

Issue 2 June 1995

# ATARI *Pro*

## Into Battle



### *Inside*

- 2** **Pure 'n' Simple** – what makes Germany's key C language special
- 4** **Fine Mesh** – a guide to Hisoft's Lattice C
- 7** **C Here** – how the two packages compare
- 10** **Resourceful** – full review of the Interface resource editor
- 13** **Answers** – Ofir Gal tackles your Pro questions

Find out how HiSoft's key language fares against the German giant...

**Exclusive!**  
First UK review of Interface



# Behind

Jon Ellis looks at the power behind German ST programming, the Pure C development system...

## Get programming!

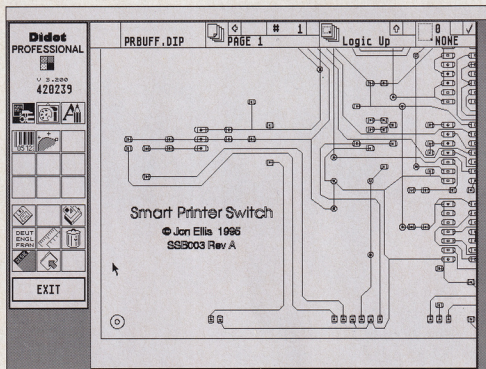
This issue of Atari Pro is dedicated to C programming. This language is most popular among programmers, especially on the Atari platform. TOS itself, as well as Magic, MultiTOS and Geneva were all written in C. Even so, C is not the only language to write programs in. Many powerful applications and utilities were written in Pascal, BASIC and even Assembler.

Programming is not as difficult as it may seem. Any one who wants to program on the ST can do so. There's a choice of several programming languages, with some C compilers being available in the public domain. Don't let the apparently complex source code listings and jargon intimidate you; the ST is an ideal machine to get started with because the operating system is relatively simple, yet modern enough to produce a powerful user interface. The skills you acquire on the ST are easily transferable to any other system.

Knowing how to write your own programs, even the most basic ones, is very useful. You can easily write a small program to initialise your printer or convert text files. As your programming skills develop, you can let other people enjoy them by releasing programs into the public domain. It is very satisfying to know that someone else is enjoying the fruits of your creativity – that's how my GEMBench program came to be.

If you want to get started, don't hesitate. Get a book on BASIC or C programming and if you persevere, you will soon be showing off your first program to your friends...

*Ofir Gal, Technical editor*



Didot Professional, just one of many excellent programs written using Pure C.

**T**ake a look at the range of major applications for the ST: DA's packages, Calamus, Interface and so on. Most of these have two things in common: they come from Germany; and they were written using the same compiler system – Pure C.

Pure C is a development system with a pedigree. It was originally developed by the German branch of Borland International as an Atari port of the best-selling PC package, Turbo C. When Borland decided not to develop the product further, Application Systems Heidelberg added some enhancements to produce Pure C.

As a result of the changes of ownership however, Pure C's maturation has been dogged by legal squabbles. The package has never appeared with English manuals – the major reason for it failing to gain widespread popularity in Britain and America. Similarly, a lack of foreign distributors has made it awkward for non-German programmers to get hold of Pure C, depriving an

excellent package of a wider appreciation. UK distribution is handled by System Solutions, but no product will be available until the next release of the program appears.

## Why is it so special?

If none of this puts you off, what can you expect from Pure C? The answer is a clean, fast development system that produces some quick object code.

Pure C works from the command line too...

```

DPP Pure C Preprocessor          Pure Software Munich
Distributed under License of Borland (Germany) GmbH
Copyright 1988, 1990 Borland International, Inc.
All rights reserved.
Version Mar 20 1995

Usage: CPP [options] file[s]

-Z          Generate 80820 code      -M          Output file directory
-B          Generate 80881 code      -O          Output file name
-R          RMSI keywords only       -P          Use absolute calls
-G          Generate OBJ-Object       -C          Use Pascal calling
-C          Allow nested comments    -N          No register variables
-Dxxx      Define macro              -S          Standard stack frames
-Fxxx      Fxxx Stop after N errors  -I          Stack checking
-Fwarn     Stop after N warnings     -U          Undefined a macro
-S          Size optimization         -V          Verbose message output
-M          Use cdecl calling         -M          Enable all warnings
-Ixxx      Include file[s] directory -Wxxx      Enable warning xxx
-N          No jump optimization     -x          Generate underbars
-L          Default char is unsigned -t          Get debug information
-l          Maximum identifier length -T          No register load optimization
-H          No string merging        -Z          No register load optimization

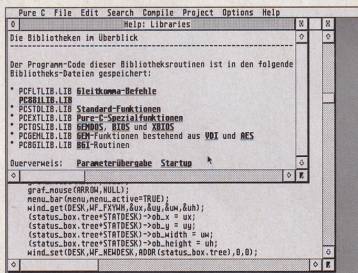
Press any key or mouse button to return to Ready

```

# the veil

Development is based around the integrated compilation environment that Turbo C popularised on the PC, which includes project management facilities for large programming exercises.

