How to expand your ST

Reviewed: K-Switch, Strip Poker, Winter Games
Revealed: The hidden secrets of ST discs and drives
Compared: Printers for the ST, from £200 to £2,200
A 1040ST may hold the key to the long term effects of extreme cold on the human body. It is being used to assess data from a unique experiment which medical men hope may lead to a better understanding of how to combat hypothermia in the elderly.

The machine - a gift from Atari UK - is even now still sifting the information from a year-long foray to the Antarctic.

In December 1983 the fifth Joint Services Expedition headed for Brabant Island, a place so wild and inhospitable that it has been visited by humans only three times since its discovery in 1936.

Led by Commander Chris Furse of the Royal Navy, the aim of the 12-strong party was to pass a complete year in the Antarctic with only tents for cover.

Although some 60 studies in all were carried out, it is the one involving hypothermia which may eventually prove to have the greatest significance.

The man in charge of this part of the expedition was Surgeon Lt. Commander Howard Oakley who, among other things, has an appreciation of the capabilities of computers in research.

"We didn't in fact take the ST along with us", he says, "but the role that it has played since then has been as vital as anything that went on before".

The novel surgeon, who served with the Marines during the Falklands, was responsible for observing the physiological changes which took place in the members of the party. "We were the first people ever to over-winter in Antarctica in tents", he says. "Before that it had been considered too dangerous.

"Anyway, it certainly meant we had people living in the most extreme conditions, so they were perfect subjects for our studies."

The researchers realised they would be breaking new ground. For while a mass of data has been accumulated concerning acclimatisation to heat, very little has been recorded about endurance to cold.

And cold it was. For though the actual temperature rarely fell to more than 20 degrees below zero, coupled with the wind chill factor this brought it down to a staggering 60 degrees below. Perfect conditions for frostbite.

The first noticeable effect of the cold was stomach upset and increased urination. In fact, the latter symptom may in fact eventually help solve the problem of hypothermia.

For the memory of the ST now contains conclusive evidence that people dehydrate even more quickly at low temperatures than they do at high ones. This was mainly caused on Brabant Island by passing excessive amounts of urine - in most cases more than three litres in 24 hours.

So dehydrated did the men become during the height of the Antarctic winter that taking blood samples was compared to "trying to get raw liver into a syringe".

Such were the conditions that the men kept the same thermal underwear on for the whole year. "I must admit we all smelled a little ripe by the time we finally left", added Lt. Commander Oakley. Yet because they wore suitable clothing, the members of the party generally remained healthy during the time.

One exception was one of the 12 who disappeared down a crevasse only to miraculously escape with just a broken leg. Major incidents like this were faithfully recorded alongside the minutiae which was regularly logged around the clock.

In fact the research threw up some 250,000 individual items of data. And this is where the 1040ST has taken over.

"It's so easy to put all the information on a shell when you get back and forget about it", says Howard Oakley, "and to be quite honest no one is that keen to help after the event!"

But the Lt. Commander was determined that the information they had gained would be put to the maximum use - particularly in the field of hypothermia. So he began to search for a suitable computer to assist him with his huge task.

At first he used an IBM PC XT, but eventually decided that this was tasked to its limits because of its architecture.

"With my work on skin temperatures I needed to manipulate very large matrices", he says, "and that means lots of memory, fast processing and graphics. The last quality was most important, as I needed to take photographs from the screen.

"To bring the XT up to that would have cost between £2,000 and £3,000".

So he began to look around at 68000 based machines. He almost immediately ruled out the Commodore Amiga on the grounds it has "lovely graphics but nothing else".

Next he ruled out the Macintosh because its strengths were not across the board. "In the end there was no other choice apart from the ST", he insists.

Among the software packages Howard Oakley has bought for his ST are Degas "for all my drawings" and Animator "the best program in the world with the worst manual".

But is the medical researcher expecting to make any major breakthroughs with the help of the ST?

"We never really look at it in those terms", he says. "All I believe we can hope for is a better understanding of hypothermia and how it affects people.

"But I can say that the ST is such a superb vehicle for research that if it was up to the machine alone, I'm sure we would find a way of controlling the killer".

Mike Cowley reporting
### Supertec Computer Offers

**Software for the Atari ST**

<table>
<thead>
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<th>Software</th>
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**ST Games**

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<td>Sundog: The Pawn</td>
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<tr>
<td>Hacker: Silent Service Flight Simulator II</td>
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**ST Software**

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<td>3 1/2&quot; DD (360K)</td>
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**Modems by Miracle Technology**

- WS2000 £125.00
- WS4000 Auto-dial/Auto-answer £172.44

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### MCS Mike's Computer Store

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Two into one ST will go!

K-SWITCH from Kuma gives you two STs for the price of one! It lets you split the memory of your ST into two equal parts, each of which operates like a normal individual ST. With a 1Mb ST this means that both programs think that they have a 520k ST to themselves.

After initialising K-Switch, a simple press of Alternate and the two Shift keys swaps you from one half of memory to the other. For example, you can let K-Switch create two halves, load 1st Word and then while still in 1st Word, switch to the other half by pressing Alternate and the Shift keys.

