RISC OS

Built by RISCOS Ltd - Powered by ARM ®Technology

Fact Sheet

RISC OS is a compact ROM based Operating System solely for use with ARM® 32 bit processors.

Why choose RISC OS for your products?

RISC OS was originally developed in 1989 by Acorn Computers. When the 6502 processor originally used in the BBC Micro no longer proved powerful enough they designed the ARM 2 processor and a new Operating System to go with it. The Acorn processor design business was spun off as ARM Ltd in 1990. RISC OS was constantly developed by Acorn as successive processors such as the ARM 3, ARM 250, ARM 610, ARM 710 and StrongARM SA110 appeared. RISC OS has appeared in Acorn desktop computers for over 13 years and also as NCOS in Network computers. RISC OS was deisgned at a time when 4MB memory was excessive for a desktop computer and 32 MB RAM would cost over £1,000 and consequently used a 26 bit mode of operation on the 32 bit ARM processors which allowed for a number of savings in code and hardware design.
In 1995 Acorn was chosen by Oracle to build the first Reference Design for the Network Computer which they managed in under 16 weeks.
RISC OS is currently in use in the DSL 4000 Set Top Box and Bush Internet TV products. Castle Technology use it in their Risc PC, A7000+ and Neuron products. RiscStation in their R7500 and portable products and MicroDigital in their Mico computer. New products that are planned to incorporate RISC OS include the Millipede Imago, SVD Visiobus, ExpLAN Solo and MicroDigital Omega.

Ease of Use

Like all Graphical User Interfaces (GUI), the RISC OS Desktop has a learning curve, but once learnt, it is by far the most user friendly and productive GUI in the world today.
As so much can be done directly from the RISC OS Desktop, you will hardly ever need to leave it for the command line. Much use is made of the three button mouse to speed productivty.
RISC OS can be used by primary school children upwards.

Built-in Command line

The command line and the Desktop are part of the same operating system in RISC OS. The command line can be reached from the Desktop with a single key press. Function keys are used quite extensively in the Desktop, F12 always takes you instantly to the command line. You can return to the Desktop just as easily.

Industry Standard

RISC OS supports many file types and further software is available to read and create many 'industry standard' file formats (i.e. Microsoft Word (.DOC), GIF, JPEG, PDF, etc) RISC OS adheres to published standards and does not attempt to enforce its own changes to universally accepted standards.

User customisable

The RISC OS desktop is easily customised for indiviudal taste and for different applications.

Proprietary code

RISC OS is based almost entirely on proprietary code with no chance of hidden backdoors that can arise from using Open Source software.

International Support

RISC OS and its applications can easily be adapted to foreign markets by the use of territory modules. These provide the services and information necessary for both RISC OS and its applications to be viewed in different languages for specific territories. RISC OS supports the loading of system information messages in a foreign language, different time zones, different alphabets and different keyboard layouts.
Application software can easily be adapted simply by the inclusion of appropriate message files and templates for a foreign market.

ROM based

RISC OS is supplied in ROM thus avoiding any possibility of corruption by viruses.

Anti-aliased Fonts

Anti-aliased fonts, including font blending, are a standard part of RISC OS and are used throughout the Desktop. The RISC OS printing system uses the same fonts as the desktop, thus ensuring perfect matching between screen display and printout. Even 6pt text is legible on a 15" monitor using the RISC OS Font Manager.

Window support

RISC OS has very flexible Window support. The window stacking order can be maintained even when giving a window input focus; windows are not automatically brought to the top when given input focus. You can type into a window whilst another window is obscuring part of it. Windows do not become unmoveable when maximised.

British development

RISC OS has been developed by British companies. Initially by Acorn Computers and laterly by RISCOS Ltd and Pace Micro Technology plc.

Fast Power on

Since the core of RISC OS is in ROM and the kernel is tailored to specific hardware the initial power up is very fast with memory check and hardware initialisation taking less than a second on current hardware. Full booting of the hard disc based components of a desktop machine takes less than 6 seconds.

Unicode Font support

RISC OS can support both 8 bit Latin fonts and 16 bit Unicode fonts. Input Method Engines (IMEs) are available to support character input from standard ASCII keyboards for the multi-character fonts used by languages such as Korean, Japanese and Chinese.

Discless operation

RISC OS does not rely on a hard disc for its operation and can easily be configured to boot extra facilities and applications from extension ROM, a network connection, CDROM or almost any storage medium.

True Drag and Drop

RISC OS supports true Drag and Drop operations throughout the Desktop.There are two types of drop with regard to applications - dropping on the icon bar opens a new window whilst dropping on an open window appends the data.

Compact Kernel

The current RISC OS kernel is only 180 KB in size.
It provides efficient task management with co-operative multi-tasking and up to 128 concurrent tasks. Applications are single threaded.
Further features include -
Fast interrupt handling.
Dynamic memory management.
System clock and timing facilities.

Module based operation

RISC OS is a module based operating system. Modules can be soft-loaded to replace those in ROM or new ones added to extend the operating system's capabilities. Applications comunicate with these modules through the calling of Software Interrupts (SWI's) that are similar to Windows API calls.