The editor portion of the package offers the usual source code editing



## Jewel in the crown

For English-speaking programmers, the real attraction of Pure C lies not so much in the qualities of the compiler itself, as Lattice C does a perfectly good job, but in compatibility. Over the years, several German programmers have compiled excellent libraries of graphics and interface functions. Many of these libraries have been released as freeware or shareware, providing a marvellous resource for anyone who wants to add a little German polish to their software.

One of the most widely used of these is MyDials, a library that is bundled with the excellent Interface resource editor. MyDials provides keyboard shortcuts for dialogue boxes, dialogues in windows together with all manner of new buttons and objects. Unfortunately, MyDials is distributed as a Pure C library file, without source code, so confining its use to Pure C owners.

Other libraries that initially appeared in the Pure C format, for example the keyboard handling package NKCC, contained source code, and Lattice-compatible versions are beginning to make an appearance.



MyDials, one of the wonderful German interface libraries accessible to Pure C users.

An on-line help system makes programming easy - if you speak German!

features: auto-indenting, parenthesis matching and so on. Having written a module, compilation is simply a matter of selecting a menu option, and then watching somewhat open-mouthed while the compiler rips through the source code. Turbo C indeed!

Library support is fairly standard: an ANSI-compatible C library; both software and 6885x coprocessor maths libraries, and GEM and TOS function sets too. An added extra is a BGI (Borland Graphics Interface) graphics library, which may be useful for porting old software from the PC.

Facilities for mixed C and assembly language programming are provided by a full macro assembler, PASM. With options for processors up to the 68040, maths coprocessors and memory management chips, the Pure assembler seems powerful enough for any task.

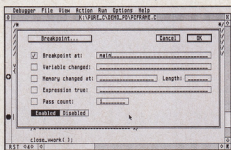
## Hammer and tongs

There's much more to a development system than an editor, a compiler and a few libraries. Most packages include a whole suite of utilities to assist in various aspects of the development process. For most ST programmers, the two most important utilities are likely to be a resource editor and a debugger.

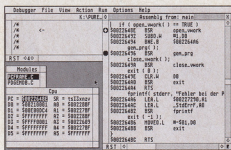
The good news is that Pure C has a very pretty debugger, PD. What is more, it's a source level debugger - a program that allows you to step through your C program, looking not at the compiled assembly language, but at the original source code. The Pure debugger also lets you look at the assembly language level too, a facility essential for catching the low-level bugs, or sorting out a mixed C and assembly-language program.

Somewhat unusually for a debugger, PD makes use of a GEM interface, with windows and dialogue boxes. Not quite up to the standard set by the Brainstorm DSP debugger, but rather more friendly than most. PD is not just a pretty face either: conditional breakpoints, variable watching and slow-running are just some of its features.

The bad news on the utility front is that the review package included no resource editor. For a number of reasons, Interface (see review on page 10)



Insert a breakpoint with a click of the mouse using the Pure debugger.



Debug in assembly language, C source or both - it's up to you!

is likely to be the program of choice, but it is frustrating to think that you could buy Pure, and then be unable to develop GEM applications without forking out again. Other common utilities were also absent: no object file librarian or code profiler, no object file conversion utilities or symbol table strippers.

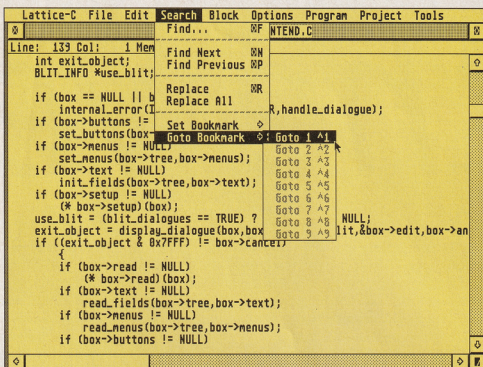
## In the know

Just how far can you get without English documentation? Oddly enough, it's not too much of a problem if you have used an ST C compiler before. All program menus and dialogues are in English, as are all compiler error messages. But the README files and much of the example source are in German.

The greatest loss though is the on-line help system, which is almost wholly in German. To be able to look up information about the compiler, the assembler or even the language itself while writing code would be invaluable to the beginner. Still, the package includes the tool to compose help files, so it's possible that some English help might make an appearance someday.

In summary, Pure C is a quick and effective tool for programming the ST. Despite the problems with documentation, it is a surprisingly usable system, mainly due to an uncluttered interface, and a fast, high-quality compiler.

Here we are inside  
Lattice's integrated  
environment.  
Loads menus!



What weighs 4.5 pounds,  
has more than 1,000 pages,  
and occupies 4 megabytes  
of disk? Jon Ellis finds  
out about Lattice C...