After a couple of seconds a normal Gem desktop will appear. You can then load a spreadsheet such as VIP Professional to look up some figures. A quick press of Alternate and the two Shift keys and you’re back in your 1st Word document at exactly the position that you left it, ready to type in the figures that you just looked up.

K-Switch also includes a built-in ram disc to make up for the fact that ordinary ram disc programs will not be compatible with it. Both halves of the K-Switted ST can use the ram disc which makes it especially useful for swapping files between programs. For example you could pass an Appli text file from a word processor to a desktop publishing program.

If your ST has only 512k of memory, then K-Switch may not work with some combinations of programs, since most programs require the full 512k of memory to run in and K-Switch will only give them 256k each. Mind you, this is more an argument for upgrading your memory than against K-Switch.

Software which auto-boots – for example some games – will not work with K-Switch. Programs must be able to be run from the desktop to be K-Switch compatible.

However, a lot of games work with K-Switch and it is possible to have a game in one half of the ST and a serious program in the other. When the boss leaves the room, a quick press of three keys and you can start zapping megatoads again.

To summarise, K-Switch does exactly what it is advertised as doing. You can have two programs memory resident and swap from one to the other with ease. What we, the ST community, will get out of it depends on our inventiveness.

That said, it’s so versatile that I am sure we can all find unique applications for it. Recommended for all ST users.

By Andrew Bennett

January 1987 Atari ST User
MEGAMAX C: Best for the ATARI ST

Reviewed in ATARI User, September 1986 by Peter Knowles and Roger Wier.

"You get a complete development system — everything necessary to produce commercial quality software is provided ... Clearly, Megamax C compiles faster and produces much smaller files. These are great advantages, and may well prove to be the overriding consideration to many prospective buyers — together with its friendly front-end shell and complete manuals."

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<tr>
<td>3.5 inch drive (1MB)</td>
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<td>Twin 3.5 inch drives (2MB), free plinth</td>
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<td>5¼ inch drive (1MB)</td>
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<td>SH204, 20MB Winchester</td>
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<td>SF534, 500k drive</td>
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<td>SF314, 1 MB drive</td>
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ONE of the first major purchases that the new ST owner considers is a printer. When Atari designed the ST, it thoughtfully included a standard centronics parallel interface which caters for hundreds of readily available models.

The centronics standard interface defines how the signals are sent from the ST to the printer, both physically and electronically.

Of course, once the signals have arrived at the printer they need to be interpreted or decoded. Atari designed the ST’s screen dump routines to work properly only with an Epson printer or any that decodes signals in the same way. Such printers are called Epson compatible and it’s important that you buy one.

Here we look at two very different printers which, while at both ends of the price scale as far as printers go, are suitable for the ST, having a centronics interface and Epson compatibility.

Firstly there is Atari’s own Epson compatible printer – the SMM804. It’s the same colour and shape as the ST itself, but is about 3 inches high. It costs £199.95 and comes supplied with a centronics lead to connect it to the parallel interface of the ST.

The SMM804’s dot matrix print head is made up of nine pins which move horizontally across the paper to form characters at speeds up to an average 60 characters per second. It achieves this speed by being bi-directional – it can print as it travels right to left as well as the normal left to right, thus making the most of the return journey.

It is also logic seeking, which means that the printer doesn’t waste time printing spaces. It offers seven text styles – bold, italic, underline, super and subscript, pica and elite, plus 13 international character sets ranging from UK to Japanese Katakana.

The output is very dark due to the use of a carbon ribbon. Although these give initial good results, they fade more quickly than ordinary ribbons and are slightly more expensive to replace.

Reviewed by Andrew Ralston
This is how they compare – SMM804 on the left, KISS on the right.

At the other end of the price and output-quality scale is the KISS laser printer. About the size of two Atari monitors placed side by side, the KISS laser printer offers superb quality output for around £2200.

In operation, the KISS is very much like a small photo copying machine with the part, where you place the original removed. The ST passes text or graphics to the printer as normal and then a few seconds later the KISS feeds out a completed (warm) piece of paper. Replacement ink cartridges cost an expensive £80, but are good for up to 3000 copies.

A4 single sheets can be fed in either through a special hole at the back of the KISS or from a container at the front which can hold up to 100 sheets. This makes it difficult if not impossible to use normal computer-printout paper.

If it wasn’t for the KISS’s built-in fan purr, you would never know that it was switched on or printing – definitely the printer to have around at 3am when everyone else is asleep and you urgently need some hardcopy.

The KISS can emulate Diablo or Qume daisy-wheels and the Epson FX-80. There is a selection of some eight fonts to choose from and these can be changed using special switches on the front of the printer or by sending control codes from the ST. The KISS also offers all the styles of the SMM804.

Because the KISS does not have the graphics commands of Apple’s laser writer for the Macintosh, it cannot produce the superb graphics associated with that device. It can only output graphics of the type that can be produced on an Epson printer.

However, the KISS uses some special in-built programs that scale any graphics up to its 300 dots per inch resolution, which has a markedly better appearance than the SMM804’s 120 dots per inch output.

