Alternatively, you can use the mouse and Q&M by selecting "Previous Record" from the control menu. Sequential jumps representing about 10% of the file may be accomplished by left-clicking on the Q&M slider bar.

As top-flight databases go, Q&M's capacity is not massive, but files of up to 32,000 records are competently managed. New files may be created from selected parts of existing files by merging or joining, using the system's full set of relational operators.

Another powerful feature allows you to "project" defined parts of an existing file, so that a new file may be built by extracting specific records from the original, with an optional automatic deletion of duplicate entries in a file. Command sequences for frequently used relational operations can be defined and "played back".

Sorting is Q&M-based and, according to the manual, Q&M will sort 5000 records in about 40 seconds. Manipulation of a group of records may occur in any of several ways. Customized reports may be generated in which you have the option of containing and/or omitting individual blocks of data.

Highly demonstrating the real power of Q&M, you can also use mathematical and conditional expressions to transform your data into text and figures.

Data output

Small databases may only require examination from one end to the other, browsing through the range of records until you come to the one you are looking for. Large or complex databases, whether single and menu planners, names and address records or stock maintenance and control, usually benefit from an option to sort the data by any of several parameters.

Extracting information from a



■ Browsing through the geography database prepared with Q&M.



■ About to extract a report from the data for a printer

Q&M file may be done by a defined ordering of a group of records. Multi-level selection allows you to select records by matching them against expressions involving one or more criteria, like "All men under 5'6" living in Hall and earning \$100,000 or more". Repeating the selection process occasionally refines the group of records.

Q&M's Report module provides you with facilities for building reports in one of three ways: where a report consists of data from a single record,

a batch of records, with common data values such as books from a single publisher; or, a summary report whereupon data is reduced to statistical averages rather than details from specific details.

Another option provided is that, if you started with Timeslot's Data Manager 37 and have upgraded to the Professional package, you can use the CONVERTAPP utility to transfer files to your new system.

WHAT USE?

Applications for databases are as varied as it is personal. In fact, virtually every sphere of human activity can benefit from a well-designed system.

Household and personal management applications include library records (titles, biography, volume, location, owner) and address records in which may be included recurring annual events and other memory-coping information, household inventory for insurance purposes and much more. The hallmark of a good database is a variety of sophisticated features, which items may simply. The person using the database should not need any computer experience.

DEMONSTRABLY EASY

Q&M's demo file consists of information relating to 123 countries. Data includes the usual information regarding capital, population, continent, soil, etc and so on.

If you want to practice adding new fields, start up the "Editor" module from Q&M's front end and load the demo file. Press [F6] to select modify, and [F7] to add a new variable. You will be presented with a box into which you type the name of your new variable. You will also have several options for defining the type of field, defaulting to "Text".

Having completed and accepted the input sequence, the screen is replaced by the record-card, with the names, types and lengths of existing fields. Overtyping the record card is a box containing your new variable.

Move the pointer over the variable and hold down the left mouse button to "grab" the variable. Still holding the button down, move the variable using the mouse, until it is in the correct position.

Releasing the left button will clear the box and install the variable. You then have the option of altering the length of the variable by moving the pointer to the closing square in record and dragging it to the left or right. Existing variables can be modified in a similar manner.

Once you have made the required alterations to the record layout, save the file under a new name. It really is as easy as that.

for

- Relational operators allow powerful data searches
- Exceptionally easy to use
- Easy to alter structure of existing files
- Exceptionally good report facilities

against

- Manual would benefit from a better index
- Professional version examples would give a better idea of applications

Features	0 1 2 3 4 5
Performance	0 1 2 3 4 5
Ease of use	0 1 2 3 4 5
Flexibility	0 1 2 3 4 5
Format value	0 1 2 3 4 5

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SCREENPLAY

3D intergalactic epics are all the rage this month so, slipping into his green latex jump suit and donning his laser filtered plexiglass helmet, intrepid space cowboy Andy Storer jumps aboard his faithful star-steed Trigger and heads for the nearest bar.

August saw 18 new games bearing into our offices and, while that's a little down on the last three months, we're currently got 155 up and coming titles listed for release in the next four. A quick check with our **CRASH-OUT ORGANIC COMPENSATION** reveals this to be a release rate of 1.375492 or so a day. This would mean that in **AN IDEAL UNIVERSE** you'd be able to spend something in the region of \$15,000 a year on games if you so wished. Luckily we're forced to be short discussing and Format will continue to test only the best.

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Format Gold

At one point this month we thought all the games we reviewed would feature tiled 3D graphics. Then **POWERSHORE** and **GLUE** were delayed. No matter - possibly **THE** two best **SOLID OUTINGS** of the year made it to time.

STARGLIDER 2 was its **FORMAT GOLD** hands down. From the moment you boot you feel pleased handling a **REAL SERIOUS SCI-FI SHM** - no wonder the Japanese are working on a **STRATEGIC FIGHTER** simulator - if you had a 50 foot screen and **SUPER-SURROUND ATMOSPHERICS** for this one you'd never be seen again.

The same could be said of **AIDESATION** or **FIELD TRADERS**, our other **FORMAT GOLD** winner.

Expensively tiled 3D graphics, 3D-shade comms, an onboard computer and a play area of around **25 BILLION TRILLION SQUARE LIGHT YEARS** make **LEFT A MASSIVE PROJECT** you could spend more than a lifetime playing.

And there's more....

The Amiga version of **CRASH** contained content not seen at a **COOL 280** MPH and ran extremely fluidly on our test with all 3D pages of excruciations and 63 control codes. However is one of the few true **PSYCHOTIC ACTION** games on the market - 50 battles if airborne and surface vehicles at **ANY ONE TIME** - if you're still alive.

Staying alive is the whole point of **HOSTAGES**, the latest Intergames release.

That and killing. Although you're put in command of a **FRENCH HIT SQUAD** you're charged with clearing something rather more taxing than that falling wreck in Auckland harbour. As **PER USUAL** for graphics are **PER EXCELLENCE**.

512KBIT scores high in the graphics department too - if you ever found your thumb playing **GETTER**, try **MULTIPLANE PARALLAX SCROLLING** looks as good as it sounds. We'll say we love the way the foreground moves faster than the horizon. Simple, but **ULTRA EFFECTIVE**.

If you love this one, though your thumb's worn, try **DOUBLEPLANE PARALLAX SCROLLING** looks as good as it sounds. We'll say we love the way the foreground moves faster than the horizon. Simple, but **ULTRA EFFECTIVE**.

AND FINALLY to **SUMMER OLYMPIAD** a game with brilliant graphics which demands a bit of skill. Your **MOON OBJECTIVE** is to win as many gold as possible without leaving your chair. Featuring a **HIGH DIVE SO HIGH** you're back **TERMINAL VELOCITY** before you hit the water, we can only conclude that **OLYMPIAD** takes sports aims to new heights. (Grrr.)

Ready for the **SHOCKER FUN** too? Turn the page and do a sort of **INTERGALACTIC CRUELTY**...



FROM THE CUTTING ROOM FLOOR

Apologies time to the 11 publishers who didn't make it. August will not display the entire whole lot of **IMPOSSIBLE QUEST**, the untold secrets of **IMPOSSIBLE MISSION 2**, the secret adventures of **ARMY MEN**, the secret career of **STREETFIGHTER**, the tangled careers of **CRASHWOOD**, and the untold secrets of **YOUTH** and **REBELS PRESENT**. Learn 'em or leave 'em is what we say, the last time.

In the 17 states we cut the upholding green flags of **MURDER**, the Amiga pages of **FINAL ASSAULT**, the alien battles of **PHOENIX** and the wacky pages of **HELLO HELLO**. You can't have 'em all. Not many could buy 'em all either.



So there you have it, a month where there were more things than 37 releases - what on Earth is happening?



STARGLIDER 2

ARGONAUT/RAINBIRD



Amiga - £24.95. Joystick, mouse. Reviewed

ST - £24.95 Joystick, mouse. Colour and Mono.

The release of *StarGLider* two years ago not only heralded 16-bit power as the future format for games software but convinced players that it was time to fork out the ready for the hardware. No other product gained so much coverage and sales and yet, ironically, as a technical achievement the look was distinctly 8-bit. Okay, so the wire frames moved fast and there were a lot of them, but at the end of the day *StarGliders* was no more than a straight shoot-'em-up with limited strategy. The sequel is a different game entirely and owes little to the original save for the name and the context. Sound, graphics and gameplay have all been radically overhauled.

■ Why not take time out and watch these guys have a go at each other?



■ Better still join in...



■ and at the direction of planets



AIM

In total of the Planet Council you have been dispatched to the Solara System is a bid to prevent the Egoni from building a space station near the outermost planet of Axxa to launch a vicious powerful enough to destroy Novena. Icarus

Propellers are being deployed on each of the seven moons of an inner world, Milvus, to protect the space station's construction. In your Icarus cruiser, you must visit the 15 worlds of Solara and collect the components, materials and the scientist required to produce a neutron bomb - the only device capable of taking out the space station. Along the way you encounter pirates, alien creatures and, of course, heavily armed Egoni opposition so it's best to regularly save your position.

YOUR ICARUS CRUISER CONTROLS

stargliders whalers

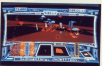
■ Some of the lifeforms you'll encounter



■ You can sit and watch the beam projectors being constructed



■ When the work is done you simply fire off a charging beam



■ And watch all that work go to pieces

STRATEGY

After learning to fly your cruiser - simply a matter of pulling and pushing the mouse for altitude and direction, and clicking the right mouse button for thrust - it's time for test-out your gas plasma beam by clicking the left mouse button. Thankfully, just about everything that moves can be annihilated with consummate ease. Once the computers have become allies it's a matter of hitting it hard from time to time to get a status update and seeing where Upton Beam Projectors are firing back. You can then activate your star drive and zip to your destination planet. Remember to shut down the drive just before planetary, though, or you'll lose your shields.

Most combat encounters occur between planets where pirates hang out and spend most of their time shooting each other up. Since they're preoccupied it's quite easy to take hundreds of them out. Some objects, however, like beam projectors, require bouncing bombs. So first of all you must search the Solace system for underground ammo deposits. Labyrinthine tunnel networks are found on most planets and moons and provide safe access to other areas up top.

Depots are difficult to find and usually require a trade before you can take what they have to offer. Though like all true blue deep-space navigators you'll be pleased to know you can also steal what's on offer with your tractor beam. This facility is very handy for refueling - just look up to one of the many asteroids to be found in a belt of debris and all your energy levels will recover. Other weapons of your choice, if you can find them, are TimeWing's submissives, cunning little devils which blow-away shipwreckers into the path of whatever you shoot them at. Fire and Fire missiles which lock on to heavily defended objects and finally the neutron bomb - designed to destroy the Upton space station. To use this one you must locate its designer and the necessary components to build it.

ST vs AMIGA

Starflight 2 has been cleverly coded using a dual format system which, like our own, holds both ST and Amiga programs on one disk. However, Approach have taken this a stage further - a game position saved on the ST can be reloaded into the Amiga and vice versa!

The game was developed on Amiga and ported over to ST's where it was found to run 10% faster. But ST owners needn't feel too smug - all you have to do is take a second game around to a friend's Amiga and be hooked out by the fabulous sampled sounds. They transform the atmosphere entirely and more than make up for what is a fairly noticeable loss of speed.



■ Time for a little underground exploration down the tunnel entrance



■ You make your way along a shaft...



■ ...and come across a shaft of missiles

GRAPHICS AND SOUND

You might imagine Starflight 2 as a combination of Mercury and Elite and you'd be right up to a point. Here though there are 100 fixed 3D objects most of which are animated. On the ground you come up against stampers, walkers, patrolled lines, parascopes, bouncing balls, cars, tanks and bikes, whilst in the upper atmosphere you can find space stations, docks, rays, tanks and strange ships. To keep you on your toes you will have to compete against 17 types of aggression.

The array of 3D phenomena is brilliant; each moving object perfectly defined, rich, solid and fast. Every object encountered can be accessed and manipulated from a library option available on startup. An excellent inclusion which could have been marketed as a stand alone feature. Starflight 2's major achievement is to get so many filled vector graphics on screen simultaneously with no apparent loss of speed. You may also switch to any one of 7 instantaneous 'interceptor' style external shots of your cruiser plus 9 different cockpit views of your current position. The instrument panel itself is worth a mention too for its laser, energy, fuel, speed and altitude indicators - each depicted by unique 3D columns designed to be holographic displays. Most of note is the currently selected weapon indicator which, with a hit on the shift key, flips between small animated icons, bouncing bombs, missiles, lasers and mushroom clouds.

Sound is excellent too. From the fit of thunder and cannon fire to the thrum of stampers striding across the landscape the overall effect is a very convincing atmosphere throughout your mission.

CONCLUSION

It's hard to find fault with Starflight 2 - it scores so highly in graphics and sound you'd be prepared to overlook any lack of gameplay. But it doesn't lack gameplay - you can play it as strategy even or load up and go out blasting everything in sight. Its game save facility lets you combine each approach without problems. Either way it leaves its predecessor standing.

still graphics



moving graphics



soundtrack



blasting inaccuracy



overall 95%



A hand holding a ruler. A circular callout bubble contains the text: "So, you need a product that's proven to work."



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ENTERTAINMENT



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This isn't just another sports simulation, this is a Daley Thompson "event" where all his talent and humour blend through to make a thrilling and entertaining game play for all the family. Go for the Olympic Challenge!

ocean

ocean

OF THE ART



FEDERATION OF FREE TRADERS



PAUL BLYTHE/GREMLIN GRAPHICS

ST - £29.95, playtex

Amiga - under development

A perfect game could be one that is open-ended. There's no finish point at which you can say it's over - there's sufficient depth, breadth and randomness to ensure you slot it in your drive time after time. *Federation of Free Traders* may not be perfect but it has all these qualities in amongst its immense play area of 10M square miles of galactic space. With the legendary *Elite* finally making it onto the 68000, you can judge just how much the space trading adventure genre has changed in the three years that feel like three decades.



■ You select a galaxy from the 32,768 available and pinpoint a system

GAMEPLAY

The *Federation of Free Traders* is an adventure in which you can choose to trade between 32,768 galaxies each comprising 256 solar systems of 16 planets in your Herley Mill starship. You begin the game as a Federation raider and through successfully completing various missions, work your way through the eight ranks up to Fleet Prince status.

At first you are given badly paid, low-risk tasks such as delivering packages to distant planets or securing freighters in the more remote areas of space, so you must use this time to trade goods and build up sufficient capital to enhance your ship's capabilities.

There are 15 missions involving searches, investigations, destructions, evasions and interceptions, each awarding different credit. Using *Galnet* - a galactic communications network - you are able to access stock market data on a range of commodities and buy, deliver and sell accordingly after time-slicing or hyper-jumping to dock at space stations or planet-bound lots. You may choose to opt out of the Federation career structure at any time by ignoring mission levels and simply playing the market. Perhaps you'll buy Class 1 lasers, shields and modules with the proceeds and thereby acquire the offensive and defensive systems required to reap the ladder of success.

Of course, in a play area of this scale, there's bound to be a whole host of aggressive entrepreneurs amongst all the other traders, so you'll be relieved to know you can communicate with passing ships via an *Elite* style parser before deciding whether to consign them to the Federation of Former Traders. Both *Galnet* and *Elite* are accessed through *Huble* - your ship's computer - a friendly little soul who'll be only too pleased to let you load in a supply of a dozen or so sub-galaxies to help pass the space time.