**L**attice C is nothing if not comprehensive. From the moment you open the box, it's obvious that this is a heavyweight package. Take installation for example: a user-friendly GEM installation program that doesn't just ask you where you want the system installed, but which bits of it you'd like.

Over the years, Lattice C has grown and matured with the ST market. When it was distributed by Metacomco, it was slow, rather limited, and supported by some fairly crude utilities. In a series of HiSoft incarnations, Lattice has evolved into a highly polished and flexible package. The system has kept pace with recent innovations in system software and hardware too: a variety of header files and library functions support the Falcon hardware, MiNT and MultiTOS, SpeedoGDOS and the cookie jar.

### Nicely developed

As seems to be *de rigueur* for compilers these days, Lattice provides an integrated development environment, where a program can be created, compiled, linked, tested and debugged all without leaving the source code editor. To speed up the development cycle, both phases

ASM will assemble  
code for many chips.

# BIG

of the compiler, the optimiser and the linker can all be made memory resident, saving on disk access time.

One of Lattice's major strengths is the sheer flexibility of the system. The development process seems almost infinitely configurable, with options covering all aspects from exactly which non-ANSI enhancements are active through to which 680x0 processor the compiled program should run on.

Having so many options incurs a price, though, in terms of complexity of the user interface. There are so many sub-menus and dialogue boxes with such an array of buttons that it is easy to get lost. Particularly for the beginner, the Lattice integrated environment can be somewhat daunting. Perhaps HiSoft should consider adding a simplified "plug 'n' play" editor without some of the more arcane options; they already include command line versions of the compiler and other tools for those who prefer not to use the integrated system.

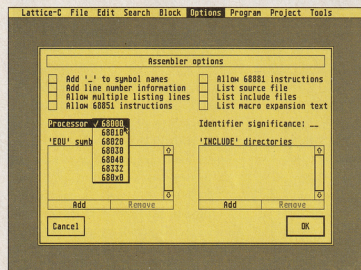
Lattice is a fully ANSI-compliant compiler, which means that it should be

happy with industry-standard C from any platform. Backing up the compiler is a complete implementation of the ANSI Standard C library, together with a maths library and a GEM and TOS function library. Each is available in a number of variants tailored to suit the range of styles of code that the compiler can produce. Additionally, there are separate maths libraries to cope with 688Sx maths coprocessors too.

### More bytes for your buck

The Lattice debugger is an enhanced version of the Mon program that forms part of HiSoft's DevPac assembler package. Although it offers some support for the C environment, it cannot be considered a proper source-level debugger. A familiarity with 680x0 assembly language is necessary for successful debugging. That said, it is a powerful and effective tool which is well worth the time spent in learning how to use it.

For those occasions when a little assembly language is called for, the Lattice assembler, ASM, is more than





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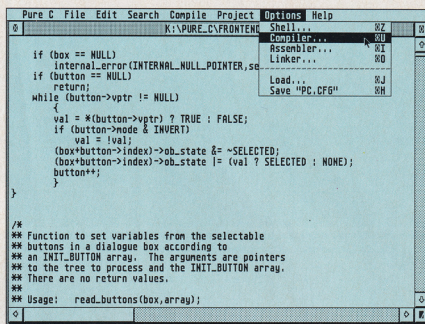
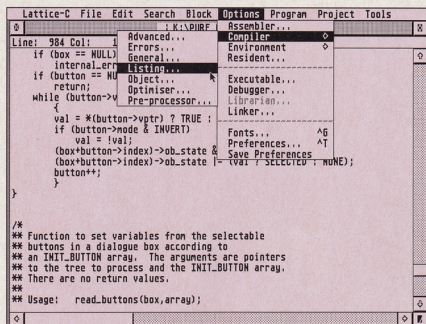
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SOUND ON SOUND



Lattice and Pure - two similar-looking development environments...

# Compiler checkout

Having made the introductions, Jon Ellis casts a critical eye over our two heavyweight contenders...

Given that any comparison between two packages will inevitably major on the differences between them, it is important not to lose sight of the common ground. Both Pure C and Lattice C are comprehensive software development systems, each capable of meeting most normal programming needs with ease.

For such complex collections of software, both packages are surprisingly easy to use. While it is unlikely that any compiler interface could ever really be described as intuitive, both Pure and Lattice feature pleasant integrated development environments that make life easy for fans of mice and windows. The traditional command-line interface is also supported by both packages.