The KISS prints at the rate of 6 pages per minute, taking around the same amount of time to print a graphics dump as a dot matrix printer, but handling text at a far faster rate.

Certainly laser printers are the future as far as hardcopy goes and the price of the KISS is an indication of how cheap they will ultimately become. Laser printers are fast replacing doty-wheel printers as the best way to achieve letter quality output with all computers — including the ST. Atari has long been rumoured to be working on a laser printer, but it is still a long way in the future.

If you can’t afford a laser printer and can only sit and dream or you’re just printing address labels, say, and don’t need the quality, a good workhorse printer such as the SMM804 will go far and provide many a yard of printout without any fuss.
Work up a winter sweat

It's too cold to go out for exercise at this time of year, which is all the excuse you'll need to play this latest sports simulation.

Winter Games has seven events for you to work up a joystick-waggling sweat on: hot dog, speed skating, ski jump, figure skating, freestyle skiing, bobsliding and the biathlon.

The games kick off with an impressive opening ceremony. Music plays as a torch-bearing runner mounts a majestic podium to light the flame. White doves are released and they fly convincingly across the scene.

From 1 to 8 players can participate, each choosing to represent any of 18 different countries (the flags are shown and the anthems played).

Options allow you to compete in all, some or just one of the events; to practice a single event; to see the world records or to replay the opening ceremony. You can use the keyboard or, thankfully, one or two joysticks.

Strange name but hot dog is actually aerial acrobatics on skis. You zip down and off the end of a short ski run and try to pack in as many daring moves as possible before gravity wins and you smack down on compacted snow. Try to land feet first – meeting the ground lips first looks clever but will not impress the judges.

Speed skating has you belting along, in horizontal split-screen fashion, against the computer or a fellow competitor. Fast and rhythmic joystick waggling is vital – brute force alone will move you about as fast as a snail on sedatives.

The ski jump is just that. A matchstick figure zooms down a massive slope and becomes airborne. Keeping an eye on the overlaid close-up in the right hand corner, you endeavour to adjust the jumper's balance to stop him going besse over apex on landing.

Figure and free skating are very similar. Both show you as a little female skater gliding across a shimmering rink. By deft manipulation you can skate forwards, backwards, spin (sitting or on tiptoe) and execute such wonderful sounding movements as the double and triple lutz and axel jumps. Coming out of a triple axel facing the wrong way is not a pretty sight . . .

The bobsliding event shows an overhead map of the track coupled with a small right-behind-the-sled view. You have to guide and bank the sled around the turns using the fastest line possible to succeed.

Finally the biathlon, the most strenuous of all the events. Wearing skis you run no less than four times around a multi-screen cross-country course. On each lap you must also stop, load, fire and hit five targets with a rifle. Those with weak wrists should give this one a miss.

Winter Games is a stunning visual feast. The fine-detailed mountain scenery is all beautifully depicted and the animation is slick and realistic. The events are great fun to play and there's plenty in the game to keep you entertained until summer comes around.

Reviewed by Bob Chappell

Sound ......................... 8
Graphics ....................... 9
Playability .................... 9
Value for money ............... 6
Overall ......................... 8
STRIP Poker has been around a little while and has now been converted to run on the ST. Apart from the sharper graphics and use of the mouse, it looks and plays very much the same as the earlier Atari 8 bit version.

This is a one-player game, you versus the computer. The top two-thirds of the display are taken up with a picture of one of two scantily-clad opponents, Melissa and Suzy. At the bottom of the screen is a command and comment line, below which is your hand of five cards.

You and your opponent start with $100. Betting is in $5 increments up to a maximum of $25. Once the first round of betting is over both players can elect to exchange any of the cards in their hand in the second round.

Using the mouse, an appropriate command — stay, drop, bet, raise or call — is selected from the command line. Cards to be exchanged at the end of the first round are simply pointed at and clicked with the mouse.

You are allowed a maximum of two bets in each of the two rounds. The normal rules of poker apply. Once betting is complete, your opponent's hand is shown to you. Once either party has run out of money they must borrow another $100 against an item of clothing.

---

Why do you suppose there's an ST in Christmast? Atari ST's make fantaSTic presents for ArtiSTs, prieSTs, STudents, SToremen, STrippers

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HAVING more connections and peripheral ports than any other home or business computer, the Atari ST has been designed with connection to the outside world in mind. ANDREW BENNETT takes a detailed look at how it works.

The monitor socket on the back of your ST carries the video signal. Atari makes two monitors - the SM1224 black and white and the SC1224 colour monitor. On a colour monitor, you can display only the ST's low (320 by 200 points in 16 colours) and medium (640 by 200 points in 4 colours) resolutions while on a black and white monitor, you are restricted to high resolution mode (640 by 400 points in black and white).

Hopefully in the near future, we will see several multi-purpose monitors on the market which will be able to display all three resolutions for less than the price of buying both Atari monitors separately - which you're forced to at present.

The S20STM model has an output which none of its fellow STs share - a connection which allows the S20STM to display its output on an ordinary television. While it is possible to display both low, medium and high resolution on a television, medium resolution is unresolvable on most televisions.