■ You check each planet in turn for the best place to trade your wares



■ A quick glance to see if all systems are go



■ This probe decides to interrupt your journey



■ But you look on with calm as it leaves



■ and it's goodbye



■ You call up Cabot.



■ And from the range of options.



■ Choose to view the commodities available



■ Frying some ferocious metals might be a good idea



■ If you feel like a little light relief in your long journey there's always the ship's computer to help you out



CONCLUSION

FOFT scores very high in gameplay and scale and employs some truly brilliant solid 3D graphics. The grand design is only marred by minor details but if you're looking for a game you can make a career of then this should definitely be on your list. It has all the pompous ultimate reality of Elite and most. Made in three years' time we'll all be crying out for the 3D-bit conversions.

GRAPHICS AND SOUND

FOFT uses tiled 3D vector graphics for all moving objects and planetary surfaces. Movement is extremely smooth – a distant ship becoming a full-screen prospect with ease. Possibly the most advanced tiled vector graphics to be seen on any screen are to be found on planet surfaces where terrain mapping remains of green plains, valleys, hills, forests, rivers, lakes and oceans, and gives the impression of tiled fractal geometrics.

Beyond the starships are 32 kinds of spacecraft which, whilst perfectly solid, do lack a certain design flair. The most interesting is your own ship which, unfortunately, you only get to see when you've been destroyed. But rotating planets in the solar system maps and the larger immensity of

the galaxy's space are well crafted. Whilst such sophisticated vector graphics are employed it's a pity that the Cabot and Riddle windows consist of the standard 57 icons laid on a green background – sharper, clearer data screens would improve the overall look immeasurably.

The inconsistencies in visual presentation are reflected in the sound department. Although FOFT comes with a disk full of original classical music, gameplay soundeffects are a bit dull. Possibly this is due to the 3D's sound chip and perhaps the design team will enhance the sounds of lasers and explosions but in the meantime the SFX are nothing special. (Which is a shame because the graphics are undeniably ace.

still graphics

0 1 2 3 4 5

moving graphics

0 1 2 3 4 5

soundtrack

0 1 2 3 4 5

lasting interest

0 1 2 3 4 5

overall 85%



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GAME BUSTERS

When the stick starts smoldering 'cos it's been a long, long day. When they're singin' you a farewell 'cos there's no more lives to play. Where ya gonna go? Gamebusteral! More revelations than a night out with the Fifth Horseman of the Apocalypse.

BETTER DEAD THAN ALIEN

■ **ST and Amiga**

Find the Quakel Reference Codes for getting to any level:

ELECTRA	PAUCET	ACQUIC	TOUGL PDM
STEFY	PELAGE	THORICK	KNIFE GOLL
BRAMBUE	WOMADA	JAMBOCKEY	SEPLUCHRE
PLUG	PARDOUS	IMMICAL	ELPHMEM
SOFARD	DERUMATE	CORNUCOPIA	GAMMAAGAN
MYRONWIDE	FRANK	PLUGAB	DROCCOWORD
			QUANTINIE

Amiga - load the game as usual and wait for the options screen to appear. Type CRAMP and you've activated the cheat mode. To display instructions on its operation, press (H) followed by the Wonderful weapon combinations are now possible. For instance, machine gun, superball and dis-able imp.

Richard Clarke
Gerrardthorpe, Leeds

ST - at any point in the game type EXX press (R) twice and then the left mouse button. A screen appears, explaining the mechanics of the cheat mode.

Steven "I call myself Bow"
Dunning
Walsington, Bristol



Overlander Conversion, this, and a full fuel tank, will get you through each level. Day Lines when you have the money, followed by Buffering Items for disposing of bunnies and Smart Bombs for buffering everything on screen. Don't bother with Flame Bombs or Turbo.

M Jordan
Farnborough, Hants

OVERLANDER

■ **ST**

Go for the highest value cargo. Fill up with fuel and save the rest of the money for the next level. Keep your speed between 100 and 120 mph; the green speed indicator should be one stop above the blue light. Going at this speed ensures you get through the Gunshot Alley safely - make sure you stay in the centre of the road though. Lamenting like driving through the linked traffic lights in Slough - [L]. Once through this stage you must consider your speed by two or three green lights. You should finish the level comfortably.

ROADBLOCKS: keep nudging them until they crash into a tree or rock. When you're on a straight stretch of road and see a car in front, keep to the centre of the road with machine guns pounding as the car gets close it will weave into your bullets and blow up.

BAMBOOZLE: keep in the centre of the road with guns firing. The cars weave from side to side - you'll get most of them by remaining in the same position.

OFFROADERS: keep to the left with barrels. Blasting for the first three levels. Bombs will drop to the right of you out of harm's way. On higher levels it is trickier as barrels are dropped on either side.

The best thing to buy is the

ARKANOID

■ **ST and Amiga**

ST - press (Caps Lock) when the title screen shows and enter R.L. This allows you to start from the level that you died on in the previous round. Alternatively, press (Caps Lock) and type DEATH-STAR. If you press S during the game you will automatically pass to the next level. If you type DEATH-STAR FPU during loading, you will be transported to the last level.

Paul Dunn
Minesbury, Shropshire



MARBLE MADNESS

■ **Amiga**

Leave your marble stationary at the beginning of level one for a nice surprise.

Mark Henderson
Geeshoth, Newcastle upon Tyne

Complete the level three times and jump off the ledge. You will receive a jump bonus and you'll be transported to the secret water level.

Robert Mullis
Leicester

Amiga - on the UK version it is possible to access a further 30 levels which simply aren't present in the coin-op game. Press F3 for a one-player game or F4 for a two-player game (either on F1 or F2).

Andrew Davidson
Bournemouth, Dorset



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REVIEWED

ELIMINATOR

HEWSON

ST, £29.99, reviewed. Joystick only

Amiga - £19.99, due soon

From the author of *Impossible!* and *Star Trek: The Motion Picture*, comes another brilliant roadster vehicle. In *Eliminator*

you fly a hover-ship along an undulating road that twists and curves through and over barren wastes, tunnels and secret

bridges. You control only its horizontal movement - height and speed are pre-set - but since the distance you can see ahead is constantly changing this is more than enough to accute you. To make matters worse, there are masses of bizarre alien firing blue charges at you whilst strange obstacles and barriers litter the route, making the journey a highway to hell.

Fortunately, you have a range of weapons at your disposal, collected by driving through revolving blue pyramids. Their ammo can be recharged by manoeuvring through orange cubes. You can switch between dual-fire cannon, bouncing bombs and triple blasters by pulling or pushing on the stick, though each time you're killed you lose one of the five weapons available.

Adrenalin

Eliminator takes position. Once you've worked out how to negotiate the twists and turns of the first highway stretch, it's on to the next and your trial and error starts again. Luckily, there's a password system for entering higher levels once you've mastered lower ones. At some points you find it difficult to be sure whether you're coming in going on certain sections involve inevitable action where you're flying

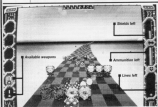


■ You burn up a spot of Australian highway

speed down along a wall hanging in the sky. Like the recently released *Gunstar*, the earliest stages are the most difficult and require masses of patience, but once you have every weapon in the world to blast the living daylights out of all that means, it's the kind of patience that's never been a virtue.

In turn, a tortuous drive through hell swifly ascends curves of colour and carnage for adrenaline with turbo-charging on adrenalin.

still graphics 3.0
moving graphics 4.0
soundtrack 3.0
loading interest 3.0
overall 70%



■ Fuelin' or what? Your hover-ship blasts with full cannons

VECTORBALL

MASTERTRONIC

Amiga, £14.99, reviewed. Joystick only

ST, £14.99, out now. Joystick only.

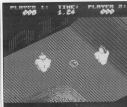
MAG MAG MAG, or Mastertronic Added Dimension as it says on the packaging, *Vectorball* is a curious blend of ice hockey, football and bowls played on a chess of metallic pitches between two droids. The speed of the game, curiously enough, is to scare more goals than your opponent - this is great but when you're playing a friend but the computer is almost impossible to beat.

You score by manoeuvring the ball to the mid and goal mouths, though you're unable to shoot with the ball - you must remain stationary and shoot by pressing fire. You can judge the power of the shot by checking out the length of your droid's track! The lighter the little head hovers above the foot the more easily in the back. You can also work out exactly when your

opponent's about to shoot and tackle him by running straight into him. You can be quite reinforcing, as the pitch scrolls to follow the movement of the ball - if your droid is out of sight you have a hard job working out which way to manoeuvre around the surface humps and dips.

Ditch pitch

Your play area may contain ditches, hills, valleys, ridges or a combination of each and all. On the Amiga version you can also choose between a dotted or shaded pitch - the latter takes ages to generate but is well worth the wait as the resulting play area takes on a 3D metallic 'look'. As you progress to higher levels, the pitches become more and more irregular and difficult to negotiate.



■ Shades of football, ice hockey, snooker, bowls and snail in Vectorball

You can also change the mass of the balls and droids, and versatility factors such as droid acceleration, breaking and friction.

While sound is largely confined to rapid fire, of bumps and crashes, the graphics are first. At the end of the day, it's the kind of game you should be able to run as a desktop accessory.

still graphics 4.0
moving graphics 4.0
soundtrack 3.5
loading interest 3.0
overall 63%

CARRIER COMMAND

REAL TIME TRAINING

Besige: 474-98, menses, Joyntik, Vardian just nat.

[illegible]

Carrion (Continued) caused a sensation by combining arcade action with a strategy game when it was released for the ST a couple of months ago, and now Amiga owners can get a slice of the action.



■ The equipment stores and the
control of functions aren't that clear

1. *Chrysomelidae* 2. *Curculionidae* 3. *Chrysomelidae* 4. *Chrysomelidae*



-
- ```

graph TD
 Pilot["Pilot: Have the cleared altitude?"] --> ATIS["ATIS: 10,000 feet"]
 ATIS --> Pilot
 Pilot --> ATIS
 ATIS --> TrafficController["Cockpit traffic controller: 10,000 feet"]
 TrafficController --> ATIS
 TrafficController --> Pilot
 ATIS --> TrafficController

```
- The diagram illustrates the flow of information between a pilot and a cockpit traffic controller. The pilot asks for a cleared altitude, the controller provides it, and the pilot then reports the cleared altitude to the traffic controller.

## GAMEPLAY

You command the ACE Express, a 200-knot aircraft carrier equipped with 8 Marko fighters, 8 Walrus amphibious tanks (M40), seven reconnaissance destroyers, a laser turret and a whole host of tactical missile weapons.

Your task is to secure an archipelago of vital islands from the rebel AOC Omega carrier in a bid to tip previous tactical advantage. You achieve this aim by displaying your military resources in a war of attrition – systematically establishing bases on each island by dispatching an Automatic Control Centre (bunker pod). You have five types of AOCs at your disposal: Defence – for protecting the island network already under your control; Recovery – for mining and refuelling sea materials and Factory – for manufacturing equipment from raw materials.

If the signal is already under enemy control, a different strategy is called for. First you take out ground and aerial enemy defenses — your UAVs are able to perform an auto-pilot or can be manually operated using the mouse and/or joystick. A quick click on an icon enables maintenance, switching between vehicles.

Island architecture is powerful, hard and furious. Heavily defended islands require a prolonged coordinated assault. The coast-to-coast planning of the island's control centre, necessitating the use of a flux layout which utilizes the enemy's computer and communications, is a complex task.

Game Command involves a complex combination of strategy and arcade action. If the last screen has daunting you can opt for an action game to startup which prepares a random but equally hot and hectic. Designed to take place entirely through a strategy game.

## GRAPHICS AND SOUND

At the time of its release on the CD, *Carrier Command* received acclaim for its tiled 3D animated graphics, almost on a par with the *Amberstar* Zarch. However, the night of the *Amberstar* Warg all but blew *Carrier Command* out of the water, and then accelerating away with the shot panning to maintain the Mariner's position, mid-screen leaves even *Zacharias* 3D routines far behind. Accompanied by stereo sound and an increased number of specheffects, the Amiga version pushes excellence to the limit.

Although Carrier Command's most enduring feature is the real-time icon control of multi-view synchronized action, there are a range of other screens to view. The revolving wire frame damage status screen, the range field supply screens, the intelligence report updates and network status displays are all part of an impressive icon driven command system designed with great care and attention to detail.

**Figure 1**



- Wireless upgrades available
- Automatic pilot
- Bank and pitch hold controls
- Click on the box to increase flight speed
- To rotate vector window
- Four-year view of activity

## CONCLUSION

The gameplay of *Amiga Command* is a significant improvement over the 51 version where the waypoints (indicated) while the Epsilon travelled between planets were almost long enough for you to get an order Manhattaned out in your hand. The result is an conclusively brilliant in all departments as you're likely to encounter without 180 Mhz chips and 16-bit monitors.

[illegible]

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[illegible]

**Table 1** Demographic characteristics of study population



**08/09/2017**

# HOSTAGES

INFOGRAMES

ST - £24.95, joystick. Reviewed

Amiga - £24.95, joystick. Due September

The first of the Infogrames titles to be released over the next three months, *Hostages* is a strategic arcade game allowing six characters to be simultaneously controlled in a bid to storm an Embassy and free captives. Yes, urban anti-terrorism has made it to the video and here it's a French SAS squad you command. Perhaps an assault on the Rainbow Warrior would have been more true to life!



■ A chopper delivers your kit over to the roof

## GRAPHICS AND SOUND

*Hostages'* graphics are impressively smooth and atmospheric. The exterior shots depicting the mission, the locations and views stand as finely detailed backdrops over which animated action unfolds. Inside the Embassy movement between rooms is temporarily halted by full screen images which have the effect of compounding the tension. When you enter a new room, the brief pause for a screen change gives you just enough time to glimpse your strategy map before you hit the trigger in anticipation of an encounter that may leave you with a ulcer for a stomach.

Sound effects feature some of the best guitar samples around cut with the groans of dying men - well, what else would you expect in a game that deals with a death-squad going about its sinister duties?



■ Ducking your way to a doorway as the searchlights beam in on you



■ You stroll down the outside wall looking for a window



■ Inside, you come across your first hostages



■ You're in position now and can take in the sights

## GAMEPLAY

It's 5.45 a.m. and you're sorting out your strategy. After selecting the level of difficulty - determined by the total time to complete the overall mission - you have to place three marksmen at safe vantage points around the Embassy in preparation for a further three to be sent in by helicopter to do real. One by one you position your marksmen along three sides of the building by peering them with precision between the terrorists' searchlights sweeping the perimeter. There are various doorways and walls to take behind as you dodge the sprays of machine-gun fire on your way to a pre-selected position. Dodging the fire involves a number of leaps and cuds which could ultimately require high-impact rubber shodden. Thankfully, you appear to be well protected all round as bullets bounce off you for quite a while before you finally hit the deck.

Once in place, you can flick to a sniper's eye view of the Embassy windows you're covering and attempt to take out the occasional figure you might sight behind the glass. But beware, the terrorists pull hostages in the window from time to time.