## Speed king

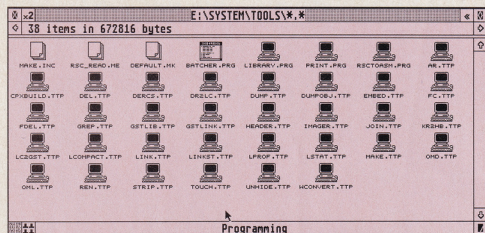
The essence of Pure C's appeal is speed. The source code editor is slick and has most of the useful extras that program-

mers find so useful, like auto-indentation. Compilation is blazingly fast - in one fairly rough and ready comparison, Pure compiled a fairly complex module in 9 seconds, a task that took Lattice 27 seconds. As a result, the edit-compile-link-run cycle turns smoothly, making development efficient. The environment contains many nice touches that also contribute to the overall impression of good design; the provision of on-line help is just one example.

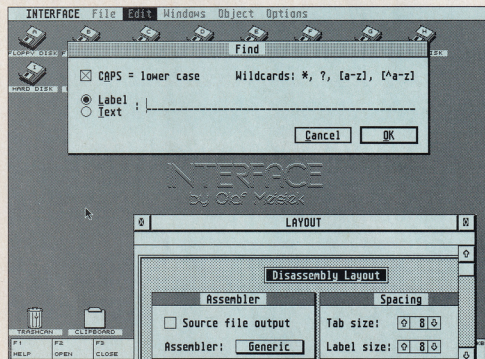
Quick compilation is of little use if the resulting code is slow. Pure C does not disappoint on this front either, as a quick check with a version of the Dhrystone test program revealed (Table 1). Notwithstanding any quibbles over the qualities of the Dhrystone as a measure, Pure C had a clear edge over Lattice in this test:

## Fully toolled up

In other areas though, Pure C looks a little under-specified. Lattice wins easily



Having lots of utilities makes programming easier.



Pure needs a resource editor: Interface is probably the best.

on the features front. It provides a much wider range of utilities to help with program development (several linkers, resource editor, object file utilities and so on). To be sure, many of these, like the program profiler will be used infrequently by most programmers, but their presence adds to the overall gravitas of the package.

Others, such as the resource editor, are everyday tools for ST programming, and their omission from the Pure package is curious. Lattice's WERCOS may not be the most glitzy of resource editors, but it's sure better than nothing! However, the pretty source-level Pure debugger does go some way to redressing the balance, making Mon look rather unpolished.

The Lattice compiler has a much richer set of options than its competitor, allowing the development process to be tailored precisely to the project's requirements. As an example, under Lattice, each individual compiler warning message can be made into an error, a warning or ignored. Pure C just has a couple of global settings covering compiler verbosity.

This flexibility also extends to an exceptional level of control over the specifics of code production. Not only does this open up new areas to Lattice programmers, such as low-level system programming, but it also allows fiddly

programs like CPX modules to be produced easily. Library support is also much more comprehensive under Lattice C, with a range of C, GEM and maths libraries covering four different code models.

### Word on the street

On the documentation front, there is no contest. Lattice includes three manuals detailing all aspects of the operation of the compiler and utilities, together with full descriptions of the standard C, GEM and TOS library functions.

In contrast, Pure C offers no English documentation, further limiting its appeal. Driving a compiler package without documentation can be awkward even for the experienced user, particularly for anything other than run of the mill programming.

### The bottom line

In summary, for general C programming, there is nothing much to choose between the two systems. Both do the job and do it well. The Pure C integrated development environment is quicker than Lattice and arguably easier to use. If the on-line help were in English, Pure would make an ideal compiler for programmers outgrowing Prospero C.

Given its current state however, with no English documentation or saleable

UK version, interest in Pure C is likely to be confined to German-speaking programmers, those with a need to access third-party graphics libraries like MyDials or developers seeking the fastest compiled code.

For more complex projects, perhaps the development of a large package or more intricate system-level work, Lattice has a breadth of options and facilities that is hard to beat, and so remains the one to have if you want to be able to tackle any ST programming project.

As a caveat though, the version of Pure C used for this feature, v1.10, is about two years old now, whereas Lattice v5.60 has had several months more development. Maybe if the long-rumoured Pure C 2 ever emerges from the lawyers' clutches, we might see a different outcome. With English on-line help, accessible technical support, more features and an aggressive price through System Solutions, an enhanced Pure C could prove a real threat to Lattice's domination of the English-speaking market.

If HiSoft want a top tip for spoiling one of Pure C's major attractions, they should look into including support for the Pure C object file format in a future release of Lattice. This would open the way for Lattice users to tap into the wonderful interface libraries produced in Germany for Pure C. Now there's a thought...

Lattice has the options and tools for all tasks - CPX programming for example.



Table 1: Dhystone speed test

| Program   | Options   | Result    |
|-----------|-----------|-----------|
| Pure C    | default   | 4695 Dhry |
| Lattice C | default   | 2808 Dhry |
| Lattice C | optimised | 3793 Dhry |

Test system: 4Mb Falcon with Power-Up 2, 68882, mono screen. The Lattice optimised version was compiled for 68030 with the short integer library, stack checks disabled and the global optimiser enabled.