The serial port, which conforms to the RS232 industry standard, outputs data down a single line and is therefore slower than the ST's parallel port which outputs data down eight lines at once. It allows connection of either serial printers or a modem. Printing works just as if the output port were to the seed port of a standard typewriter.

A daisywheel printer uses small pica-like wheels which hold a letter at the end of each stem. When a letter needs to be printed, a hammer presses the letter against the ribbon and thereby prints on the paper. A modem fitted to this port allows you to connect your ST to the outside world through such services as Microlink, Telecom and dozens of small home-based bulletin boards.

Once connected to these services, you can converse and swap messages with your fellow ST owners and also download public domain programs and utilities.

ST peripherals

The two joystick ports at the side of the ST20STs and at the front of the other models allow you to plug a standard Atari joystick into your ST to control games and some graphic utilities.

Joystick port zero is also set up to accept the ST's mouse switch to control Gem with drop down menus and windows.

AST is currently designing a graphics tablet for use with the ST, which will allow control of painting and drawing programs with a stylus rather than the mouse or keyboard.
Unlike most older home computers, the ST has a built-in floppy disc controller, which means that either a 3½ or 5¼ inch floppy disc drives can simply be plugged in and used. Atari manufactures two 3½ drives – the single sided 160k SID and the double sided 720k SID.

Third party drives come from Cumana and Applied Systems and Techniques (AST), both of whom make double sided drives, see the Cumana review in this issue.

One bonus with 5¼ drives is that you will be able to read and write data created on an IBM PC or compatible. This means that you can continue to work started on the IBM PC at the office on your ST at home, as long as the programs you are using are in compatible formats. For example, VIP Professional from Silex Shop can read and write data created on an IBM by Lotus 1-2-3.

The cartridge port offers the programmer an alternate method of inputting his programs into the ST. Up to 128k of ROM (read only memory) can simply be plugged in by boffin and novice alike. This ROM can contain any manner of program or data.

The cartridge appears as an icon on the creosoted in the same way as the disc icons. When you double click on the cartridge's icon, a window is opened and the program or programs stored on the cartridge are displayed as normal. Another double click runs a program from cartridge, with none of the delay associated with loading programs from disc.

Unfortunately, the number of cartridge based programs available for the ST is currently limited and is likely to remain so. Because of the large cost associated with developing and manufacturing them compared with their disc based counterparts.

Programs currently available on cartridge include the excellent Fast Basic and BackPack from Computer Concepts, both of which were reviewed in the November issue of Atari ST Review. Another use for the cartridge port is to connect the ST to certain hardware devices such as battery backed clocks and hardware development systems. The Nexus Eprom developer board which was reviewed last month is an example of this.

The ST's hard disc port allows you to connect a hard disc drive or CD rom player. The port is modelled upon, but is unfortunately incompatible with the very popular Small Computer Systems Interface (SCSI) - procure only a standard part.

The magnetic disc inside a hard drive is permanently sealed and cannot be removed like ordinary floppy discs. This means that the disc can spin much faster and the data stored there can be packed much tighter, because there is no chance of dust interfering.

Hard disc drives are available from various manufacturers ranging in capacity from 10Mb to 100Mb and in price from $100 to $2000. CD rom players are based on the Hi-Fi compact disc that is available from most high street electrical shops, but instead of musical information, computer data and programs are stored on the surface of the disc. The disc is read very accurately at very high speeds by a small laser whose beam tracks across the disc like a stylus across a record. As with a musical compact disc, a CD rom cannot be changed by the user but must be created in the duplication factory.

A single compact disc can hold several dozen megabytes of computer data – entire encyclopedias can be stored on only a small portion of a disc. CD rom players currently start at $1200, but Atari hopes to produce one in 1987 for around $200.
FAST BASIC
Atari ST cartridge

A new and very fast BASIC interpreter ROM cartridge for the Atari ST computers. This 128K program has been written specifically for the Atari ST computers and so makes full use of (and gives the programmer full access to) all the special features of this machine.

Based around BBC BASIC, but considerably extended, FAST BASIC is a modern structured programming language. It is the ideal environment for those who want to experiment with the ST and to find out about 128K and 68000 assembly etc.

ASSEMBLER
Similar in concept to BBC BASIC, this allows mixing of assembly language and BASIC together. The assembler can assemble at over 50,000 lines per minute making it the fastest available. Macro and conditional assembly facilities combined with one of the best editors around makes this a superior alternative to many dedicated assemblers.

VARIABLES
FAST BASIC supports a full range of variables, 8, 16 and 32 bit integers for speed, single and double precision floating point. Strings up to 64K and arrays of any size. The floating point maths routines are

Price £59.00 inc. VAT and postage.
Available from all good Atari dealers or directly from Computer Concepts.