You are then shown the arrival of your assault squad on the roof and select the first one to stroll down and go headfirst through a window. Once inside you view the proceedings from behind the handle of a machine gun. A small map indicates your position and that of any terrorists on that floor. As you move from room to room, fast close-up shots depict nearby doorways to add to the tension. Suddenly an armed mount will appear out of nowhere and you have no choice but to pump him full of lead. Action is very fast and you need to be pretty quick on the stick to turn him into a target. As there are 14 guys all ready and waiting to cut you in half, you'll be switching through to your second and third lookouts to flush out all fears and find and rescue the hostages.

## CONCLUSION

Maybe a little dubious in the content department - but that's never bothered buyers of shootouts in the past - *Hostages* manages to effectively capture what we can only assume to be the busy nature of an armed force. Graphically, the game is on a par with the usual high standard of Infogrames' releases, so if you're after convincing atmosphere, tension and the chance to test the sharp and if not intense, well you'll find *Hostages* quite a liberating experience.

### still graphics

0 1 2 3 4 5

### moving graphics

0 1 2 3 4 5

### soundtrack

0 1 2 3 4 5

### getting interested

0 1 2 3 4 5

overall 78%

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[illegible]

How are ratings for the world's smallest yearling? The American Quarter Horse Association's American Quarter Horse Yearling Sale is the largest of its kind in the world. The sale is held annually in the heart of the horse country in Kentucky. The sale is held in the heart of the horse country in Kentucky. The sale is held in the heart of the horse country in Kentucky.



Small pieces may be found throughout the region, but the New York and New Jersey areas have the highest concentrations. These concentrations may be due to the fact that these areas have the highest populations, and therefore the highest number of people who are likely to be exposed to the highest concentrations of lead in the environment.

[illegible]

Microsoft's new software will help teachers share lessons with the help of pre-installed network capabilities. Microsoft's new software will help teachers share lessons with the help of pre-installed network capabilities.

THE VERY BEST IN



ST ENTERTAINMENT

# STARRAY

HIDDEN TREASURES/LOGOTRON

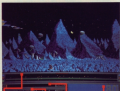
Amiga — £24.95, mouse, joystick, Reviewed.

ST — £19.95, Under development.

Logotron's pioneer Amiga shoot-em-up *StarRay*, is the first game we've come across to feature a last game option to prevent you from playing it all day. Invoke this and you

have to reboot to play again — essential when there are other, less enjoyable, things to do. Also a sure sign that the programmers know they're on to a winner.

■ This kind of action requires mountains of patience



■ The radar scan — all objects (besides you) in the centre and the installations at the bottom are active and hostile

■ The shield bar shows your remaining energy supply

■ The radar scan — you have a smart bomb left

■ guess what?



■ In the jungle and up against all kinds of enemies



■ In some places about corners...

## GRAPHICS AND SOUND

Each landscape is ingeniously coded to present fast-moving backgrounds against slowly moving horizons. This multiplexed screen-grading has the optical effect of speeding up action considerably. Here vehicles move quickly and with flicker-free solidity irrespective of the number on screen. Along with visual specc-effects such as explosions, the laser fire and vaporisation effects are sharp and clear.

Sound effects are also particularly impressive — vapouring an entire screen of aliens is greeted by what sounds like deep digitised groans. Loading and other screen music helps complete the overall sense of atmosphere.

## GAMEPLAY

*StarRay* has seven levels of multiplex parallel scrolling screens through which you fly your lighter armed with lasers and smart-bomb vaporisers. The action is thick and fast and requires the kind of automatic skills you may have acquired in *Defender* and its clones. Your mission is to protect energy, robot and alien installations against alien hordes. The most common aliens are Landers which not only return fire but attempt to land on installations in order to transform them into gun emplacements. Other opponents consist of green spheres which explode to shower several pursuit UFOs in your direction, blasts of wandering bombs, molecular fires and saucers, alien worms, kamikaze leaping springs and alien blue hunter-killers. You've guessed it, the action is frenetic and somewhat insane.

Luckily, some Landers have installed bonus bells behind when you've eliminated them. These produce a variety of effects if you can collect them by running through them — you can improve your acceleration and speed, gain rapid fire, greater laser penetration, limited invulnerability, continuous fire and bonus points. If you are especially good at dodging efficiently with the alien damage merchants you may come across an Alien which you have to make an evasive or shooting down. (Is this an American ship? — Ed.) On exploding, an Alien releases a capsule which loads your energy to max if you catch it. There is no other means of increasing energy and the game ends when you're out. Fortunately, an option has been included which allows you to restart a game at any level from 1 to 4, though only in the first level will you possess maximum energy.



■ Hinting to save the score later

## CONCLUSION

A great first for Logotron's 16-bit market plans, *StarRay* provides state-of-the-art multi-plex scrolling and with frantic action. Although the game bears more than a passing resemblance to *Defender* this should be considered a positive feature since the original concept has been enhanced with a great deal of class and style. As *StarRay* is working on the ST version expect an equally comprehensive alternative available on that machine too.







# SUMMER OLYMPIAD

TYNESOFT

ST - £19.95, reviewed, joystick

Amiga - £19.95, joystick

**M**odern Olympics have been held since 1896 but it seems our American cousins haven't really caught on yet; this game has been released as 'Summer Challenge' over there. Ironically, this is probably more appropriate

since the five sports events in Olympiad the game - Triple Jump, High Dive, Fencing, Hurdles and Skat Shooting could hardly be described as representative of Olympiad: The Games.



Fencing a fence!



Just about to Skat after the first attempted take off.



Shoot that skat!



What you enter the pool



Hardly hurtling over the hurdles!

## GAMEPLAY

Up to 4 players compete in a pentathlon after a brief opening ceremony, you find yourself with a shotgun in hand ready for a spot of skat shooting. You can opt for either mouse or joystick to move the cursor across the sky controlling an animated figure with a gun. Each round has seven 'stations' requiring an average of 2 to 3 shots to complete. Thankfully you don't have to be too accurate.

Triple jump is next on the list and is the hardest of the five. You need to toggle your controls from left to right very rapidly to gain maximum speed and then pull back to lift-off. All too often you miss the take-off point and the animated figure trips and slips whilst you pull on the joystick again to determine the degree of jump.

Fencing is controlled by the joystick too and you play against a computer opponent whose pos-

tures and lunges are pretty competent. The three rounds last 60, 70 and 80 seconds respectively and in these times you must score as many 'hits' as possible.

The High Dive is perhaps the most fun since it's so high that a real person would probably shatter on impact. With the joystick you control the speed of tumble and amount of back before you pike and attempt to enter the pool as gracefully as possible. As the dive is so long it can get really complex - how about 30 forward rolls without with slow motion cartwheels?

Finally, Hurdles has some of the best animation sequences to be seen on a home micro, as you race with four competitors to a finishing line in the distance. Running into a hurdle doesn't lose you points - just time.

## CONCLUSION

Despite excellent graphics, sound and gameplay, it's not as though your realistic performance in any of the five events would improve as a result of playing the game, so it wouldn't seem to appeal to the sportsman. However, it's graphics are second breaking and you should check it out for those alone.

## GRAPHICS AND SOUND

Olympiad's graphics are of a very high quality. All screens are clearly drawn, smoothly animated and feature true perspective graphics. Each event is preceded by a different background music track and excellent start screens of hand drawn artwork. Tynesoft's programmers have concentrated on the animation of the competitors - most effort has been put into the movement of the hurdles, the most convincing with a tilting pan view, moving down-

from as high to track level. As the hurdles dash off, your view remains constant, just behind your chosen competitor. The smooth animation of the hurdling is first class.

Sound plays a useful ambient role. From the gun shots in Skat to the sound of running feet in Triple Jump, from the splashes of High Dive to the crash of a hurdle as you hit it, special effects are very convincing.

|                  |           |
|------------------|-----------|
| game graphics    | 1 2 3 4 5 |
| moving graphics  | 1 2 3 4 5 |
| sound effects    | 1 2 3 4 5 |
| looking interest | 1 2 3 4 5 |
| overall          | 77%       |





# QUICKIES

**A pair of utilities come under the Format microscope – one to allow you to run mono and colour software all on the same ST monitor, another to save you Amiga disk space. How do they rate?**

## OMNIBUS

£39.95 ■ ST only, all models ■ Elsewsoft, 8nd QT, Royal Mills, Esher, Surrey, KT18 8AB (0332 89922)

If you've got your ST hooked up to a colour monitor or television then doubtless you will have looked on in amazement at the excellent picture-quality offered by Atari's 59874/59875 mono monitor – not to mention all the cheap monochrome software that's out there. Similarly, if you have a monochrome monitor you'll probably have gazed in awe at the technicolour games and paint programs available to colour-monitor users. Stop looking sorry for yourself! Elsewsoft's Omnibus utility might just be the answer to your problems.

Omnibus displays the same meaningless high-contrast mono no matter which monitor you have connected –

meaningless because each item is called OmnibusX where X is simply a number. If you're emulating a colour monitor then the display choices are black and white, four grey scales and 35 grey scales. TOS8 and Mega ST owners can also select a fast-updating version that uses 16 grey scales. The last four options are for colour programs that try to treat the screen colours during execution.

Naturally the fewer grey scales used, the faster screen updating will be. Colour pictures displayed on a monochrome screen look very sharp, but animations (games) can be reduced to hell speed.

You're probably aware of what a

mono emulator is capable of – usually if you have toyed with Max/Moto's version supplied with our test issues 1 and 2 disks. Omnibus only offers two versions of the monochrome emulator. The first version is for standard 520s and the other for machines with one megabyte or more screen updating is faster.

The monochrome emulator has four display modes: a scaled representation of the 640 by 400 screen, an expanded top half of the screen (giving a true mono screen aspect ratio), an expanded bottom half of the screen, and an expanded version that can be scrolled from top to bottom using the mouse. You can flip between these modes at any time.

Programs which stick to GEM's rules work well with either emulator. Painted games and other auto-loading software does not. Check with Elsewsoft that Omnibus will work with the programs you wish to run. There are hundreds that do work and hundreds that don't.



■ Omnibus emulating a colour screen on a mono monitor. Colours appear as shades of grey. All the features of that disc are still available, notably game speed is reduced.

|                |     |
|----------------|-----|
| features       | 4.0 |
| performance    | 3.5 |
| ease of use    | 2.0 |
| manuals        | 2.0 |
| format verdict | 2.0 |

## DISKPRO+

£22 ■ Amiga only, all models ■ Amiga Centre Scotland, 4 Hart Street Lane, Edinburgh EH1 3BN (031-657 4042)

Why is it that no matter how large the capacity of your disk drive, be it 1MB, 20MB or even 100MB, your disks still seem to fill at an alarming rate? More often than not this is due to old files you are keeping, just in case, although they may be of no immediate use. One solution to this problem is to compress all your archived files and then decompress them only when they are required.

DiskPro+ is a file compression utility that claims to decrease the size

of a file by up to 50%. Four programs come on the disk that can be run from either the Workbench or from the CLI. The main program, Disk Doubler, allows for the compression and decompression of files from within a friendly windowed front end, while the other three programs are purely CLI-based.

In our tests, several different file types were fed through DiskPro+, including an ASCII text file, an RTTI 1.0M picture file, a Program file and

an RTTI 100K sound sampled file. The file sizes shown in the box were produced (all figures in bytes).

The figures gained are on the whole representative of what you would expect from most file compressing programs. The extra 25K added onto the RTTI 1.0M file is rather disturbing and demonstrates that there are definite flaws in the program's compression technique.

One thing that you should consider before looking out for DiskPro+ is what it offers that PD compressing programs available in the Feb or Amiga libraries don't. Quite simple, nothing. Save £15, buy a PD disk.

| File Type       | Normal size | Compressed | Saving |
|-----------------|-------------|------------|--------|
| RTTI 100K       | 41288       | 48973      | 0.8%   |
| ASCII text file | 14500       | 8841       | 46.1%  |
| RTTI 1.0M       | 58670       | 78020      | -29.6% |
| Program         | 17844       | 18620      | 10.5%  |

|                |     |
|----------------|-----|
| features       | 2.0 |
| performance    | 2.5 |
| ease of use    | 3.0 |
| manuals        | 2.5 |
| format verdict | 1.5 |

## DiskPro +

### COMPRESSION METHODS

For those of you who are interested, DISKPRO+ uses a modified Lempel-Ziv technique. This basically works by searching for common substrings and replacing them with variable sized codes. The compressed file is then saved with a .Z extension (ie for Ziv) in its compressed form, a file is of no use to anyone until it is fed through the decompressing program.

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# DISK EXTRA

ST Amiga Format's unique dual format disk gives you the best of both ST and Amiga worlds! Jason Holborn details this month's cover disk programs.

## ST

### 74 PIPE PANIC

Big deep underground for 'Black Gold', while avoiding all hazards. It looks good, sounds good and plays great! What more could you ask for?

### 75 MANDELBROT GENERATOR



Mathematics can be fun! Create screens full of chaotic color with this Mandelbrot pattern generator.

### 77 SPELLER

Read these entertaining spelling modules with this great little Spelling Checker program. Speller even lets you add your own words to its dictionary.

### 77 ST\_INIT

Load only the accessories you want. ST\_INIT lets you keep your ST completely under control.

### 77 PRO CALCULATOR

Whether you're a programmer or just hopeless with numbers, Pro Calc will help you figure out the figures and save all the sums.

### 77 RAT TRAP

Keep those mice from feeding to the menu bar until you want them. Rat Trap is a clever little mouse click compiler.

## AMIGA



### 74 MISSILE COMMAND

Defend your cities from another alien onslaught in this fast and furious arcade game. Missile Command uses sampled sounds for extra realism and will have you glued to your Amiga for hours on end.



### 75 IFF2PCS

This great little game turns any low-resolution ST picture into a jigsaw. We've even included a request gallery for you to temper with.

### 76 VT100

Communicate with the outside world using this fully-featured console program. Join the console brigade with VT100 and a modem.



### 76 LENS

Take the strain off of the old eyes with this handy little screen magnifier. LENS lets you zoom in on any part of the Workbench screen.

### 76 MCG8010 UPGRADE

Keep up with the times by upgrading your Amiga to a more powerful processor. Replacing the 68000 with a 68010 can speed up some programs by as much as 50 percent.

## 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 nifty programmer you could earn big bucks from your editors - games, business applications, utilities or anything of general interest. We're also interested in any specially original graphics you may have created with art packages. Offer 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 into the Format cover disk.

## ST

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

### PIPE PANIC

by R. Swallow

Colour STs only

FILENAME: P.PANIC.PRG

Top of the bill on the ST this month is Pipe Panic, a game which features excellent graphics and sound. Written completely in BASIC, the program is a superb example of what can be achieved with the language: professional programmers' tool to boot.

The aim of the game is to collect all the oil blobs scattered about the screen while avoiding the underground demons. Once you've completed one screen, it's on to the next: it's a challenging series of tiny. After forty-two screens there's a unique bonus game where you try to collect all the oil blobs in the fastest possible time for a high score.

Load Pipe Panic either by clicking on the P.PANIC.PRG icon on the



desktop or by selecting it from our CLICK.ME menu program. Pipe Panic is written completely in Fast BASIC and uses the runtime system from that language to produce a stand-alone program. Once the runtime program has loaded, you have to load the game from disk by selecting

'Load Program' from the File menu. A file requester box appears listing all the files in the root directory of the root disk. Click on the P.PANIC icon and then double-click on the P.PANIC.BAS to load it. Once it's loaded, select 'Run Program' from the File menu, and the game starts.