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# C-LAB

## FALCON MK II



# Face to Interface



The most important GEM programming tool, apart from a compiler, is a good resource editor. Ofir Gal investigates Interface...

Interface has been hailed as the best ever resource editor for the Atari platform. This pack of programming tools has been used to design many of today's best GEM programs and is finally available in the UK.

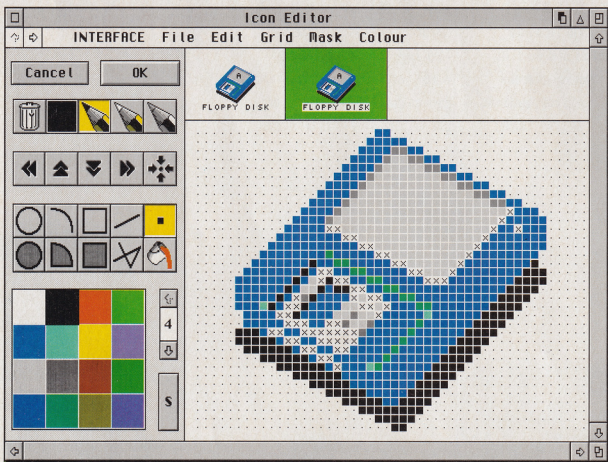
The package consists of two double-sided floppy disks and a manual.

Unfortunately, the current manual is in German, but an English language version is on its way. Even so, Interface can be used without reading a word of documentation, mainly because it is such a user-friendly program. Apart from the main program, there are several source code libraries on disk, including NKCC and MyDials.

One of the main strengths of the program is that it is up-to-date with all the latest AES features. It copes with colour icons and knows all about 3-D objects. The user interface features non-modal windows, keyboard shortcuts and many Let 'em Fly features. One option allows you to work in a modal environment, which is faster.

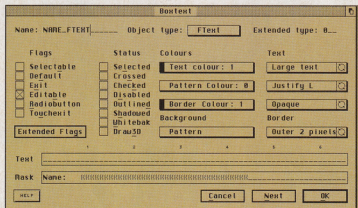
Interface installs its own desktop by default. The basic layout is somewhat similar to KResource, but much more polished. The drive icons are placed at the top of the display and a ten button toolbar at the bottom. The buttons change their functionality, depending on the current operation, but typically offer quick access to operations like open, save, tree test, object info and the like. The Interface desktop also features a clipboard and a trashcan and when the desktop-like design is unsuitable, such as in a multi-tasking environment, it can be switched off.

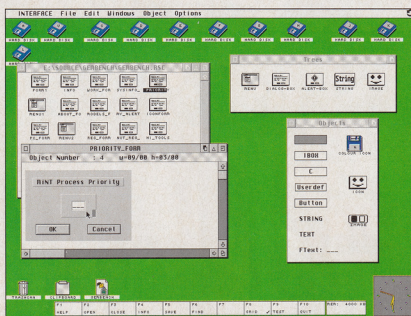
To create a new resource file, simply select New from the File menu; a blank window opens. Open the New Trees and New Object windows. As Interface



A fully featured colour icon editor is integrated into the main program. The ability to import Windows icons is a sure way of obtaining a vast number of 'em!

The object edit window uses a modern and friendly interface to make your work as simple as possible. One notable feature is the ability to change the object type, in this case from FBOXTXT to FTEXT.





features a non-modal design, you can leave these windows open all the time and use them like toolbars. Create your first object tree by clicking on the tree type you want and drag it into your main resource window. A double click opens a window with the new tree. New objects can now be dragged onto the tree window in much the same way.

## Object editing

Each object can be selected, cut, copied or pasted, and moved freely from one tree to another. A copy of the object is created if you hold down Shift while dragging it; holding Control down while clicking on an object selects its parent. Clicking and quickly releasing the mouse displays a pop-up menu with some common operations like align to grid, hide, erase and edit. Selecting Edit brings up the object parameters dialogue window. All the standard features are available here – object text, flags and states as well as colour, border and fill style.

The info bar in the tree window displays the name and index of the object under the mouse so there's no need to open an object edit window just to get some basic info. A very useful feature is the ability to select multiple objects and then start editing the first. The object edit window sports a Next button that takes you to the next object and Interface also allows you to change the flags and states of multiple objects globally. A press on F9 at any time quickly tests the object.