FAST BASIC INCLUDES:

- ROM Cartridge - it uses no RAM, leaving the maximum available for BASIC programs. It does not have to be loaded from disc and so offers instant start-up and can be permanently available.
- Example disc containing a range of example programs from simple loops to complete GEM examples.
- Quick reference card

COMPARISONS

<table>
<thead>
<tr>
<th>BASIC</th>
<th>PCW BENCHMARK</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM PC</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>BBC B</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>MAC BASIC</td>
<td>7.1</td>
<td></td>
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<tr>
<td>ST BASIC</td>
<td>9.2</td>
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</tr>
<tr>
<td>FAST BASIC</td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

(Seconds)
Structured

Programs are normally written without line numbers. This, in addition to named procedures and functions, ensures that FAST BASIC programs are easier to write and simpler to understand than any other programming language. It also supports REPEAT, UNTIL, WHILE, GOTO, and multi-line IF-THEN-ELSE constructs, and in addition a powerful SWITCH-CASE-ENDSWITCH structure replaces the use of multiple IF-THEN statements.

FAST BASIC supports many of the best features of languages like PASCAL or C, but without the drawbacks.

Review

"...it positively flies. Students of structured programming will be well pleased."

"Perhaps the most staggering advantage of Fast BASIC over the official lingo concerns using the various facilities offered by GEM." "...it's a vast improvement on Atari BASIC."

"Popular Computing Weekly"

GEM

Direct and full access is given to the ST graphics such as cIRCLE, arc, arc, area filling, etc. In addition there is a range of keywords for controlling the menus, icons and windows. It is possible to write programs that present the user with a perfectly standard GEM type interface. An example of a complete GEM program is supplied on the example disc.

STAND ALONE DISC

Now available this disc enables FAST BASIC programs to run without the cartridge being present. Once a BASIC program has been written with the cartridge fitted, it can be converted, using this disc, to a stand alone GEM application program. Simply double click on its icon and it will execute the BASIC program as if it were a normal GEM program. This enables BASIC programs to be run while the cartridge is being used for other things. Also programs can be written in FAST BASIC and given, or marketed, to others who do not have the cartridge. We ask no licence fee or royalties.

£10 - VAT

Review

"...just about every command you could ever ask for is supplied, plus a good many others besides."

"the execution speed has been seen to be believed."

"...if you own an ST, even if you are a C or machine code programmer you should own a copy of FAST ST BASIC."

"I don't know a BASIC on any other machine which is so feature packed and yet still easy to use."

ST User magazine - Oct 86

Compatible with all 520 and 1040ST computers

Review

Dealers enquiries welcome.
Now you can write expert systems on the ST

Cambridge LISP

The complete Artificial Intelligence development environment for the ST

Cambridge LISP is unique and perhaps the most powerful language yet to become available for the ST. It combines an interpreter and compiler providing a complete environment for learning and using LISP, the language of Artificial Intelligence.

The interpreter makes it easy for you to learn LISP and to test and debug your programs as you go along. Once debugged, the compiler makes your programs run efficiently and quickly.

Cambridge LISP Features

- Integrated interpreter and compiler
- 16 Megabyte address space
- Rational Arithmetic
- Trig functions
- Integers of any size
- Floating point arithmetic
- Vectors
- Full Tracing
- Large numbers of built-in functions
- Will run on a 520 ST but we recommend the use of 1 Mbyte of RAM

Cambridge LISP has the computing power of very much larger and expensive systems. It comes complete with a full interface to GEM functions, example programs and a comprehensive, step-by-step manual, all for £149.95.

The C Compiler the Professionals Use

IBM Compatible C Compiler for the ST

Because GEM and TCS routines are written in C, using the C language is important to programmers who wish to use all the features and power of the ST. Lattice C is compatible with Lattice C compilers on the IBM-PC and other micros, this means structured, powerful and portable programming.

Lattice C is a full Kernighan and Ritchie implementation with floating point arithmetic, macros, powerful data types, separate compilation and a number of optimizations to produce fast and compact code.

Lattice C includes a complete interface to GEM VDI and AES functions and comes with comprehensive libraries of UNIX and utility functions. All the features of the ST – icons, windows, graphics etc. can be used. Modules written in assembler or other high level languages can be linked into Lattice C programs.

Lattice C includes Manu+, screen editor and a comprehensive user manual, all for £99.95.

I felt most comfortable with the completeness and speed of Lattice C. Atari ST User July 1986.

Metacomco

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January 1987 Atari ST User
Everything you wanted to know about discs . . .

but were afraid to ask

In these days of disc-driven computers such as the ST, it is surprising how many people cannot explain what happens inside the box which lives next to or inside of their computers. Yet it's not too hard to discover what's going on. Here we will try to explain some of the hidden secrets of your ST discs and their drives.

It is probably easiest to compare your disc and its drive to an LP and its player. The player, or drive, is made up of several mechanical parts including a motor to spin the disc at very high speeds inside its protective plastic case.

When you insert a disc into the drive, a simple mechanism opens the sliding door on the disc and reveals the magnetic portion inside. The stylus or head sits on top of this exposed area, reading and writing to the disc by changing the magnetic state of the particles that make up its surface.

For this reason, you must never place your discs close to a magnet (including the top or side of your TV or monitor which contains powerful magnets) – this can change the magnetism of the particles thus destroying valuable data on the disc.

The information on the disc is mapped out into tracks. The head can read or write to one track of the disc at a time in much the same way as a stylus sits in the groove of a record. The head is moved from track to track by the precise movement of the tracking motor.