## AMIGA

First, copy and load the disk as described at the end of Disk Extra. These programs run on all three Amiga models. We have been unable to test them on the early version of the Amiga 1000.

### MISSILE COMMAND

Public Domain ■ All Amigas

FILENAMES: MISSILE COMMAND, MISSILE.DOC

If fast and furious arcade action is your bag, look no further. Missile Command contains all the elements that make a great arcade game:



great graphics, shocking sound, and immediate playability.

The aim of the game is to prevent the incoming holocaust as alien missiles rain down on your planet. Using a system known as Reagan would be proud of, you aim to destroy the missiles in mid-flight, before they reach the ground, splitting certain doom for the human race.

You can load Missile Command either from our open disk menu program CLICK.ME, or by clicking directly on the Missile Command icon on the Workbench. The sampled sounds are not loaded but need to be loaded from within the program. (In this by selecting 'Load Sounds' from the Sounds menu. The program always tries to load the game's sounds from drive 0:0; so always play Missile Command from disk in your Amiga's internal drive.

If you have access to a sound sampler or any sampled sounds in 68K format, it is possible to replace the included samples with sounds of your own. All the Missile Command samples and with sound so you should have no problems testing them. To actually replace a sound, copy the new sound file into the Missile Command disk with the same filename as any of the existing sound files.





## MANDELBROT GENERATOR

by J.Ark

Colour STs only

FILENAME: MANDEL.PRG, MANDEL.DOC

Over the past few months, Forum has been flooded with Mandelbrot sets (and I forgot my tanks - Ed. How indicative testing of all of them, J. Ark's was judged the best).

A Mandelbrot image is the visual representation of a mathematical expression involving the area around the

edges of the complex plane. Complex numbers aren't really within the scope of this magazine, but the results of plotting the Mandelbrot set are. The patterns are generated by this program on your ST - all you have to do is enter a few parameters and off it goes!

A word of warning for those who expect instant results. Mandelbrot plots require a lot of very complex (and) mathematics and even the mighty 68000 processor can get a little sluggish, so be prepared to wait. Full instructions on the Mandelbrot set can be found in the program's documentation file, MANDEL.DOC.

## MANDELBROT

The Mandelbrot Set was discovered in 1981 by a very clever chap by the name of Benoit Mandelbrot. Ever since then, computers around the world have been charming our players using his mathematical ideas. So what makes Mandelbrot perform so beautifully? Well, the more you enlarge and examine areas of a set, the more complex it becomes. Although the area is finite - lying within the circle defined by  $|z| \leq 2$  - it is true that what is seen is Mandelbrot's look, the 'Fractal Geometry of Nature' - the edge is infinitely complex and of infinite length.

## BT2PCS

All Anigags

FILENAMES: BT2PCS, BT2PCS.DOC

BT pictures are all very well, but they're not as much use once they're finished. It's a bit of fun drawing them, but once they're completed, they are usually just left on a disk for posterity - a classic case of 'let for art's sake'. BT2PCS is an enjoyable puzzle game with the added advantage of making use of your BT art.

BT2PCS takes any format, 16 colour BT pictures and cuts it up into pieces. The size and number of these depends on the level of difficulty. The game isn't that demanding and if you've ever puzzled over a jigsaw then BT2PCS will look very familiar.

BT2PCS is run by clicking on one of the .pic files in the same directory as the main program - it can't be run by clicking on the program icon itself. Alternatively, you can load BT2PCS from our menu program, BT2PC.ME. Running from CLICK.ME automatically loads BT2PCS with the same image each time, so to use any other you should load the program from the Workbench.

Any BT format 16 colour picture can be used with BT2PCS, as long as you first make a simple change to the default tool within its icon information file, so that it automatically loads the puzzle program. To do this, select the BT file you're trying to click on in the Workbench, and press the right mouse button to show the dashboard menu. Select 'Info' from the Dashboard, and the BT file's icon information is



displayed. Find the 'default tool' field and click somewhere within it. If there is already text within the field (eg a CHAT picture file) will show something like 'CHAT', delete this,

enter 'BT2PCS' and press (Return). Select SAVE, and your picture file is fit for use as a puzzle, as long as BT2PCS is in the root directory of your disk.

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**Abstract**

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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, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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## SPELLER

Public Domain

Medium,16-Bit STs only

FILENAMES: SPELLER.TOC,  
SPELLER.DOC

How needs a spelling checker? Sending letters rotated with spelling mistakes to your Banc Manager (or even Forward) - that is a certain way to impress him. If you're just one of the those people who never could get the hang of the English language and its peculiarities then Speller will be of great use to you.

It scans an ASCII file, checking the spelling of words by comparing them with its own dictionary of commonly used words. The dictionary grows each time it finds a word that is correctly spelled but not already within it.

When Speller finds a word it thinks is misspelled, it stops scanning the file and you can choose to ignore the word, change its spelling or enter it into the dictionary.

You can run Speller from **CLICK.ME** or by directly clicking on its icon from the desktop. Once loaded, you will be prompted to enter the filename of the dictionary. The dictionary included on the cover disk is called **SPELLER.DOC** - enter the same including the full path to the file and the dictionary is loaded into memory. Finally, you enter the filename of the ASCII file you want to check and Speller starts doing its stuff.



## RAT TRAP

by A. Thomas

All STs

FILENAMES:  
RAT\_TRAP.ACC,  
RAT\_TRAP.DOC

How many times have you accidentally moved the mouse pointer over the menu bar on the GEM Desktop and dropped down a menu that you didn't want? It can get annoying after a while can't it? Help is at hand in the form of Rat Trap, an incredibly useful Desktop accessory.

Rat Trap alters GEM so the menu only drops down when you click on the menu's heading in the menu bar, the way the Macintosh does it. Two modes are available, 'full' and 'partial'

## PRO CALCULATOR

Public Domain

All STs

FILENAMES: PRO\_CALC.ACC,  
PRO\_CALC.DOC

One nice feature of the Amiga's RMP system is the very handy calculator included on every workstation disk. This little gem (not of a program is invaluable component in the Amiga's Workbench arsenal. With Pro Calc, ST owners can also benefit from having a calculator resident as a Desktop

accessory. Once installed, unless Calculator from the Desk menu and a powerful programmer's calculator is instantly at your disposal.

Pro Calc is an accessory program and therefore cannot be loaded like a conventional program from the **CLICK.ME** menu. To use any accessory file it must first be put in the root directory of your boot disk. Copy the **PRO\_CALC.ACC** file into the root directory of your disk by dragging it from the **CALC.DOC** directory of the cover disk. Reset your ST and insert your work disk into drive A. GEM automatically loads Pro Calc and any other accessories and lists them in the Desk menu.

## Desk File File Options



## ST INIT

by S. Walker

All STs

FILENAMES: ST\_INIT.PRG,  
ST\_INIT.DOC

Desktop Accessories are wonderful things, but they have two disadvantages: only six can be loaded at once and they take up memory all the time they're loaded, even when they're not running. Wouldn't it be nice if you could choose which accessories are loaded when the ST boots up? Well, now you can with ST INIT.

ST INIT displays lots of useful



information about your ST during boot, lets you set the system time and date and select which accessories are to be loaded.

You can load ST INIT either by clicking it from **CLICK.ME** or by clicking on **ST\_INIT.PRG** from the desktop. Although ST INIT runs live from the Desktop, it was designed to sit in the AUTO loader of your work disk. Copy ST\_INIT.PRG into the AUTO folder by dragging it to the AUTO list or icon on the root directory of your work disk.

Full instructions are included with the program under the filename **ST\_INIT.DOC**.

and if Mac menus don't appeal to you, Rat Trap can be turned off altogether.

Rat Trap is a desk accessory and therefore cannot be loaded like a conventional program from the **CLICK.ME** menu. To be able to use any accessory file it must sit in the root directory of your boot disk. Copy **RAT\_TRAP.ACC** into the root directory of your disk by dragging it from the **RAT\_TRAP.DOC** directory of the cover disk. Reset your ST and insert your work disk into drive A. GEM automatically loads Rat Trap and any other accessories and lists them in the Desk menu.

## DISK DOCUMENTATION

Many of the programs on ST Amiga format disks are Public Domain. In such cases we've simply passed on their standard documentation files unchanged, as is required by the PD code of conduct. Some of the programs in Microcomputer, what we say, to please don't blame us for misquoting!

**GULTRONICS**  
01-436 3131

217-218 Tottenham Court Road, London W1

Fax 01-636 1075

**LONDON'S LEADING ATARI CENTRE**

TABLE 2. (continued)

| Asset | PC 1 | PC 2 | PC 3 | PC 4 | PC 5 | PC 6 | PC 7 | PC 8 | PC 9 | PC 10 | PC 11 | PC 12 | PC 13 | PC 14 | PC 15 | PC 16 | PC 17 | PC 18 | PC 19 | PC 20 | PC 21 | PC 22 | PC 23 | PC 24 | PC 25 | PC 26 | PC 27 | PC 28 | PC 29 | PC 30 | PC 31 | PC 32 | PC 33 | PC 34 | PC 35 | PC 36 | PC 37 | PC 38 | PC 39 | PC 40 | PC 41 | PC 42 | PC 43 | PC 44 | PC 45 | PC 46 | PC 47 | PC 48 | PC 49 | PC 50 | PC 51 | PC 52 | PC 53 | PC 54 | PC 55 | PC 56 | PC 57 | PC 58 | PC 59 | PC 60 | PC 61 | PC 62 | PC 63 | PC 64 | PC 65 | PC 66 | PC 67 | PC 68 | PC 69 | PC 70 | PC 71 | PC 72 | PC 73 | PC 74 | PC 75 | PC 76 | PC 77 | PC 78 | PC 79 | PC 80 | PC 81 | PC 82 | PC 83 | PC 84 | PC 85 | PC 86 | PC 87 | PC 88 | PC 89 | PC 90 | PC 91 | PC 92 | PC 93 | PC 94 | PC 95 | PC 96 | PC 97 | PC 98 | PC 99 | PC 100 |
|-------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Asset | PC 1 | PC 2 | PC 3 | PC 4 | PC 5 | PC 6 | PC 7 | PC 8 | PC 9 | PC 10 | PC 11 | PC 12 | PC 13 | PC 14 | PC 15 | PC 16 | PC 17 | PC 18 | PC 19 | PC 20 | PC 21 | PC 22 | PC 23 | PC 24 | PC 25 | PC 26 | PC 27 | PC 28 | PC 29 | PC 30 | PC 31 | PC 32 | PC 33 | PC 34 | PC 35 | PC 36 | PC 37 | PC 38 | PC 39 | PC 40 | PC 41 | PC 42 | PC 43 | PC 44 | PC 45 | PC 46 | PC 47 | PC 48 | PC 49 | PC 50 | PC 51 | PC 52 | PC 53 | PC 54 | PC 55 | PC 56 | PC 57 | PC 58 | PC 59 | PC 60 | PC 61 | PC 62 | PC 63 | PC 64 | PC 65 | PC 66 | PC 67 | PC 68 | PC 69 | PC 70 | PC 71 | PC 72 | PC 73 | PC 74 | PC 75 | PC 76 | PC 77 | PC 78 | PC 79 | PC 80 | PC 81 | PC 82 | PC 83 | PC 84 | PC 85 | PC 86 | PC 87 | PC 88 | PC 89 | PC 90 | PC 91 | PC 92 | PC 93 | PC 94 | PC 95 | PC 96 | PC 97 | PC 98 | PC 99 | PC 100 |

## COMPETITORS & ALIENATION

[illegible]

## THE LAMP FACTS

|                                                      |        |
|------------------------------------------------------|--------|
| April 1940: 517 + 500 20 + Megaflo 20 .....          | 21 140 |
| April 1940: 5750 + Phalpa 5000 + Megaflo 20 .....    | 21 140 |
| April Mega 2 + 500 20 + Megaflo 20 + 50.20 804 ..... | 23 440 |
| April Mega 6 + 500 20 + Megaflo 20+ .....            | 23 440 |

## DATE DUE:

|                             |         |
|-----------------------------|---------|
| Asahi SP304                 | 100     |
| Asahi SP314                 | 21.25   |
| Comura 1000 3.0"            | 100     |
| Comura 1000 5.25"           | 21.40   |
| Asahi SP3004/200            | SP 0. A |
| Asahi Megalite 50 Hard Disc | 5000    |
| Comura 50 400-80 Hard disc  | SP 0. A |

ATCUB70195

|                 |      |
|-----------------|------|
| Asset SM105     | 4125 |
| Asset SC1034    | 4370 |
| Philips CM-8835 | 4595 |
| Philips CM-8833 | 4370 |
| Philips CM-8835 | 4595 |
| Philips CM-8833 | 4370 |

## ACKNOWLEDGMENTS

|              |      |
|--------------|------|
| Asari Mwanu  | 82.4 |
| Uwaila       | 82.4 |
| Mwanga Mwa   | 82.4 |
| Uwaila Mwanu | 82.4 |

## REFERENCES

|                 |         |
|-----------------|---------|
| Sony LCC Colour | £2295   |
| Epson LS8600    | £619    |
| Epson P7480     | £2795   |
| Epson F51000    | £449    |
| Epson E5800     | £449    |
| Epson S5-1000   | £299    |
| Epson LQ6900    | £449    |
| Epson L5850     | £299    |
| Epson Vg 1000   | £449    |
| Epson LQ1500+   | £299    |
| Citizens 12001  | £149    |
| Parascan 1001   | £159    |
| Parascan 1000   | £159    |
| Parascan 3151   | £249    |
| Hercules 2200   | £299    |
| HPLJ PS         | RP £1.4 |
| HPLJ FT         | RP £1.4 |
| Sony LC-30      | £179    |
| Sony FS-15      | £299    |
| Sony SB-24-30   | RP £1.4 |
| Sony SB-34-35   | RP £1.4 |
| Toshiba         | £499    |
| Toshiba TPA-150 | £499    |
| Toshiba TPA100  | £599    |
| Joko            | RP £1.4 |

## THEORY

|                    |          |
|--------------------|----------|
| ADAMS TEL. METER   | 21.10000 |
| EXPENSE COUNCIL    | 21.10000 |
| TOTAL PAGE LEVER 3 | 21.10000 |
| TOTAL PAGE LEVER 3 | 21.10000 |

## APPENDICES

[illegible]

**GULTRONICS**  
Tel: 01-436 3131 (5 lines)

**Abstract**

7777, The Grosvenor, Grosvenor Road, London, W1

|  | 1986 | 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 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2 |
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Journal of Management Inquiry 22(1) 3-17

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## VT100

Public Domain

All Amigas

FILENAMES: VT100,  
VT100.DOC

If you've read the rest of Format, you'll be aware that this month's issue features a packed article on communications. More and more people are getting into terminals, and every day we hear news of new bulletin boards around the country. No matter what your interests, there's nearly always a bulletin board that can cater specifically to you. To get involved with the exchange of interest in computers, you'll need a modem and suitable software. The choice of hardware is entirely up to you, but for software we present the VT100 emulator, a full-featured communications program.

Even if you're not of interest, VT100 can still be useful. If you're the owner of more than one computer (ST and Amiga?) then you can use VT100 to transfer files between the two, through their serial/RS232C ports. Both the Amiga and ST feature standard RS232Cs and we at Format use VT100 to transfer files between our Amigas and STs and Macintoshes. Of course you'll need a similar package on the other machines, but these are readily available commercially and from the Public Domain.