Image and icon objects can be edited by selecting the Edit button in the object edit window. This opens the best icon editor ever

sported on an Atari program. You can quickly create a mask for the icon or generate a medium resolution version

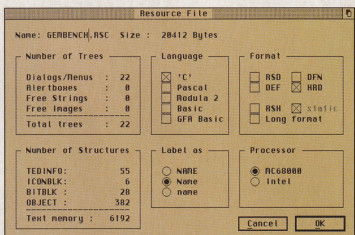
**Publisher:** Noj Software  
**UK distributor:** Compo Software Ltd  
**Contact:** 01487 773582  
**RRP:** £49  
**Requirements:** any TOS system with 1Mb of RAM

**Pros:** The ultimate GEM programmer's tool  
 \* powerful and versatile \* colour icons support  
**Cons:** A little slow in screen redraws  
 \* no English documentation

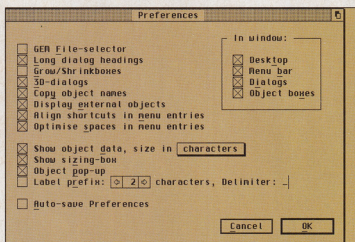
automatically by halving its height. The icon editor allows you to create 2, 4, 16 and 256 colour icons. One point worth noting though is that you must run in 256 colours or more to access all possible icon resolutions. The icon editor also reads IMG files as well as Windows 3 icons and can export the icon as a header (ICN) file.

## Verdict

Interface is an absolute must for anyone programming GEM applications. Even without using the more specialist libraries, you will find that programs like WERCS and KResource pale in comparison. It is also extremely reliable and works well under all versions of the operating system. The only problem is that an English manual is not yet available but, according to Compo Software, one is imminent. If you are serious about GEM programming, get Interface now!



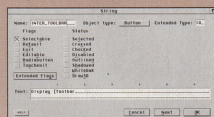
Interface can generate header files suitable for a number of programming languages. Users of HiSoft BASIC are not catered for, but can easily use the conversion utility that is included with BASIC itself.



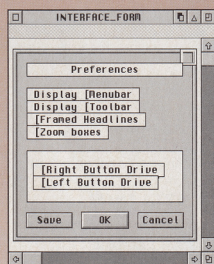
The user options give a good idea of the flexibility. A built-in file selector, non-modal interface and custom desktop can all be configured.

## MyDials

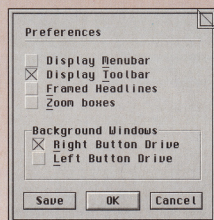
Interface includes the MyDials library for Pure C, GFA BASIC and Omikron BASIC. Using the library enables you to display keyboard shortcuts in buttons, create flying dialogue boxes and use round radio and check box buttons. The library is integrated into the Interface test tree routines so that you can immediately see the results.



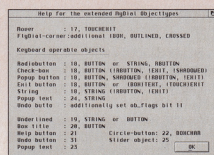
Create a button with an extended type of 18 and set the selected flag. The keyboard shortcut is assigned by adding an open square bracket before the shortcut character.



A typical dialogue box looks like this while being edited. Extended object types are used to create the custom objects.



Press the Test button to see what the dialogue box really looks like. Notice the 3-D look and the by now familiar check boxes that are not available as standard AES objects.



If you forget the various codes to use for the MyDials library, this table is available by pressing the Help key.

# GASTEINER G

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APPLE AUTHORISED RESELLER

# Q&A

## Ofir Gal and his team of experts set about solving your problems...

### Where is TOS?

**Q** Please explain to me something about TOS that I have not yet understood. I always thought that TOS and GEM were loaded into RAM at boot-up. I've tried to search for them in RAM using a disk/ROM monitor program and can see some parts but not others. If TOS remains in ROM, how do patch programs work and how is it possible for alternative operating systems to be loaded from disk?  
Stuart Campbell, Fort William

**A** TOS is stored in ROM chips and works from there so as not to use up valuable RAM memory. So, it is not loaded into RAM. What TOS does is to have a series of storage locations called exception vectors and system variables located at addresses \$0 to \$600 (0 to 1536 decimal) which have specific meanings. Most contain addresses of important places in the ROM where certain functions or information lie. Whenever these are needed, a program (including TOS itself)

### BASIC bug

**TIP** At the age of 68, I use the ST for the record-keeping of the local branch of the USA, University of the 3rd Age. For this purpose I use the excellent HiSoft Power Basic. Other users of Power Basic may be interested to learn of a bug in the INSTR function of version 1.21. INSTR returns the position of a small string within a bigger string; for instance, INSTR ("cat", "a") is 2. The bug shows if the last letter of the first string is the same as the first letter of the second string.

D. Gold, Herts

I have just tried reproducing this bug in HiSoft BASIC 2.10 and it appears that the bug has been fixed. You may like to contact HiSoft for an upgrade. Ofir Gal

looks at the value contained at the exception vector or system variable and goes there to carry out the function. Some patch programs work by changing these values to point to another address where their own routine lies.

There are two types of alternative operating systems: other versions of TOS and TOS-compatible operating systems (such as MultiTOS and Magic), and other non-TOS operating systems (such as Spectre Mac emulator). The former are completely loaded into

## Send Us Your Questions

Can't find anyone to answer that nagging question? Then drop us a line. Our team of experts are on hand to investigate and solve almost anything you can throw at them. Just send your letters to:

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While every effort will be made to answer your question within the pages of either Atari World or Atari Pro, please note that individual correspondence cannot be entered into.