On an ST disc there are some 80 tracks numbered from zero at the outside to 79 in the centre. Each is further divided into nine sectors numbered from one to nine, each of which can hold 512 bytes of data. Multiplied together, this makes a total of some 368840 bytes or 368k of data on each single sided disc.

When you format a disc from the desktop – which places the tracks and sectors on the disc ready for the ST to use – you will notice that you have only 357376 bytes of data on the disc. What happens to the extra 11264 bytes?

When you save a file on a disc, it can spread across dozens of sectors. The ST needs to remember where the file starts, how long it is what you have called it and other such information.

Your ST could remember each disc in its memory, but this would be extremely wasteful of memory, so instead some of the 368k of disc space is taken to remember the necessary information about your files.

Some of this information is stored in the directory of the disc, which occupies 7 sectors on the disc, and the rest is stored in the File Allocation Table (FAT) which takes up another 10 sectors.

One more sector – the Boot sector – is read by the ST when you switch it on or press reset. This contains information about the disc and which program, if any, to autorun.

This still leaves a discrepancy of four sectors, which can be explained by introducing the idea of clusters. A cluster is made up of two disc sectors and is the smallest unit which the ST drives can think in. Therefore even a file which contains nothing but your name will take up 2 sectors, or 1k of the disc.

And of course there are 360 clusters to a disc. This also means that you can be left with a disc which is apparently full but has dozens of single unused sectors.

Therefore the above figures changes to 8 sectors for the directory, 12 for the FAT (which is in fact 5 sectors long and is stored twice on each disc for safety) and 2 for the boot information. This makes a total of 22 sectors or 11264 bytes.

The seven sectors of the disc directory contains 8 entries about each file on the disc. Each of the entries is 32 bytes long and is made up of the . . .

By Andrew Bennett

Figure 1: 10 sector single density format

January 1987 Atari ST User
Figure II: Directory entry

The third entry, the files’ attributes, consists of 8 bits of information such as whether the file is read only. Most of the attributes, for example whether the file is hidden – not shown in a directory of the disk – are not used on the ST.

The FAT keeps track of which sectors belong to which files, since a file isn’t one continuous area of sectors but is stored on whichever sectors are available on the disk.

It is made up of entries for each of the clusters on the disk. Each of the FAT entries is 1.5 bytes or 12 bits long and can hold a number between 0 and 4095. The possible values that can be found in a FAT entry are shown in Figure III.

If a FAT entry has a value between 2 and 4080 it points to the next cluster which contains the file.

That cluster’s FAT entry contains a pointer to the next cluster and so on until we reach a FAT entry of between 4088 and 4095, which is the last cluster of the file.

If some of the information on one of the sectors of one of your discs becomes damaged or corrupted, you can usually repair it using the information above and one of the disc doctor programs that are available for the ST. These include Hippo Disk Utilities, Disk Help from Microdeal and the one which is proving most popular with the ST community – Disk Doctor from Antic.

Remember to make attempted repairs on a backup of your damaged disc – not the original – so that you can try again if something goes wrong.

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**MPC SOFTWARE**

**ATARI ST SOFTWARE**

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- 1992 ST/M-II - single disc drive
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- 1986 ST/3 - single disc drive
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January 1987 Atari ST User
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<thead>
<tr>
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<th>Description</th>
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<tbody>
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<td>£34.95</td>
<td>16 bit version of the best selling 8 bit arcade game which gives you 3D views from the cockpit of your heavily armed helicopter.</td>
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<td><strong>Hacker! - The Doomsday Papers</strong></td>
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<td>The follow up to the successful Hacker, Hacker! once more has you hacking into a computer system. This time your mission is to control four robots to recover pieces of the secret Doomsday Papers.</td>
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<td>This fully featured Gem-based communication program includes a number of powerful editing functions along with a built-in 50,000 word spell checker.</td>
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<td><strong>Paper Clip Elite</strong></td>
<td>£59.95</td>
<td>The ST version of the popular 8 bit word processor. It includes the ability to paste-in graphics and has a built-in spell checker.</td>
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<td><strong>Degas Elite</strong></td>
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<td>Expanded version of the best selling Degas drawing program. New features include new fonts and multiple work screens.</td>
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It is inevitable that any successful computer will inspire the industry to produce add-ons of all shapes and sizes. Until recently, there was only one supplier of ST disc drives – Atari itself.

Now there are two more on the scene in the shape of Applied Systems and Techniques (AST) and Cumana, who are well known for their BBC Micro drives. The AST drives were reviewed in the August issue of Atari ST User, so here we take a close look at Cumana’s offerings, both 3.5 and 5.25in drives.

The 3.5in drives are double sided models which can store 720K on a single disc and come as either single or double drive units.

Finished in a shade of grey similar to that of the Atari drives, the Cumana variety are not as wide or as high but they are almost the same length. But unlike the Atari drives they have a built-in power supply which eliminates the need for a brick sized transformer under your desk.

Another difference is that instead of Atari’s round cable, the Cumana drives are supplied with a ribbon cable and a special adapter plugging it into the back of the ST or an Atari drive.

The single Cumana drive can only be used as drive A in connection with an Atari drive, since it has no socket into which to plug another Atari drive. Therefore if you already own an Atari drive, it will remain as drive A and the Cumana drive becomes drive B.