You can run VT100 by either clicking on its icon or by selecting it from the CLICK.ME menu. VT100 requires access to the serial/device file in the DEVS directory of your Workbench disk. When you're prompted for your Workbench disk, follow the on-screen prompts and VT100 loads and runs with minimal hassle.

Full instructions on the use of VT100 can be found within the same drawer as the VT100 program in the file VT100.DOC. This file is definitely recommended reading.

## MC68010 UPGRADE

Public Domain

All Amigas

FILENAMES:

MC68010.DOC, DECEGEL

As this month's *Features* feature on 68000 processors explains, the 68000 used in the Amiga and the ST is a rather dated piece of silicon. The latest addition to the 68000 family, the 68010, runs at an astounding 20 MHz. Upgrading your Amiga to a 68010 or higher is a tricky task because the chips are not pin for pin compatible with the 68000. Luckily the 68010 has the same pin arrangement and it's therefore possible to swap the old chip for a 68010 with few problems.

Installing a 68010 in your Amiga can improve its speed from 8 to 50 percent, depending on the program



being run. Any program that accesses the Amiga's custom hardware will be slowed down to half everything in byte, but speed improvements really start to show with programs that

carry out a lot of heavy number crunching, such as Script 3D.

Seems great, doesn't it, but there's a slight snag. The machine code emulation (MCE) chip, which is free on a 68000 but it is illegal on the 68010 in some cases. Any program which uses this instruction set on a 68010-based computer is therefore likely to crash the system. Luckily there is a software fix for this problem in the form of the PE program, DecGel. DecGel sits in the background and intercepts MCE/PE instructions, replacing them with an equivalent legal instruction. We've included the DecGel program with the instruction file, MC68010.DOC, so everything should go smoothly.

**Format warning:** This upgrade is definitely not for the faint hearted. Amigas are very delicate machines and can be easily damaged. Spinning your Amiga will void your guarantee.



## GIVING IT AWAY

Any program from our disk listed as Public Domain can be freely copied, though your user club, bulletin board or whatever. Other programs, the ones credited to specific authors, are copyright to those people. They are not PD. If you want to sell copies of these programs, Format can put you in touch with the authors.

## LENS

Public Domain

All Amigas

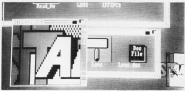
FILENAMES: LENS, LENS.DOC

Lens is another intriguing solution looking for a problem to solve. It's great fun to use so we've included it anyway - perhaps someone will think of a good use for it. The program provides a zoom window similar to those found in art packages like Deluxe Paint. By moving the mouse pointer around the screen you can view a close-up of any part of

the Workbench screen.

On the side of the Lens window are three buttons: a '+' sign, a '-' sign and a question mark. Click on the '+' or '-' to increase or decrease the magnification, and on the question mark to bring up an information window showing details of the author so we can all rest in the knowledge.

Load Lens by clicking on its icon on the Workbench or by selecting it from the CLICK.ME program. A short text file from the author is included with the program.





# HOW TO USE THIS DISK

The ST Amiga Format master disk is a special format disk which both the ST and the Amiga can read. Even if you are a seasoned computer user, please read these instructions carefully or you could permanently disrupt your copy of it.

The first thing you must 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 at all difficult.

## DISK TROUBLE?

We have done our best to check that the programs supplied on this master disk are simple to use, error free and have no known viruses. However, we cannot accept responsibility for any consequences of using the programs.

We duplicate 40,000 disks a month, and it is inevitable that a few will be faulty. If, after you are sure you have followed the instructions on this page correctly, you are convinced that your master disk is defective, you can send it back for a free replacement.

ST Amiga Format Master Disk, Onlayn Labs, 20 Byth Close, Blacksville, Northampton NN6 6DN.

Please allow up to ten weeks for your disk to be processed. **AMIGA OWNERS:** If your Amiga refuses to recognise the disk, before sending it back try using the **DISKFORMAT** utility as described on page 33 of issue 1. Don't worry that every track gives you a "hard error" - this is the Amiga being unable to read the ST parts of the disk.

## WE WANT TO GIVE YOU MONEY!

If you've got any programs for either ST or Amiga which you think other readers would find useful, interesting or amusing, we'd like to hear. Here's how to go about securing international fame for yourself:

1. Only send in programs on 3.5" disks; we cannot accept printed listings.

2. Make sure your disk is clearly labelled with your name and address and the program name(s), and is marked ST or Amiga.

3. Make sure there is a documentation file on the disk called **README**.

4. Include a clear covering note explaining what the program does, and if you possibly can please also send a printed or any re-disk documentation file. Remember your address and telephone number. Include a stamped return envelope for the disk if you want it back.

5. **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. Use the following wording:

The program/s (write the title here) is/are submitted for publication by ST Amiga Format magazine. It is my own work and has not been submitted for publication elsewhere.

Signed ...

If we accept your program, we will get in touch with you before publication to agree terms and payment rates, the will evaluate all submissions in a batch once a month, so please allow up to six days for return of your disk/s. We will only send back disks with adequate return postage and packing.

6. If you send in a disk with a virus on it, we reserve the right to send round the floppy disk in the next issue and do compensate those to your full budget. Naturally, since we've already supplied three other programs (on issue 1), do check your disks very carefully.

## ON THE ST (Assuming a single drive machine)

1. Take a blank disk and format it in the usual way.

2. With the blank disk still in the drive, double click on the A disk icon to open up the formatted contents window.

3. Now drag the icon for disk B into the open window of disk A. This will copy all the files one by one off 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 so the hole is open) 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 swaps, and understand enough about the GEM, you can set up a RAM disk using the ability provided on the July 1988 disk and use that as an intermediate step.

## ON THE AMIGA (Assuming a single drive AMIG)

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 see in the contents window into the 'RAM 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 disk icon 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 RAM disk at once on an AMIG - so whatever will fit, then after step 4 icons from the RAM disk will appear from the Workbench, indicating Diskd 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 put 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\_PPG** - just do what it says, doubleclick to run 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 in safe. As an alternative to using **CLICK\_ME\_PPG**, if you know enough about GEM you can click directly on the icons for individual programs. These normally end **\_PPG**, with the documentation files having the same name as the programs 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, as described in the Amiga manual. Once at the Workbench, put the ST Amiga Format disk in the drive and doubleclick on its icon to open it.

You will see an icon called **CLICK\_ME** - this is a menu program which takes you into the programs and their documentation. Double click on its icon to run it, it will ask you for a couple of disk swaps, so just follow the on-screen requests to load the program.

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 the menu (this, sometimes happens through shortage of memory in 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 folder; 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 screenshot at a time. Press any key to move from one screenshot to the next, or click on the close gadget in the top left-hand corner of the window to cancel the display. The **README** icon gives you a brief summary of the disk's contents and how to use it.

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# LEARN BASIC

This month intrepid programmer Richard Monteloro spends his time going around in loops but only after reaching the right decision. Here are all the right conditions for getting the most out of BASIC.

On a day-to-day basis, are you really influenced by conditions when the clockwork goes off in the morning, it's time to get up, if the million-dollar loan then freedom are out, if it's raining then take an umbrella to work, nothing acts faster than trouble! — So take nothing, similarly, many BASIC instructions look out for conditions or occurrences, and, if they are met, divert the user's attention to another part of the program to execute specific commands.

There's a wealth of BASIC instructions devoted to condition testing. For instance, FOR-NEXT loops check for a condition; they continue looping round until a variable reaches a particular value.

```
FOR counter=10 TO 1 STEP -1
 LOCATE 1,1
 PRINT counter; " iterations
 waiting on a wall..."
NEXT counter
```

This program keeps printing a number and message until counter reaches one. This should be nothing new to you, if you followed last month's article it certainly which is itself is an example of a condition.

How about your FOR-NEXT loops in a different light, check out a few other condition-testing commands. Possibly the most popular conditional test in BASIC is IF — its operators and options are almost identical to those in English. For example, if you test are equal to zero then you are dead must be written as `IF zero=0 THEN [command]`.

In many decision-making commands are associated with IF that following the logic of the full structure can be difficult. However, here are the rules of syntax. Stick to them and you won't go for wrong:

```
IF [expression] GOTO
[label] ELSE [value] GOTO
IF [expression] THEN
```

```
<label> GOTO [value] value
value
IF [expression] THEN
[command]
GOTO [label]
ELSE
[command]
GOTO [label]
END IF
```

According to the first and second rules, the examples:  
 IF `ammunition=0` GOTO dead.  
 IF `last-bullet=0` THEN `GO ON`.  
 "You?"

and  
 IF `ammunition=0` THEN  
`ammunition=ammunition+1` ELSE  
`ammunition=ammunition-1`  
 are all acceptable. So how does it all work. Well, if the result of expression is true or a certain condition is met, check out the point or loop. If you're unsure what we're waiting about then the THEN clause is included in the program. However, if GOTO is used instead of THEN.

Statement labels within IF  
 ELSE, ELSEIF, ELSE, and ELSE END  
 If you cannot select IF THEN ELSE

## AMIGA BASIC



Cursor

## LOCATING STRINGS

The INSTR function has the format: `INSTR(string1, string2, [start])` and returns the position of the first occurrence of one character or string using string2 within another string string1. Start is an optional integer variable specifying the start position of the search within string1.

INSTR returns the following values:  
 1) The start position of string2 in string 1, if found.  
 2) Zero, if start is larger than the length of string1.  
 3) Zero, if string1 is a null string.  
 4) Zero, if string2 can't be found.  
 5) Start for 1 if start is not specified, if string2 is a null string ("").

## RELATIONAL AND LOGICAL OPERATORS

Relational operators are used to compare two values. The result of the comparison is either true (which is internally equal to -1) or false (internally 0). The result of this type of test can be used to make a conditional branch, using IF THEN, WHILE, REPEAT or that sort of structure. The relational operators are:

| Operator | Relation tested    | Example            |
|----------|--------------------|--------------------|
| =        | equals             | If your dog's year |
| <        | less than equal    | 2002.2 day - night |
| >        | more than          | 2002.2 day - night |
| <=       | less than or equal | If Launch is early |

Power BASIC also offers == (almost equals) which can be used to check for near equality.

Logical operators can also be used for making conditional branches. They perform bit manipulations (checking one bit of a byte against another), or Boolean logic tests. Logical operators return results based on combination of true or false operands. The result is either true (-1) or false (0). The true or false combinations and the results of a logical operation are known as truth tables. The six logical operators are NOT, AND, OR, XOR (exclusive or), IMP (implication) and EQV (equivalence). The table below shows the result of these operations; 1 indicates a true value and 0 a false value:

|   | NOT | AND | OR | XOR | IMP | EQV |
|---|-----|-----|----|-----|-----|-----|
| 0 | 1   | 0   | 0  | 1   | 0   | 1   |
| 1 | 0   | 1   | 1  | 0   | 1   | 0   |
| 0 | 1   | 0   | 0  | 1   | 0   | 1   |
| 1 | 0   | 1   | 1  | 0   | 1   | 0   |
| 0 | 1   | 0   | 0  | 1   | 0   | 1   |

If both operands are either 0 or -1, then the logical operator will return 0 or -1. For instance, `NOT NOT -1` AND 0 returns 0. It is possible to use logical operators to test bytes for a particular bit pattern. AND can be used to check out that one of the bits of a status byte, OR can change one byte to create a particular value. Heavy stuff that we shall be covering in more detail in a later issue.





Full journal name: *Journal of Management Education*

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**Abstract**

Journal of Management Inquiry 23(1) 3-17

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| 1984 COL. MONITOR | 1989 COL. |
| 1990 EXT. (1994)  | 1990 COL. |
| 1990 EXT. (1994)  | 1990 COL. |

## ST &amp; SARGA INDEPENDENT BUYERS CLUB

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

**Figure 1** The full implementation process and efforts in each step

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1. The first step is to identify the problem. In this case, the problem is that the system is not working properly.

2. The next step is to gather information about the problem. This includes checking the logs, looking at the error messages, and talking to the users who are reporting the problem.

3. Once you have gathered information, you need to analyze it. This means looking for patterns, identifying the root cause of the problem, and determining what needs to be done to fix it.

4. The final step is to implement the solution. This involves making changes to the system, testing the changes, and communicating the results to the users.

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# AiRT 2

**Does programming scare you? Jason Holborn plucks up his courage and investigates a new system that promises to take the pain out of it all.**

**£55 ■ Amiga only, all models ■ Amiga Centre Scotland, 4 Hart Street Lane, Edinburgh EH1 1 031-667 4242**

The main claim to fame of machines such as the ST and Amiga are their ultra-friendly user interfaces. All those windows, icons and pull-down menus add up to one immediately usable computer. But if you've ever tried programming the Amiga then you'll know that the situation suddenly becomes very different. Not a single icon is sighted and even the mouse, the workhorse of a RAMF-based system, is left skulking in a corner of the desk. Beneath those so-called friendly MMF systems, nothing seems to have altered where pro-

gramming is concerned.

AiRT hopes to change all this. Using AiRT requires no typing of incomprehensible commands and meaningless functions. No longer do you have to worry about the positioning of braces and semicolons, and point-click, and that's it.

AiRT is a programming language that was even designed to represent its commands. Each command has its own specific icon and you program by bringing several of them together on a grid. In this sense, programming under AiRT is very similar to con-

ventional programming, apart from the fact that your program exists more in the form of a flow chart than an ASCII text file.

The range of icon commands is extensive and includes most of the commands you'd expect to find in a good programming language. These are commands to control the logical flow of a program, including jumps, loops and subroutines. Although these control commands are adequate for most uses, if you're used to highly structured languages such as Modula 2 or C, then the omission of base

## HOW TO BE AN AIRTIST

► AiRT's program editor gets its grip with a program, bringing the icons up in the correct order.

► Control of AiRT's editing functions.



► The "Forms Editor" allows you to set up the screen as you want it for your program's output.

►

► The current frame being edited.

► This is just a small section of a single "frame". Each frame calls in its own code.

► The icon menu - scrolling left and right along this menu gives you full access to all AiRT commands.

► Scroll bar for scrolling through the icon menu.





## WHAT'S NEW IN VERSION 2?

Version 2 of ART features several enhancements over its predecessor, as well as the expected bugfixes. Support for IFP pictures that has been extended so that they can be programmed for use later in a program, thereby cutting down on the amount of disk space. Another useful addition is a random number generator which enhances simple games. And the majority of features in version 2 are related to ART's format facility, which makes the handling of forms very much easier. One other addition the advanced user will appreciate is the ability to add fragments of commercially-programmed code (C or Assembly) to cover

shortcuts. ASCII, INEO logic and the like may prove annoying. As well as the standard program control commands, ART has a comprehensive list of commands for screen rendering, file control and input/output control. Using all these different icons into your menu most programs with a minimal amount of knowledge of the icons.

Amiga specifics, such as speech systems, ROMs and sprites are all accessible from within ART and even picture and music files can be read (the IFP 1.8MB and 1550K file formats respectively). ART programs can also call external programs written in other languages using a system of library modules. Using these modules gives the ART programmer access to some powerful facilities only available in fairly low level languages such as C and assembly.

### First catch your program

To write a program under ART you first load the editor which is included with the package. This opens a frame (MIP containing 75 frames, each of which is divided into 75 cells). Each cell can contain a single command icon, after you've selected a frame, the icons change to show you a version of the frame's cell map and you 'enter' your program by clicking on the icons you require and copying them to cells on the grid. A new screen is then displayed, showing all the information for that particular screen. By clicking fields on this screen you can add parameters to the command represented by the icon (a list of variables to be printed, file handles). Most icon commands require at least one parameter to be passed to them before they are entered into a program.