### Compatible Falcon



**Q** I've been an avid Atari user for several years

now. My system is a 4Mb STe, with an SM124 monitor and 180Mb SCSI hard disk (using the ICD Link). I've been thinking recently about upgrading my set-up to the Atari Falcon but am concerned about software compatibility and whether or not I'll need to buy another hard disk. It's a very confusing situation which I'd like you to advise me about.

Douglas Hilliard, London

| Vec | Addr | Name                           | Value               |
|-----|------|--------------------------------|---------------------|
| 32  | 8800 | TRAP #0 Instruction:           | 6288051FE 537612790 |
| 33  | 8804 | TRAP #1 (GENOPS) Instruction:  | 6 17080A0 1228130   |
| 34  | 8808 | TRAP #2 (RES/VDI) Instruction: | 6 058FA 675252      |
| 35  | 880C | TRAP #3 Instruction:           | 6288051FE 507944448 |
| 36  | 8810 | TRAP #4 Instruction:           | 6288051FE 647121662 |
| 37  | 8814 | TRAP #5 Instruction:           | 6288051FE 621480878 |
| 38  | 8818 | TRAP #6 Instruction:           | 6288051FE 536276894 |
| 39  | 881C | TRAP #7 Instruction:           | 6278051FE 655463318 |
| 40  | 8820 | TRAP #8 Instruction:           | 6 FC6C 1833932      |
| 41  | 8824 | TRAP #9 Instruction:           | 6288051FE 60868742  |
| 42  | 8828 | TRAP #10 Instruction:          | 6288051FE 785384950 |
| 43  | 882C | TRAP #11 Instruction:          | 6288051FE 722162174 |
| 44  | 8830 | TRAP #12 Instruction:          | 6278051FE 738393908 |
| 45  | 8834 | TRAP #13 (BIOS) Instruction:   | 6 058FA 675194      |
| 46  | 8838 | TRAP #14 (XBIOS) Instruction:  | 6 880FA 788144      |
| 47  | 883C | TRAP #15 Instruction:          | 6278051FE 285721838 |

Profile 2 gives you a thorough rundown of your machine's internals...

| Address | HexDump of Memory                                  |
|---------|----------------------------------------------------|
| 000000  | 60 2E 81 84 08 FC 08 38 02 2 03 52 03 00 51 FE     |
| 000004  | 04 00 51 FE 08 FC 07 08 00 00 51 FE 07 00 51 FE    |
| 000008  | 08 00 51 FE 09 00 51 FE 08 00 02 EC 08 00 06 F6    |
| 00000C  | 0C 00 51 FE 0E 00 51 FE 0E 00 51 FE 0F 00 51 FE    |
| 000010  | 10 00 51 FE 11 00 51 FE 12 00 51 FE 13 00 51 FE    |
| 000014  | 14 00 51 FE 15 00 51 FE 16 00 51 FE 17 00 51 FE    |
| 000018  | 18 00 51 FE 19 00 51 FE 1A 00 FC 00 00 FC 07 07 00 |
| 00001C  | 00 07 00 E6 08 FC 07 08 00 FC 07 08 00 FC 07 08    |
| 000020  | 20 00 51 FE 22 05 00 08 5A 4 23 00 51 FE           |
| 000024  | 24 00 51 FE 25 00 51 FE 26 00 51 FE 27 00 51 FE    |
| 000028  | 00 0F C6 CC 78 00 51 FE 28 00 51 FE 2B 00 51 FE    |
| 00002C  | 2C 00 51 FE 00 5A 00 08 F6 27 00 51 FE             |
| 000030  | 30 00 51 FE 31 00 51 FE 32 00 51 FE 33 00 51 FE    |
| 000034  | 34 00 51 FE 35 00 51 FE 36 00 51 FE 37 00 51 FE    |
| 000038  | 38 00 51 FE 39 00 51 FE 3A 00 51 FE 3B 00 51 FE    |
| 00003C  | 3C 00 51 FE 3D 00 51 FE 3E 00 51 FE 3F 00 51 FE    |

... while the PD program ST Tools enables parts of the memory to be examined as well as disk files - but be careful!

**A** As a follow-up to a similar question in last month's issue, Doug, let me clear up any misapprehension about Falcon compatibility. The Falcon is compatible with all correctly written Atari programs. In practice this means that 99% of all serious programs will work on your Falcon. If you have any very old versions of commercial software then you may need to upgrade to the latest ones. A tiny majority of PD software doesn't work - but then a lot of PD software doesn't work correctly on an ST! The only problem is with games software, most of which isn't compatible, but there are products like Backwards that can get up to 70% of ST games running on the Falcon.



Most Atari software is Falcon compatible - and many PD games, such as Columns, reviewed this month, are Falcon-specific...