If you have a 1040, 2080 or 4160 with their built-in drives, the Cumana drive is used as drive B. Since the ST can only be connected to two floppy drive units at once, Cumana’s dual disc units can only be attached to the 520ST.

In operation the Cumana drives are whisper quiet, sounding more like a hard disc than the Atari floppy drives. Unfortunately – due to a quirk in the design of the ST which is in no way Cumana’s fault – both motors operate when you access a drive.

This means that if you have an Atari drive as A and a Cumana unit as drive B, the noise that the Atari drive makes will drown out the quietness of the Cumana unit. The same happens when you have two Atari drives or two Cumana drives connected, but you can’t tell because both drives sound the same.

Cumana also manufacture 5.25in drives for the ST. These are double sided and can hold up to 720K on a standard floppy disc of the kind found on the 8 bit Atari and the IBM PC. While they cost slightly more than their 3.5in counterparts the actual discs themselves are about half the price.

As with the 3.5in drives, you can attach one or two of them to your ST and they can be freely mixed – Cumana even makes one unit, the CCA2000S, which has both a 5.25 and a 3.5in drive.

Of course you can’t read standard 3.5in drives on a 5.25in drive and you don’t get any more storage. So why attach one to the ST?

When Atari designed the ST, it wisely opted for the MSdos disc format standard. This means that with a 5.25in drive attached to your ST, you can read and write files which will be compatible with the IBM PCs.

The result is that you can work with an IBM at the office and at home on your ST – as long as the programs which you are using can understand each other’s files. For example, VIP Professional from Silica Shop can read and write files which are compatible with Lotus 1-2-3 on the IBM. And you can save IBM word processor files in Ascii for loading into 1st Word or most other ST word processors.

To conclude, I found Cumana’s disc drives to be of the highest quality and fully compatible with the ST. In price, size and quietness they cut perform their Atari counterparts easily – give them serious consideration when you’re thinking about upgrading!

By Andrew Bennett
The truth about TELEX

How much does it cost to go on Telex?
You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That’s a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more micro users are doing – use your Atari to double as a Telex machine. And just use your ordinary telephone!

How do I turn my Atari into a Telex machine?
All you need is a modern and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to MicroLink.

Telex is just one of a growing number of services available to micro users on MicroLink. With it you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages, and electronic mail right round the world, download free telesoftware programs directly into your micro... and much more.

But why use Telex?
Because it’s a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. They need it to dramatically speed up business communications – just as quick as using the phone but far more efficient, because you have a hard copy of every “conversation” for your records.

But there’s a big bonus you get when you use MicroLink for Telex that the conventional way doesn’t offer.

With MicroLink you don’t HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable), so now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How’s that for your business efficiency?

MicroLink application form: Page 8

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WIN £25 FOR YOUR ST 5 LINERS

If you've written any useful or interesting five line programs in either Atari Basic, Fast Basic or Logo, why not send them in to our five-liners section for ST owners? We pay £25 for each one published. Simply send a copy on disc along with a clear listing and good explanatory notes to: ST Five-liners, Atari User, Europe House, 68 Chester Road, Hazel Grove, Stockport SK7 5NV.

TEXT TYPES
from S. CHERIAN

THIS allows you to change the height, font, style and colour of any text displayed by your Atari Basic programs.

Line Breakdown
10 Fulls and clears the output
20 window and inputs the various values.
30 Sets the character height.
40 Sets the character style.
50 Inputs the text and prints it to the screen.

```
10 fullw 2:clearw 2:input "charheight,font,colour,effect,posx,posy":a,b,c,d,e,y
20 poke contrl,12:poke contrl+2,1:poke contrl+4,6:poke ptilin,8:poke ptilin+2,a :vdisys(0)
30 poke contrl,168:poke contrl+2,8:poke contrl+4,6:poke ptilin,8:poke ptilin+2,a :vdisys(0)
40 poke contrl,2:poke contrl+2,1:poke contrl+4,6:poke ptilin,8:poke ptilin+2,a :vdisys(0)
50 input "text ",a$: color c :goteox,y;y?:a$: goto 10
```

TEXT SCROLLER
from ADAM KENNEDY

HERE'S a quick and easy way of smooth scrolling text across the screen in Atari Basic, using Gem call 8. The text to be scrolled is placed in a5.

Line Breakdown
10 Set up the variables.
20 Put the Ascii values of the letters into the intrin array.
30 Poke in the position of the text.
40 Do the call and change the colour of the text accordingly. If the text has reached the right hand edge of the screen, wrap it round to the other side.
50 Jump back to line 30.

```
10 done=0:x=y=200:poke contrl,b:poke contrl+2,1:asc=string to scroll
20 poke ptilin,32:for i=1 to len(a$):poke intine+2,i,asc(mid(a$,i,i),1):next i
30 poke contrl+6,len(a$)+1
40 color 1,1,1,1,vdisys(0);x=x+4:if x>640 then x=4
50 goto 30
```
Here's a great opportunity for you to increase your library of Atari ST software. Microdeal have generously donated some of their best-selling titles in this easy-to-enter competition.