The ART editor includes many of the functions you'd expect in a text editor such as scroll-bar (used compared with typewriter mode in a text editor), and insert and delete, which means inserting and deleting lines is a text editor. One nice feature is that the editor automatically updates the end of your program when you insert or delete icons, so jump commands (GOTO) go to their correct destinations.

One useful program included in the ART package is a Forms Editor which links the three included with the most powerful relational database systems, such as Superbase Professional. The ART forms editor shows you to load IFP pictures for use

as a backdrop to your screen display. Once an image is loaded, you can place all the required fields onto the form. Once the completed form is saved, it can then be recalled at a later date for use in your program.

Once you've written your program you can compile it to an executable program, (after most language compilers, ART's is remarkably fast). Once you've clicked on the computer icon from the Workbench, a small window

ART programs are not blindly fast but still a good deal faster than AmigaBASIC.

### In the limit

So what kind of person would benefit from ART's approach to programming? The authors, RCU Software, feel it is probably best suited to the programmer who requires a rapid solution to a programming problem, or to the inexperienced first time programmer. While a beginner would certainly benefit from ART's approach, it's doubtful whether the professional programmer would change the habits of a lifetime and switch to ART's method of working.

ART is probably best suited as a learning tool, its design encourages structured programming and top-down design and could be an invaluable tool in teaching the principles.

### IFF formats

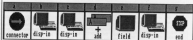
IFF is just the name used to describe the standard data format of Amiga pictures or music files.

Sound IFP format used, which is the most popular one as follows:

1.8MB - Pictures  
1550K - Sound Samples  
1550K - Animations  
1550K - Music

IFF is an interesting file format that is designed to cover all file types. Now IFP 1550K are treated as text files. The most recent addition to the IFF file type is for multi-colour fonts. Expect to see a lot more about these in Workbench 2.0 when it finally arrives.

## PROGRAMMING WITH ART



Writing a program under ART is a simple process and is more like designing flow charts than conventional programming. If you've ever worked with flowcharts then programming using ART should be simple.

The listing in this panel is an extremely simple example of an ART program. It prompts the user for two numbers, adds them together, displays the result and waits for (presses) to be pressed before finishing. Screen variables or 'fields' as they are called in ART have to be defined, three of which contain the screen control text.

Icon 1 - Every program must have a start and finish and these are marked by a connector icon and a terminator icon. The connector icon is automatically placed into your program

grid when you select an empty frame.

Icons 2 and 3 - display a text string on the screen to prompt the user to enter a number. Two parameters must be supplied, the string to be displayed and the name of the field to hold the user's input.

Icon 4 - adds the two numbers together and stores the result in a separate field.

Icon 5 - prints the sum of the two figures on the screen, complete with a title message.

Icon 6 - pauses the program until the user presses (Return). ART automatically opens and closes an output window at the start and end of a program. This icon is used to prevent the output window closing so that the final message is displayed.

### for

- Wide full range of basic programming features
- Easy way of learning programming
- Editing/debugging simple
- Can include Amiga 'IFF' pictures/digitised sound in programs

### against

- Can be laborious to build even simple programs
- Ultimately not as flexible as a conventional language

### Features

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# DESKTOP

And now from our medical correspondent we have a report on recent developments in anti-viral treatments for all STs. Also invaluable tips on keeping your machines in tip-top condition. Martin Saunders carries off the £30 cash prize for his invaluable virus dodges.

## Virus is the disease

A disk virus isn't a physical disease, it can't be transmitted by rubbing disks together. It doesn't destroy disks, either, just the data on them. If you format an infected disk, the virus will be destroyed though it could still be in memory. A disk virus is basically a destructive program. When you start up your ST the drive reads the first sector on the disk. The information stored in this sector tells the computer where real data is read data. It virus usually works by squandering itself into the boot sector of a disk to ensure it is loaded into the ST, from where it can start destroying data or programs. Once a virus is in memory it links itself to the read or write function of the disk operating system. From there it enters itself to boot sectors of other disks as they are loaded into the system.

To reduce the chances of infecting your disks follow these guidelines:

- Switch the machine off and on before running any new program.
- Keep disks write-protected if you don't save data to them regularly.
- Check your disks for viruses with the Virus Killer supplied on our first issue disk (remember, standard format disks only - you couldn't use commercial games software which often uses special formats for its disks).

There is a new virus which spreads by attaching itself to one or all files with a .PRG extension. This new virus cannot be killed off in the usual way (with the Virus Killer, that is). So how do you avoid it?

Select a .PRG file by single clicking on its file icon, pick Show Info from the File menu, change the PRG extension to .BPP and

click on OK. So this to all .PRG files. This protects them from the virus which only looks for files with .PRG filenames.

The problem then is running the newly saved programs - you can't. Unless, that is, you modify the .BPP to .PRG file. Open a window from the Desktop and Save Desktop from the Options menu. Use a text editor (Prow, Word, Hedit or even the Word400 accessory supplied last month) to load the .BPP to .PRG file and alter the line .RG 03 PP to .PRG 03 to read .RG 03 PP to .PRG 03. Remove .BPP to .PRG, visit the machine and you will then be able to run all files with the .BPP extension.

The only problem is having .PRG files in an AUTO folder - TOS can only automatically run files with .PRG extensions. You can mess with .BPP to .PRG if you like, it won't have any effect. Your only recourse is to remove everything from the AUTO folder (fortunately this isn't always what you want).

**Martin Saunders**  
Broadstone, Dorset

## Text file dodges

When displaying a non-program file from the Desktop by double clicking on any file that hasn't got a .PRG, .TOS, .ACC or .TIF extension and clicking on the INFO box in the resultant list can be inconvenient one line at a time by pressing (Return), a page at a time by pressing (Space), or exit with either (Control-C) or (Q).

**J Taylor**  
Sunderland, Tyne and Wear

## Bug off

Current versions of Career Command have a bug which prevents you getting through level 10 to complete the game. You can check for this early version app for a strategy action game and,

when faced with a host view of the career, press (Control-Q). The version number is displayed - 1.01 is the old and 1.04 the new. Alternatively mail upgrade your game if you send them the old version.

**Tony Elkins**  
Mirkelock, Glasgow

## Olds again

If you love the demo, but hate waiting for the program to reload after playing a game, try this: wait for the text to disappear (after typing) and then keep any function

key pressed. This re-starts the demo without it accessing the disk.

occupied, in which case it's highly unlikely the old file will still work properly. The sooner after deletion you try to recover the file the better your chances of success.

When a file is deleted the first character of its directory entry is changed to 05 (05 is deleted) - the rest is left intact. To retrieve a deleted file simply alter the 05 character to an ASCII value in the range 02 to 037.

If you have saved other programs onto the disk since erasing the file, you may well have overwritten the space it originally



occupied, in which case it's highly unlikely the old file will still work properly. The sooner after deletion you try to recover the file the better your chances of success.

When a file is deleted the first character of its directory entry is changed to 05 (05 is deleted) - the rest is left intact. To retrieve a deleted file simply alter the 05 character to an ASCII value in the range 02 to 037.

## Undeleting files

Using any sector editor - such as Tapedrive from last month's cover disk - it is possible to recover recently deleted files. The disk's



you're unsure how to use a sector editor, ignore these tips. It is hard to make a backup of a disk before altering sector data.

I Wrote

Conway

## GFA Compiler bug

If you write large programs using GFA's BASIC interpreter, chances are you won't have enough memory to run them (especially on a 500K). No problem once the program has been compiled though, since you won't then need the interpreter in memory. The compiler usually reports errors it finds during compilation and refers you to the interpreter. However, one place where it falls down is in the



passing of parameters to procedures.

Say you write a procedure that accepts four parameters (using or numeric) and, during the main body of your program, call the procedure with only three parameters - the mistake won't be highlighted by the editor's syntax checker. When you come to compile the BASIC program, the compiler will crash. Most disappointing. The moral of the story is take care with procedures and parameter passing.

## MONEY MONEY MONEY

Yes, you have the chance of getting your mite on media-look-and-as-what-cost-to-you? If the luxury files of bits on getting the best out of a soft ware package, or a hardware modification, or how to use the Desktop more efficiently or anything you feel will interest other Amiga users.

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## BEGINNER'S CORNER

Outlines you've seen the collection of the icons that appear when you insert a disk in the drive and double click on the drive's icon. There are only three types: the data file icon which resembles several sheets of paper with one of the corners folded over, the executable program icon which has a dotted bar along its top and the folder icon which looks like a folder.

If you've been following Beginner's Corner, you should know what happens when you double click on either a data or program icon. But just in case you don't, double clicking on any file with an extension other than .TCL, .PAG or .TYP will cause a window to pop up asking you to Save, Print or Cancel. Save displays the contents of the file on screen. Print sends the file to printer and Cancel takes you back to the Desktop. Double clicking on a program icon runs that program.

Then comes folders. Basically they are used for organising files and other folders into neat categories. Folders are neither programs nor data; simply convenient drops in which files and folders may be held. For instance, if you have a window displaying an entire mass of files, it can become almost impossible to find any particular one!

### CREATING FOLDERS

Get organised: create a folder. Make sure you have a disk in the drive with a display of the files on screen, point at the file option on the menu bar and click on New Folder. A dialog box appears asking you to give the folder a name. Click on Cancel at this point if you don't want to proceed. Otherwise type in the name (single characters plus a further three-character extension followed by (Notes) or a click on OK. After some delay warning you should open the folder or in the currently active window.

Now let's create a money folder as you like, but don't go away as they getting up this money fast. You can even create folders within folders, up to eight levels of them.

### FILES INTO FOLDERS

First open the folder by double-clicking on its icon. The current directory is replaced by the folder's directory, which at this stage should be empty. Open another window by double-clicking on the current drive's icon and check that the files you want to move into the folder are visible in this second window. Now, select the files you wish to copy into the folder by holding down (Shift) and single-clicking on their icons. (ing the highlighted files into the folder window. The files are automatically copied. You can then delete the files from the original directory by selecting them and dragging them to the trash can.

### REMOVING FOLDERS

You can't. Well, you can, but it's a very slow and tedious process. First create a folder with the new name, then copy of the files from the old folder into the new one and finally erase the old folder with its entire contents. Sounds easy, but if the old folder takes up a lot of disk space it may be necessary to copy one file at a time, erasing the old copy each time to keep enough room on the disk.

### AUTO FOLDERS

It's possible to create a special folder, appropriately named AUTO, that at startup automatically runs any file with a .PAG (Startup) stored inside it. Any number of .PAG files can reside in the AUTO folder - they are executed in the exact order in which they are saved into the folder.



1. Making folders is fun. First ensure you have a directory showing and then click on the New Folder option from the file menu.



2. Enter a name for the folder and press (Return).



3. After a few seconds of delay, a folder will appear in the directory.



4. Now get organised. Copy files of a particular type into the folder.

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# WORKBENCH

Expand your Amiga's consciousness with this mind-blowing collection of top tips. Creating and editing icons is the major theme this month, for which a £30 prize goes to Norman Little of Preston.

## Creating double icons

Normally, when you click once on an icon it goes into a kind of 'negative' colour scheme to show it is active. Many icons for commercial products, though, have a 'dual image' - when you click on them, a whole new image appears. This is often used to create a pseudo-animation effect. For example, on this month's cover disc there are drawer icons: click once, and the drawer opens.

You can create your own dual icons, with the aid of a utility on the standard Amiga 'Extras' disk called *IconImage*. First, you need to create the two separate icon images. For this you need the icon editor, *IconEdit*. As an example, let's create a new icon for the Workbench clock tool, an icon which the clock hands move round when you click it.

Run the icon editor - this is covered fairly well in the Amiga manual, on pages 3-31 onwards - make sure you are only working with copies of any master disks. From the Workbench, open the System drawer of your Startup disk and double-click on the *IconEdit* icon. Once it has loaded, an information box about 'tool tips' appears - click on OK.

You can now load an icon to change, and edit it as though you were in a paint package. Load the Clock icon from the 'Clock' menu: choose Load data, click in the name box on the box that appears, type: *ICON:CLOCK* and click on Load. Now you can manipulate the image to your heart's content.

When you come to save the changed version, choose Save Data from the Disk menu. You now have two choices: *Frame* and *Save Full Image*. You will have noticed that the icon doesn't usually take up all of the box that it's edited in. If you click on *Save Full Image* then the whole editing area is saved. It's often more use-



▲ 1 - The icon editor is in the System drawer of your Workbench disk. Load up the supplied Clock icon to edit it



▲ 2 - Save the central image as *CLOCK1*, with 'Save Full Image'.



▲ 3 - After getting *IconEdit*, you'll find *IconImage* in the 'Tools' drawer of the Extras disk. Follow the prompts to create a new *CLOCK* icon combining



▲ 4 - Centre the icon in the frame with *IconEdit*'s 'Move' menu



▲ 5 - Now you can edit the icon to move the hands round, then re-save it as *CLOCK2*



▲ 6 - Before and after... look at the Workbench, your Clock icon is now animated

ful to save just the icon: click on Frame and Save and imagine a rectangle framing the icon image. Click at the top left and bottom right of the area to be saved.

The only complication if you're going to use icons is that the two icons to be changed must be exactly the same size, or you get a bad effect. For this reason it is best to save icons with 'Save Full Image', since it is almost impossible to 'Frame and Save' two read icons by hand.

So, after loading the CUBIC icon, save it the full image unchanged as CUBIC1. Use it to make the hands round, and save that image as CUBIC2. Quit the icon Editor program.

Put your Lotus disk in the drive, and from the Root drawer set icons. Put the disk on which you saved the CUBIC1 and CUBIC2 icons back in the drive. Follow the prompts, typing in DRACLOCK1 as the name of the first image and DRACLOCK2 for the second. Then type DRACLOCK as the final icon name. **DRACLOCK2** then overwrites the old Clock icon.

After the program has finished, your handwatch is visible. First, close and reopen the window containing the Clock icon; this makes the fringe around the Clock to register the new colour. You'll find the icons for CUBIC1, CUBIC2 and CUBIC2 are all at top of each other - drag CUBIC1 and CUBIC2 to the 'fringe' so you can see CUBIC2 properly, then click on the Clock icon to make the hands move, and click on a blank part of the screen to deselect the icon and reveal the hands.

**Morewin, Lotus**  
**Provision, Lotus**

## BASIC types

Amiga BASIC will produce your icons for you as you type them in, to save your typing mistakes. Make sure **Icons Lock** is off so you are typing in lower case. After you press [Enter] at the end of each line, Amiga BASIC converts all keywords into lower case. Look at each line and check that the words you expected have been capitalised.

**Andrew Ripoli**  
**Barnet, Herts**

## More hidden messages

These hidden Amiga ROM messages keep cropping up. Local 'Preferences' and you will see the graphical representations of your lovely mouse. Testing the buttons on these mice as 1, 2, 3 and 4

from left to right, click on:  
1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4

then select 'Change Printer' and click on the square of the printer selection menu until you run off the top. This reveals a cute comic message!

**Alan Tucker**  
**Leicester**

## BASIC space

One tip for BASIC programmers who are frustrated at being limited to 256 - use the CLEAR command. For example, **CLEAR** : **MOVE** gives you 75K of program space to play with.