## MagiC moments

**TIP** It is possible to change the window colours, as in TOS 2.06, under MagiC. Use the WCOLORS CPX module that is available from PD libraries.

Also, if you have NeoDesk3 or TOS 2.06, and do not want to boot into MagiC every time, try this. Move the MAGXBOOT.PRG file from the AUTO folder into the root directory. Now drag this icon onto the desktop and give it a title like "Go MagiC!". Set NeoDesk to autoboot, and save the desktop. Now when you next boot your machine, you should have the "Go MagiC!" icon on your desktop. Simply double click on this and the computer will reboot with MagiC. If you want to go back to TOS, do a cold reset. Also, you could install a program like COLDBOOT.PRG on the MagiC Desktop, with a title like "Go TOS!".

Andrew Ward, West Yorkshire



The Window colours CPX from Atari works well under MagiC, allowing you to customise the colours of the GEM window elements.

As your hard disk has a SCSI interface it should plug directly into your Falcon, although depending on your hard disk driver and formatting you may need to reformat. If you want to save even more money, and don't mind losing your STe, then you might like to think about buying a 1Mb Falcon, a memory adapter (from Systems Solutions) and using your STe memory in it. Ask Systems Solutions first though, since not all SIMM memory is suitable for FalconWING. *Graeme Rutt*

## BASIC help

**P** I am writing to ask for your advice with regard to HiSoft BASIC 2.10. I am new to HiSoft BASIC programming and I previously followed your tutorials in ST Review. I have recently purchased HiSoft BASIC 2 and it is rather confusing to say the least. I have tried to follow the tutorial inside to the letter, however things don't go right for me.

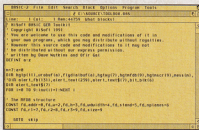
Although I've written to HiSoft, can you recommend a good BASIC 2 tutorial? I have read that BASIC 2 is compatible with Microsoft QuickBASIC. Do you think a book on QuickBASIC could explain the art of programming in an easier fashion?

*At the moment I use STDS BASIC and I have knocked out a couple of programs without too much fuss, but GEM programming is a bit confusing. I am eager to learn to work in HiSoft BASIC.*

Ade Wherry, Ayrshire

**A** I too had problems getting started in GEM programming. I would recommend going through the HiSoft GEM Toolbox tutorials and slowly trying to figure out how it all works. Unfortunately, there are no books that deal with GEM programming in BASIC specifically, but The Atari Compendium (available from HiSoft) may be useful. This book covers the operating system in detail and also includes sections describing GEM in particular.

HiSoft BASIC is compatible with QuickBASIC but only partially. Because QuickBASIC is designed for PCs, there are no equivalent GEM functions. In Atari World we will continue to support



The HiSoft GEM Toolbox is a collection of routines for GEM programming.

programmers with tutorials and articles. This issue is mostly dedicated to C programming, but we will most certainly be looking at BASIC in the near future. *Offr Gal*

## CD-ROM Drives



**Q** I'd like to add a CD-ROM drive to my

machine, a 4Mb STe. I want to use Kodak PhotoCD discs and some of the clip art CD-ROMs that are available. What type of CD-ROM drive should I buy and how do I connect it?

Robert Percy, Chelmsford

## Why an STe?



**Q** I've often wondered what the

difference is between the ST and the STe. I believe it has some extra colours but I can't see any extra graphics modes on my friend's STe computer. Can you tell me what the differences are?

Thomas Monk, London

**A** You have a number of options regarding CD-ROM drives, which one you take depends very much on your experience with connecting hardware devices and also your current configuration. The basic requirements are a SCSI adapter, driver software, the correct cables, and the CD-ROM drive itself. If you have a hard disk it's possible you already have a SCSI adapter – ask the hard disk supplier if you don't know.

Whether you buy each item separately or not is very much up to you. If you are on a tight budget then it's possible that you could save a little money by buying a separate CD-ROM drive. Some box-shifters are offering very attractive deals on CD-ROM drives, especially on the older double-speed and ancient single speed types.

However, if you want a single package that's guaranteed to work, and care about after sales service, then you should look at System Solutions' CD-ROM pack for STe/STF machines. It comes with all the required parts for a

**A** There are a number of differences between the two machines. There are more colours available in the palette (4,196 instead of 512) yet you can still only use 16 of them in low-res mode. The sound system is much improved: as well as the standard Yamaha "beep" chip of the ST range, the STe boasts a pretty good stereo sample play-back chip. It also offers a blitter chip and hardware scrolling, and while the benefits of such extras weren't put to use when the STe first shipped, a number of programs – mainly in the art and sound fields – have emerged that take advantage of them.

Another advantage that is easy to overlook is that the design of the STe allows easier upgrading of the machine. For example, to add TOS 2.06 to an STFM will set you back £54; on the STe it's a mere £39. *Graeme Rutt*

The excellent STormtracker, an example of a program that puts the STe's enhanced sound system to good use.



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