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  - (Communications software)
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  - (Video Pool on the ST)
- TRIVIA CHALLENGE
  - (4,000 questions)

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- PINBALL FACTORY
- TRIVIA CHALLENGE

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1. What was the name of the first Space Shuttle?
2. What was the name of the first dog in space?
3. What does NASA stand for?
4. What was the name of the first artificial satellite?
5. Name the three Apollo crewmen who lost their lives on the launch pad?

**Answers**

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Send to:
Shuttle Competition, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

January 1987 Atari ST User
WE start this month with a query from Barry Barwick from Derwent regarding reading joystick values from Atari Basic.

I'm afraid that due to some peculiarities in the keyboard controller chip which also controls the joystick ports on the ST, joystick control is not possible from Atari or even Fast Basic and is difficult even in C.

I suggest that you consider using the mouse for non-keyboard program control, which is simple in Fast Basic and relatively easy in Atari Basic. See Program 1 for the method of using the mouse from Atari Basic.

John Packard from Swansea writes to ask me how to use the Gem file selector from his C programs. Although the file selector is one of the most commonly used routines in ST programs, it is not mentioned in a number of books about Gem routines and is even omitted from some C manuals.

Looking at the accompanying screen dump you will see that the file selector is made up from four parts - the name of the current directory and file,

```
10 REM PRINT MOUSE POSITION AND BUTTON STATUS
20 AT%=68
30 CONTROL%=PEEK(168)
40 GLOBAL%=PEEK(164)
50 GINTIN%=PEEK(164+16)
60 GINTOUT%=PEEK(164+12)
70 ADDRIN%=PEEK(164+16)
80 ADDROUT%=PEEK(164+20)
90 BERSYS(77)
100 PRINT PEEK(GINTOUT%+2) : REM MOUSE X
110 PRINT PEEK(GINTOUT%+4) : REM MOUSE Y
120 PRINT PEEK(GINTOUT%+6) : REM MOUSE BUTTON
```

Program 1: Using the mouse from Atari Basic

---

**Joystick control**

The window containing the listing of the directory and the two buttons which you click on.

When you call the file selector, you must provide the routine with three inputs - directory path, initial selection and the name of a variable to hold the result of the button press.

The routine's call looks like this:

```
return = sel_input(path, selection, &button);
```

The value of the variable return can usually be ignored and is simply an error code which is positive if no error occurred.

The path is of type Char and will look something like:

```
path[] = "A:*.DOC/0";
```

If you change the directory path it will be stored in the variable path.

You should set the first byte of selection to zero if you wish the selection to be blank when you call the file selector:

```
selection[0] = 0;
```

Your final choice will be returned in the string selection.

`button` will hold either 0 if Cancel was clicked on or 1 if Return was pressed or OK was clicked on.

All other operations of the file selector, including moving through the directory and changing discs, are automatically handled by the

---

**Send your Atari ST queries to:**
Andrew Bennett,
Atari ST User,
Europa House,
68 Chester Road,
Hazel Grove,
Stockport
SK7 5NY.
QA

feel_input routine.

It is then up to your program to decide if the file exists, read it in, delete it or whatever else you want to do.

When the file selector routine ends, a large grey area will be left on the screen which your program will have to clean up by redrawing whatever was there before the file selector was called.

Harry Rawcliffe writes to ask about the excessive cost of hard discs for the ST and whether there are any viable alternatives.

Whereas hard disc units for the IBM PC and its compatibles seem to start around £400 for 10Mb and £550 for 20Mb, the best price for an ST hard drive is around £750 for a 40Mb unit.

If you can’t afford this sort of price, your only alternative is to wait for the price to drop, which should begin to happen in the new year.

If you don’t necessarily require the speed of a hard disc but need the capacity, you might have another choice in the near future.

At least one British company is working to produce a new 3.5in unit for the ST which could store up to 60Mb. It is currently waiting for the Far Eastern drive manufacturers to decide on the format and design of the drives. I’ll keep you informed of progress.

There is a bug in the file selector routine which can cause you to lose whatever you are working on. It rears its ugly head when you click on the directory line of the file selector and change the current directory path.

If you include an underscore (_) character in this line, the ST will crash with 10 bomb symbols appearing on the screen.

To see this for yourself, load 1st Word and click on the directory line when the file selector is showing. Press the underscore character once and see the result.

The crash is unrecoverable – the only solution is to reboot your ST. Now that you how about the problem you’ll be able to avoid it and Atari will hopefully fix it in the next upgrade of Gem.

A few of you have written in concerning a problem with last month’s screen conversion programs which convert a colour screen to one which can be viewed in black and white, high resolution mode.

The problem arises when you attempt to run the programs on an ST which has more than 512k of memory. A completely blank screen will appear when the program is supposed to be displaying the picture as it is converted.

A couple of very simple changes will correct this problem for 1MB STs.

In Program 1, change the &H78300 in lines 20 and 220 to &H8000. In Program II change the &H78300 in lines 1 and 61 to &H8000. Both programs will now operate correctly.

We must ask that you always take the various possible locations for the screen into account when you are writing your programs in whatever language.

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