**Alan Tucker**  
**Leicester**

## 3D Digitising

It is possible to produce 3D pictures with the Digitiser digitising kit - as reviewed this month. It uses the digitiser penholders without release of old 3D lines, so you'll have to buy some red and blue cellophane and make up your own pen to see the result for use the Digitiser colour wheel.

Digitiser constructs a colour picture by taking three different views of a scene - red, green and blue - and combining them into a colour composite. To get a 3D scene, first take a red view of the scene, then carefully move the camera a few inches to the right (about the distance between your eyes) and take a blue shot. Do it twice with the green.

Display the colour picture in **VIEWER** mode, and turn the green slider to a minimum. Hold the digitising colour wheel in front of your eyes with the blue filter over your right eye and red over your left, and eye pencil - 3D of course, you only get 3D if you were digitising a true 3D scene originally, not a flat photograph.

You may get better effects with some images if you use red and green at just two colours, not red and blue. It depends on your camera and the colours in the scene. Experiment.

**Aaron Gerber**  
**Thornhill, Strling**

## Silent running

The 'Word' programs on issue 17's disk is great. If you put it in your Startup sequence it works, but even if you use the command **RUN WRDCL** it leaves a CLI window open, which is annoying.

What you need is a PO program called **WRBACH**, which runs a program without its window. It's on disk 44. Copy it into the C directory of your boot disk, then with **WRDCL** in the root directory include in your Startup sequence



■ Project icons have the name of the Text file program they call up, written into the title. To convert a file from a standard name like **WRDCL** to a suitable file, change the Default Tool line to read 'WRDCL'.

the line

**PROJECT WRDCL**  
and it won't leave you with a dead CLI window hanging around.

If you have a copy of Mastermind's 'Space, Slanger, you're in luck. Look in the C directory of that disk and you'll see **WRBACH** there for you, saving you the additional cost of a PO disk. It may well come with other programs too, so look out for it.

**K. Maitlandwright**  
**Market Drayton, Salop**

■ Workbench editor adds: A version of **WRBACH** called **WRBACH256** can be found in the C directory of 'The Very First' disk. The internal disk supplied with recent 4080 sales. So you won't even have Space Slanger!

## Creating icons

Now you may want to make an icon for a program, created as image and named it accordingly, but had the image do nothing but flash vainly at you!

Creating icons for programs from scratch can be tricky, but there is a PO program called **ICONS** to do just that. You'll find it on disk 102, or alternatively in the **WRBACH** directory of issue 17's cover disk or the **VRM** directory of issue 7's. Here's how to run a set of CLI commands from a Workbench disk.

1) Copy **ICONS** from the relevant place on the Format cover disk to the root directory of your boot disk.

2) Using the ordinary Amiga keyboard utility, create a file called

testing the CLI icon you want to be made. For example:  
**ICONS "WRDCL" up icon**  
**ICONS ...**

Now you're all set.

3) Save the Workbench file.  
4) Right the icon information: click once on the icon you have just created to highlight it, then from the Workbench menu choose the Info option. This displays a screen showing the icon's details, one of which is a line saying **TOOLCALL** 7000. Workbench/Icons/Notes. Click on this line and edit 'WRDCL/Notes' to read 'Word'.

5) Delete all the foot types from the bottom of the screen by clicking on the GILS box at the bottom right until they are all gone.

6) Click by clicking on Save. If you want, you can use the Icon Editor window to edit the icon's appearance, to change it from the Workbench standard.

7) Now double-click on the icon and a CLI window opens and the command file runs. Click on the Close/Quit to return to the Workbench afterwards.

8) You can also use **ICONS** to display text files. Create your text file with the Workbench, amend the text as before, but also add the Tool Types line of the text control (click on **ICONS** to get **ICONS=...**).

9) The upper and lower case is important. Now when you double-click on the icon the file is displayed a page at a time, allowing you to click the mouse on the bottom of the window to continue, or type [Ctrl-C] to exit.

**Faustine Minge**  
**London SW16**

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# GOLD DUST

**Steve Gold taps the bulletin board wires under the Atlantic and finds American ST users not at all happy with Atari, and plans of an Afaq-basher from Commodore.**

**A**tlas is now under fire from its producers, in the US, for leaving last month's decision to phase out distribution in favor of company-appointed "direct sales representatives".

The effect of the changes has meant that many dealers are now flying away from handling the ST, since they have never to turn to either their Atari or when it comes to technical enquiries, their customers.

Even if you're a technically-averse user of the ST in the US, you can still be problems with the current ST developers' kit (price \$1000). For your money you get 1,000 photocopied pages on the 52050, most of which is available from other sources.

In addition to this, Atari is founding an old copy of C Programming by Mark Williams, and five disks of programming utilities. Most of the utilities' features are now available from other pub-

lishers and Europe is moving away from Atari US's management. Maybe that isn't such a bad thing...

## Press for action

ST Report, incidentally, is a weekly online newsletter for the Atari community which is available free of charge to subscribers of the Computer and Game online systems in the US. Computers costs a few dollars to join and use, but - until the end-of-the-year - Game is offering a free subscription to its service.

To access Game from the UK, you'll need a 30 Pin Packet, Bulletin Stream account using an MUA (network user address) of 4903158903.

Once connected to Game (at the 408M prompt) use is simple: `OPEN`, `NAME` and you will be asked for some personal details, and a valid credit card number.

Game is cheap to use (apart from PPS costs of a state call to the UK) and has an online area for ST users called the "Atari ST Round Table".

The Round Table has three main areas: a bulletin board, software library and the real time conference area. For UK users, the software library is the most interesting, since it contains the latest public domain and shareware packages available in the US - usually some weeks, if not months, ahead of when they first hit the way into the UK scene.

## Out of the dungeon

On a more upbeat front, the signs are all the time of writing) that Atari is now using Sony drives in the 52050TBM. This should increase the reliability and longevity of the drives on the ST. Good news.

Meanwhile, if adventures are your genre, The Dungeon Master by TTY now has a solution book available. The Dungeon Master

Guide is produced by Computer Avenue at \$6.95 (about \$4.00) and is receiving rave reviews in the US.

If you're into the Kingston Machine, then send a cheque or money order for \$4.95 (including international postage) to: Computer Avenue, 90 South Woodworth, Suite 105-102, Lakewood, CO 80026, United States. If you can get your order in promptly, then you'll get a free parchment paper spell list as well.

On the ST hardware front, plans are now firing up for the new version of TOS. By the time you read this, the ROM chip will be available from Atari US at around the \$180 mark. Expect the package from Atari UK, before the end of the year.

Finally this month, there's a spot of good news on the horizon for those ST users who've been thinking of upgrading to a 58020 or even 68050-based ST when they arrive. In an online interview during August, Julian Okamoto, a senior officer with Atari Canada, revealed that Atari is considering offering a 58020-based state upgrade for 58020-based ST users. More details as I hear them.

## Parallel Amigas

Over at Commodore meanwhile, and the word is that Commodore is, reading, a "transputer-based system for 1989 release. Details are still sketchy, but the machine is expected to bear a strong similarity to the Atari Afaq.

How close to the Atari? Close enough to use the same operating system, that's the case. Inside word is that Commodore is expecting to use Helios on its Transputer system. The idea is that Helios will become the Transputer's real-time OS, as for the PC, except light years better for control.

Not that Helios will be the only language available on the

Commodore Transputer. Commodore R&D staff are reportedly busy working on getting a time-based OS to their machine.

If you've got a clean vista Amiga, however, and want to create some database applications on your machine, then stand by for a revolutionary product called Maximize File from Software House of 28 Forest Road, Haverhill, MA 01701 (Tel 0303-412475/5178).

Maximize File will cost less than \$20 (possibly as low as \$10) by the time it appears at the end of this year, and is reported to be the first database package aimed for the Amiga. The package is almost entirely non-driven, and a flat very easy to use.

ST reports, as from the US on various Amiga and versions that are doing the rounds have seen over the maximum 100 per cent. This package could be well worth waiting for.

And finally, there's still no news on the requested baby Amiga. Most industry watchers had expected to see a 1MB version of the 8000 (the \$18000 available by now. Sources have it that OEMA chip prices are hitting Commodore as bad as at Atari, a



■ Atari's UK MD Bob Gleadow - doing a better job than his US counterparts.

to commodity hardware software sources. Jo Frank Marino, managing editor of ST Report in the US, said "All this for a mere \$5000" Ours.

UK users should consider themselves lucky that they have the likes of Bob Gleadow's (Atari UK's managing director) team to deal with. Gleadow is off old hand in the industry, with considerable experience. If the trends in the US are anything to go by, Atari UK



■ The transputer chip - at the heart of Commodore's chat is the Afaq.

thinks, but keep an eye out for reports from Corbin Las Vegas - (14/15 November). You could see some activity from Commodore at last - further details in next month's issue!





# FORMAT LETTERS

In which the Format team pit their wits against bulging mailbags of questions, comments, brickbats and bouquets. Why not add your voice to the cohorts of *Format Letters*, ST Amiga Format, 4 Queen Street, Bath BA1 1EA.

## In the FPICture

I am an Amiga 500 owner. Could you post the answers to my queries, as I'm about to read?

On disks on the FPIC program from disk 4, I've put the icon in the RAM disk, transferred it on to a formatted disk, reinit, loaded Workbench again, run FPIC again successfully... Oh so far, now to the point, I can't load a picture into FPIC.

The loaded Deluxe Paint, so now I've got DP and FPIC, and it should be as easy as selecting 'load' on FPIC, drag to DP and they should fit. No, Amiga wants FPIC in its drive again, tries to load a pic but of course, only FPIC is on this disk. I've tried putting pics on the FPIC disk but I don't know how to put a 1-megabyte picture on a disk. I've even tried transferring the LORES drawer, but that is too big for the RAM disk. Please forgive the minute description, I'm going insane. I know I should have bought a Spectrum.

How for a couple of other queries: How do you get into RAM mode, interface etc, without using a paint package? How was the 'Screenplay' pic created? I loaded it into Deluxe Paint only to see that it was made up of millions of randomly coloured dots.

P Tomlin  
Harrow, Middle

■ You're experiencing a common problem we doctors call 'the Amiga's filing system'. Here's the best way to make FPIC load a picture from a disk other than its own program disk, assuming you only have one drive: 1) Let's assume you've saved your low resolution picture in a drawer called LORES, I don't mention what disk you use, so the FPIC still has 'Workbench' running at the same time or you may run out of memory and go to the Load menu, hit Put the disk with the

picture into the drive, then in the 'Drawers' line of the Load box type 'c:\' and press (Return). You will get a directory of the new disk, hit (New) you can click on the LORES drawer and select your file or the more so normal.

Now to the rest: 1) The Amiga computers do seem to be 'crazy' for any picture you display, so you shouldn't normally worry about modes. The Professionals don't use an interface mode switch, if you're programming in AmigaBASIC, you can open a window in any resolution (except HAM mode) with the 'WINDOW' command - see the manual. 2) The 'Screenplay' picture is a public domain HAM mode picture which was 'displayed' using Display. Deluxe Paint can't edit HAM mode pictures - you might try Picture Paint instead.

## A funny game

Thanks for the magazine, at last someone understands that both machines are brilliant. Can you put an editor's guide to wordprocessing terms, as I have always thought that a teacher was in a game of letters.

Can you use a Commodore 1084 monitor with a STE66, and if so will it display all three graphic modes of the Atari?

Tom Dawood  
LAS NIMI, NYPO

■ You will no doubt be astounded to know that your letter was edited and replied to using an ST1040 running through a Commodore 1084 monitor, so it certainly is possible. You've got to buy a special lead though - the Amiga's monitor uses a 'Twisted Pair' plug. Any good computer shop should be able to supply one. The monitor acts as a normal ST low/medium res colour monitor, so you can't display

any mono mode screens. Get hold of issue 1 from our 'Black Numbers' department (see the Special Offers page) for a WP glossary.

## Blank horror

I am writing this letter to firstly complain about the first issue of the disk. I have just returned it to the returns department. I found the disk totally unusable as I don't think there was anything at all written on it. I hope no more disks turn out the same as this. I may cancel my current subscription with you.

I must also say that the disk I am returning is not the one you sent me but one of which I bought in a shop. I purchased this because the copy you sent me was damaged by the postman as he bent the envelope to get it through our letter box. It was clearly written on the envelope 'Please Do Not Bend, but he still bent it. I ask myself are postmen 'deranged'? I therefore went to the Post Office and put in a compensation form to the value of the magazine and disk.

So far I have spent over £7 and I still do not yet have a working copy of the disk, and two mag. copies, exactly the same. I hope no other readers have had the same difficulty as I have had. I also do not know when I will get my money back or if I will get it back at all. I also do not know when I will get the disk back from your returns department.

Also I must say that the disks are not 100% 'Loading Guaranteed' as sometimes I have to take the disk out of the drive and reinsert it into my Amiga a number of times before I can access the programs from the Workbench. This is solved quite easily by copying the disks; I have managed to put the first two

issues of the disk on to one disk with a couple of 8 to 9 gaps. (Yes I know I am a smart ass.)

To avoid the problem of unusability why don't you put ST programs on the disk one month and Amiga programs on the next month? There is also another solution: why don't you put two disks on the front or split the magazine into two different magazines?

I must not complain too much or else you might not publish the letter. I do enjoy your magazine and I really enjoy the games reviews. The 'Workbench' desktop, menus, and most of all the programming tips section.

Simon Brown  
Southampton

■ Judging by the feedback we're getting, there seem to be more problems on the Amiga than the ST, so far as reading our special format disks goes. Using DISKDOCTOR as described in issue 1 can often help. Our disk-casters, OnCopy Ltd, tell us they try to handle replacements by return of post, but particularly with the current postal strikes going on, please be patient - it's worth the wait!

## RAMming speed

I bought your magazine (issue 5) as I am hoping to buy an Amiga in the near future and found it very interesting.

I read your Workbench section and have a question. You suggest copying a number of CU commands to RAM to make life easier for single disk users, and in your example put a PATH RAM-ADD command at the end. I may be missing something, but I don't know how the machine works, but wouldn't it speed things up to copy CPU to RAM first, then put the PATH command, then carry out the other copy command?



Surely this would mean less disk access since the COPY command would then be picked up from RAM for subsequent use in the startup sequence?

**J Flynn  
Ankney, Essex**

■ You're absolutely right. I should be even faster though to use the multiple copy facility and do all copying from one command line. Just put a '!' before the key.

**COPY COPY/NT/TYPE/...  
TO AALL**

## Those viruses

I own a 5200MHz and am about to purchase an ASCII to join it. In issue 3 I was asking 'What Do?' and I was shocked to find out there are viruses going about on the ST. I know nothing about any of these on other machines. I only use computers for games, nothing else. Do the viruses affect games disks? Will the viruses wreck the future of the 16-bit computer? How do you cure the virus? Will the viruses ever disappear for good?

Please, please, please could you answer my questions and send me further information about the viruses, then I might get some sleep at night. As I said I only use computers for games so please don't confuse me with computer jargon and words I've never heard of. I would be grateful for any information.

**A McElhinney  
Northfield, Aberdeen**

■ Well, viruses are a pretty big topic. In brief, viruses are programs that hide in disks, spread themselves to other disks, and eventually wreck data on those disks. They load themselves from disk, hang around in memory, and corrupt other disks put in the drive. The best way to be safe is by turning your machine off - not just pressing the reset button - so often as it is practical (ideally between every disk change). Two remedies are viruses from memory.

Viruses don't really threaten the future of computing. There are several good virus killers around which remove them from infected disks. We supplied Amiga and ST killers on issue 1's disk. In this month's 'Desktop' pages we cover procedures on the ST in more detail.

## Demo copying

Would you please give me advice on making a backup copy of all Amiga Format cover disk no. 2. I

have managed to move everything except the Starline demo. The other files I transferred by dragging them onto a copy of Amiga Workbench. I have not been able to use the CUI to transfer Starline despite making numerous attempts.

Could you please send me detailed instructions on how to solve this problem or if this is not possible perhaps you would print an explanation in a future edition of the magazine.

But how Taylor test IntelliKey? using an American keyboard Amiga/ Electronic Arts are rewriting the program at present so that it will work properly with the GL keyboard. The problem is that question marks are in a different place on the two keyboards. Some other keys appear in other places as well. I'd tell me that the keyboards are there but the program ignores them and reads the keyboard directly.

**Steve Howson  
Spartanburg, Hawaii**

■ To copy Starline, 1) Start your Amiga up and copy the command files you will need to the RAM disk; open up a CUI window and type

**CD C  
COPY COPY/NT/TYPE/NT  
FROM AALL ADD**

2) Format a blank disk in the ordinary way. Leave it in the drive and make it 'bootable' with the **MCNLI** command.

**INTERRUPT OFF  
LF For the ST Amiga Format disk**

in the drive and type

**COPY COPY/NT/TYPE/NT  
FROM AALL ADD  
CD C  
COPY COPY/NT/TYPE/NT  
FROM AALL ADD**

Now when you reboot with the new disk the Starline demo will start.

Thanks for the info about boot/types.

## Dot dash it all

A dash - does anyone know of a mouse code table program (dot) and dashes that run on the ST? And if so where can I get hold of it?

In the Centronics GLP printer capability of printing the Atari computer character set, and if so how?

I would like to get in touch with other ST users and would welcome users writing to me in order to exchange tips on the ST, and possibly set as a programming team.

Thanks for a great magazine

and keep up the good work.

**Don Heiner  
London NW4**

■ We don't know of a mouse program, but maybe some team ST-running reader has not there has one? We might even consider one for our cover disk if you'd send it to us.

The GLP can't print all the ST characters as they appear on screen. It can do screen-dump graphics though. If only prints the IBM set, but that's more than enough for word processing.

## Life...

A question. Which all is going to run out of 16 bit? Answer, the one I'm standing at. What is the Chancellor going to reduce the tax on petrol? Answer, when I fill up with petrol the day before budget day. Which computer magazine increased its offer to retain people to subscribe? Answer, the one I recently renewed my subscription with. How long before ST Amiga Format increase their offer

of a £5.95, sorry, £11.95 disk box and mouse mat to wackole subscribers? Answer, probably next month as I've just tube sorted. Well at least you get a good disk each month don't you?

**Mr P J Burnett  
Wellingborough, Northants**

■ Well, Mr. P J Burnett of Wellingborough, you're probably the only person in the country who is pleased our cover price has gone up this month!

## Questions, questions

Your mag is really great, it puts the rest to shame. The review are the best I've seen in any mag yet. Congratulations to its strength in simplicity. The stuff you give away on the disks is great too. Keep up the good work. The only criticism I have is that you should try and brighten the letters a page.

I have the following points/questions to make:

1. Superfences, he's a tell.
2. Do you know when 'Captain

## MONITOR MATTERS

I would be very grateful if you could pass on information to Mr H Bonford of Burness Inc in issue 2 letters page telling him that it is now possible to connect the Amiga to a Ferguson TV (M20) including sound. The lead is available from Triplex and costs £30. It gives a good quality picture (as expected) plus good sound (even stereo). I hope it helps him.

**Jonathan Morris  
Chesham, Bucks**

Attention to all frustrated ST owners with Ferguson Monitors! This is the MC range. I have an M201 with Atari ST/M and I have never been able to get a decent picture.

My dealer gave me a lead, when I purchased my ST, but warned me that the picture would be very bright, sure enough it was. As we knew beforehand, when the MC201 detects the RGB signal the colour and contrast controls are disabled, and will not affect the picture. The brightness control works, but the result was still too bright.

I then purchased a lead made up from a real order line. The result was exactly as before and £11.95 sorted.

After several months, of eye-strain while using first Word etc I decided to try and sort it out myself. I searched through all my old mags and found several solutions, most involving resistors in the R, G and B lines, and one with a diode in the vertical sync line.

I tried all three with no success. I dismantled my cheapo cheap lead and found three resistors in parallel with the RGB lines - no one at all on electricity takes the path of least resistance and would ignore them. So I put them in series. Slightly better. How about more resistance?

Eventually, I ended up with 1500 Ohm resistance in the R, G and B lines, and one in the vertical sync. Rather than solder the resistors in the plug, I made a small 'donger' with a plastic adaptor box, and 7 pin din plug and a 7 pin din socket, some hardware and about 12' of screened cable.

I now have a working monitor after 8 months of eye-strain. It helps this helps people out. Total cost of the parts required works out at about £3.00, all available from any electronics store.

If anybody wants me to make one up for them, I'd be happy to do it for £5.00 including postage.

**Clive Parker  
14 Cross Lanes, PB, Bristol BS20 9JQ**





deeply into a specific language and then another has to be learned. So such BASIC has to be a last, best place to start. Anyway, to show how to how about doing a parallel version in another language, like Assembler? Plead any reasons?

**Demolitions and The Mad And Dead Wizard**  
**Sandy, Leeds**

■ Each to his own. We still love assembler.

As to your main point, while everyone is entitled to have a favourite language you are very wrong to dismiss BASIC as you do. It seems you haven't progressed in BASIC for five years or so - modern versions, as HESB's Power BASIC is - are just as 'structured' as Pascal (local variables, subroutines etc.) and since they have the option of being interpreted or compiled are a bit easier to learn as. BASICs are usually written for a specific machine, unlike C or Pascal, and so tend to have some commands to change screen colours, generate sounds, and so on. In short, modern BASICs can be fast, powerful and flexible.

## Specialist games

Through my ST I am an avid Flight Simulator II flyer and as such I have spent many a long hour 'flying' through the Flight Adventure lands that are around, and now there are the new 'Stormy days' available I am happy trying to land at Gatwick in midwinter on a foggy night with a faulty altimeter. But after I have mastered that one, what next?

How about writing up a page or so each month dedicated to a



We understand you seek some rather specialist games...

PSI Adventure (compiled either by yourselves or from people writing in). Such an adventure might contain the co-ordinates of your favourite airport, type of weather and anything to look at on the way, plus of course an interesting scenario to accompany the flight.

As the updated PSI is available on both the ST and Amiga, what better way to master both sets of machines than through such a series of Flight Adventures.

**F.H.H Evans**  
**London SW14**

■ However... what an original idea.

## Cheat modes

I used your 'cheat' poker supplied in issue 3 for 'Casualty' and 'Microcosm' to help my son (7 years old) to last a bit longer in the games. However, I would like to reset the games back to the original settings and wonder if it is possible to obtain codes to do this.

**David Price**  
**Ashted, Kent**

■ With poker that mostly the game disk, there is no way you can reset the games to their original state. You should only run the codes on copies of the master disk, or when you are sure you are tired of the game.

Of course, the problem is that very few games can be reset. You might find that a disk cover called ProCopy by The Moving Finger Company (0203 2376045) helps. This is a disk system that can copy a game protected game disk and so allow you to keep backups of your software.

## Video quest

I own an Amiga 500 and a Commodore A6004 monitor. I was wondering if you could tell me how to connect the computer to a VHS video recorder to record animation to tape, via the Euroconnector (SCART) port.

**James Talbot**  
**Kings Lynn, Norfolk**

■ Forget your 3004 monitor, your best route is to buy a VHS modulator for the Amiga, then connect the lead into your video recorder's serial input socket.

## ST disk drives

Replying to the questions of Mr Kendrick issue 21 on upgrading old 10 Meg internal drives to 5 Meg ones.

When taking my ST apart I found that the disk drive made the unit was made by Clowes of Japan. This drive has a unit fixed

to the rear of it which, as far as I can tell, is some sort of drive controller but I don't know if it is the ST acted as if no drive was present. The problem is that this makes the drive about 1" bigger than, say, the Comans 3.5" when unboxed. I had bought the external Comans 1 Meg drive but after a few problems with the internal drive, and waiting for the double sided drive, I decided to do a swap.

You will need 4 screws, about 0.75" long and 4 spacers about 0.5" to hold the new drive in place. The bolt holes in the Comans drive were identical to the ST's own drive, so no alteration was needed there. I suspect that this may be true for many of these drives. The electrical connections are also identical.

The only thing that needed altering was the ST 'coping' at the side to let the disk slip over out. A little careful work with the Stanley knife and it looks good. I did not attempt to remove or replace the speed mechanism since the ST's own seemed to be well embedded in the drive.

Make sure that the screws fit the drive holes, as the new disk drive might before screwing them in.

I also had to remove the power supply from the Comans case since the ST's internal drive would not fit in the case while it was there. Two new side holes had to be drilled in this case for the side corners of the ST's drive. This may have changed if they have changed the drive in the ST, so look first before going ahead.

I would not recommend removing either speed mechanism since both were entirely different and this would mean taking both disk drives completely apart.

Remember that no matter how little work you do make the case you have completely destroyed your guarantee.

I hope at least some of the above may be of use to your other readers.

**Ruth Magenta**  
**Glasgow**

■ Thanks for the benefit of your experiences. We haven't tested this method out, and can only repeat your penultimate para again - remember if you buy the upgrade you are invalidating your guarantee.

## Load of TOS

Hearing all the latest about the new ST TOS, I was wondering what the differences/advantages are over the old one and whether it is possible to upgrade it anyway when magazines last, namely

surely you'll treat the old and out of date things as if they didn't exist. I expect that there are many more people with machines of the age of mine or older than there are with Summer Pack!

**Nick Handley**  
**Brentwood, Essex**

■ It depends what you mean by the 'new' TOS ROMs. Recent STs - Summer Pack ones and Magas - have a new set of ROMs which is essentially a bugfixed version of the old ones. Unless you are a machine code programmer you wouldn't notice the difference, and it isn't worth upgrading.

There is supposed to be a complete new version of TOS under development which does sound good though. Among new offerings will be a disk format more compatible with IBM PCs (thanks for emulations) and file copying without so many disk swaps. No price or date is yet known.

## Guitar bands

Did you know that the shell of the suspended armadillo is used by nature to make a musical instrument resembling a vocal guitar? Also, the young of one litter are always identical twins.

**Geoffrey Hines**  
**Worthing, Sussex**

■ The Formal researchers in the Natural History Museum have also uncovered the fact that the Armadillo is a descendant of the prehistoric Giganodon, which had a body shell three metres long.

## Speculation

Could we have taken on writing for IBM, that sort of thing? It was like this in the early days of the Spectrum. Yes, I joined a Spectrum, when magazines were prepared to educate, before they all became games only.

It's a good idea, catering for both ST and Amiga and having a disk that works on either. You may be the best way of stopping the stupid ST/Amiga arguments. Myself, I own an ST but I read the Amiga bits, simply because it interested.

**Andrew Pearce**  
**Hemel Hempstead, Essex**

■ The majority of people buy their machines for games or applications, not programming, but would like to know more about how their computer works if it is presented simply and covering GEM and general programming, but we won't turn into an obnoxious 'techy mag'.

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## Katakis. Bless you

US Gold's latest future magazine, *Katakis*, has taken lots of readers by surprise — it seems to have been well and truly slipped on by the editors of *Antares*, very *Melanie*! They did it change their name?, as being too similar to their own *A-Ten*. They've got together a 'look and feel' equation which looks and feels as though it's going to

stick, since Gold have capitalized and withdrawn from one program.

The kind of looking is not unknown in the fast-moving world of international simulation building known as the games software industry. US Gold themselves are currently taking action against EMI, claiming that *Demolition* infringes their *Breakthru* design.

It seems to have caused much trouble for magazines though. Fellow publisher *Newsweek* will now have to withdraw the US4 cassette cover promotion of *Katakis*, that they have already printed and mounted on the October issue of their games monthly, *Zone 64*. *Future Publications* also built a double page review and competition around *Katakis* for the launch issue of their new *Computer Games* Week. Looks like the prices, if ever released, could be something of a collector's item.

## Cover Price

It's a warning time — you will probably have noticed the increase in *Format*'s cover price. Unfortunately the 2.5" disk short age has finally caught up with us, resulting in a 25% increase in the cost of black disks and their duplication. However, even at £2.95, we hope you'll still appreciate what good value *Format* is. Our main competitors are around the £2 mark, but don't supply a cover disk with over 400K of program code each month. Even at 75 software prices, you don't get a disk for £1.



## Little Darlings

Simulator fans may have played some of the games that have spawned out of Code Masters (though there are precious few available for the 16-bit machines). You're lucky. You only have the games to contend with.

*Code Masters* is the software house put together by the world-famous twins, with the help of most of the rest of their family and embryo in-laws: superstars, Bruce Forsyth, Doreen Rordale, so many other names, seems to be to produce an odd photo of some member of the Darling entourage each month, with a witty caption, and send each to long suffering backs such as ourselves.

We leave you to judge the effectiveness of this policy for your sales. Here are the last three months' offerings — is it too much to hope that some talented Peter Pan will fly away with the Darlings?



For a limited period you can still get round the price increase by subscribing to *Format*. The rate for a full 12 issues remains at

£29.95, and still entitles you to a free disk box and mouse mat. Subscribe now, it's even more worthwhile.

## STAMIGA

Issue 5 of ST Amiga Format hits the streets on Thursday 20th October — pick one up before someone treads on it.

## Superheroes, Inc.

by Barker





## The games they said couldn't be written

## QUADRALIEN



## STARGOOSE!



## STAR RAY

[illegible]

You are entering Hyperspace. Your destination: Astra, the vast cybernetic nuclear-fusion complex they orbited mid-21st century. Something strange has happened there. Astra has melted itself off from the main side world, the control mechanisms won't respond, the temperatures rising. Meltdown is nigh. But it's worse than that, for in the very heart of the reactor itself, the sinister QUADRILLION towers have established their foothold in our solar-system. You have just six minutes to react. It's now.

**QUADRALIN is ACTION-STRATEGY TECHNOLOGY**

ST. AUGUSTINE CROSS  
1974-85[illegible]

What happens when a team that's outlived its 16-000 member once decides to tackle the classic theme of the vertical scroll-and-tilt? The result is StarGaze, the latest from Steve Cain and GP (Rummy) Brown, and boy is it wild! Until you're faced the mind-boggling variety of defense forces in the 3-D world of Worm, you're still in Straight City. StarGaze ingredients include: The heaviest scroll-FULL screen width and Variably sized, Unique relief landscapes, Unique supply tunnels, and the best

ET, America (1999)  
© 1999



RESEARCHER: \_\_\_\_\_

We won't mention the super-smooth parallel scrolling, the stunning backdrops, the amazing hi-mo graphics, the never-heard-before sounds, the gameplay that turns humans into jelly, the slots that just get weirder...the castable *Lord of the Rings* characters.

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, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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