Flexible filing systems

RISC OS supports many local and remote filing systems-
SCSIFS
Floppy drive - MS-DOS, Acorn, Mac, Atari
ISO 9660 CD-ROM with RockRidge and Joliet.
PCMCIA - (PCCardFS)
RAMFS
PIPEFS
IDEFS
ShareFS
NetFS
NFS
As well as booting from ROM, RISC OS can be loaded and booted from Hard-Drive, Compact Flash or Network.

Long file names

RISC OS supports real long filenames as opposed to a pseudo long filename mapping onto a file with a short name. Unlike under Microsoft Windows, the space (ASCII 32) and full stop are not valid characters in filenames.

16 bit Sound

RISC OS computers have 16-bit sound support and can play back multiple concurrent sound streams.

TCP/IP Network Stack

RISC OS supports industry standard networking facilities including:-
BSD 4.4 TCP/IP networking, IP, TCP, UDP, ARP
SLIP, PPP, BOOTP, DNS, DHCP, NFS, FTP, telnet

Printing

The printer manager supplied with RISC OS is superior to that found on other operating systems in that it is bitmap- rather than font-based. This makes it slightly slower but the printed output is incredibly accurate.

Variable screen resolutions

The graphics chips supported by RISC OS allow a wide range of graphics modes to be generated. Almost every screen mode on a RISC OS computer possesses both a text cursor and a graphics cursor. Text can be plotted at the graphics cursor and the text and graphics cursors can be combined. PAL TV and NTSC compatible screen modes are available.

Mouse

RISC OS has had a three-button mouse from the very beginning when each button was assigned a specific purpose. The use of each button is totally consistent throughout the entire Desktop. You can, for example, select a menu item without closing the menu or scroll both scroll bars of the same window at the same time. The third button can also be used to do the reverse of the first button; if the first scrolls up a window when clicked over a particular icon, the third button will scroll it down. The third mouse button can be compared to holding down Shift whilst clicking the left mouse button under Windows, but is much more convenient to the user.

Virus protection

RISC OS email systems are immune to PC attachment virus attacks.

No Hidden files

RISC OS does not have hidden files; with operating system files, application files and a user's data files so neatly departmentalised, there is very little, if any, need for hidden files. You can have an unlimited number of files per directory.

RISC OS
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RISC OS provides a stable and reliable base for the following company's products and services.

RISC OS provides continous reliable operation in demanding environments.

OMNIBUS SYSTEMS LIMITED

OmniBus Systems is a UK based company at the forefront of broadcast automation encompassing every aspect of operation from lines-in to transmission. In 2000 they won the Queens Award for Enterprise (Innovation).

RISC OS computers are used to provide two of the basic products of the OmniBus system.

OmniBus Workstation
The OmniBus Workstation is a standard Risc PC which uses a high resolution colour display and keyboard / mouse or touchscreen to provide a consistent control interface for all the connected equipment. The interface is broadcast format and technology independent. The soft control menus displayed on an OmniBus workstation have been designed to represent the actual look of the broadcast equipment.

Rack mounted OmniBus Interface Units
The second piece of equipment is the OmniBus interface unit which provides the link between the Omnibus workstations and the actual piece of broadcast equipment. This is an A7000+ computer which is built into a 19" Rack mount unit and provides Ethernet, RS 422 and other appropriate control interfaces.

OmniBus is the real-time network operating system that gives distributed control of a vast range of broadcast television equipment from simple intuitive user interfaces. The system allows equipment resources to be shared between many users, ensuring that the customer gets the most use out of valuable hardware assets.

OmniBus systems are in constant use worldwide at nearly 100 broadcasters such as ITN, BBC News 24, Botswana TV (Africa), Doordarshan TV (India), and TVNZ (New Zealand) to name a few.

www.omnibus.tv

DENBRIDGE DIGITAL

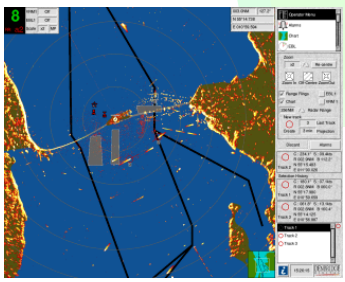
Denbridge Digital designs and manufactures a range of traffic management products around the world for the marine, air and highway transportation industries.

One product offered by the Vessel Traffic Systems Division is the RDS-4200 which is a high-performance, low-cost multipurpose radar display processors.

Based on the StrongARM RISC processor, the RDS-4200 offers performance features not found on any other commercial radar displays. The RDS-4200 has a unique zooming capability which provides target resolution and detail limited only by the resolution of the radar antenna and transceiver, anywhere on the screen. The RDS-4200 provides an impressive presentation of radar data and can be used with most commercially available marine radar transceivers. The RDS-4200 features standard ARPA functions along with an advanced sixteen target tracker and can be combined with other Denbridge Digital radar system modules for additional system functionality.

Their 4th generation of advanced radar video compression technology, the RCS-4000C provides real-time radar video compression down to 9600 bps for most commercially available marine radars. With applications ranging from remote radar video transmission by radio and telephone, radar video "broadcasting", to radar video recording and playback, the RCS-4000C has proven to be a unique and versatile product.

The systems are currently installed in Dundee, Plymouth, Milford Haven, Sweden, Kuwait and Gloucester.

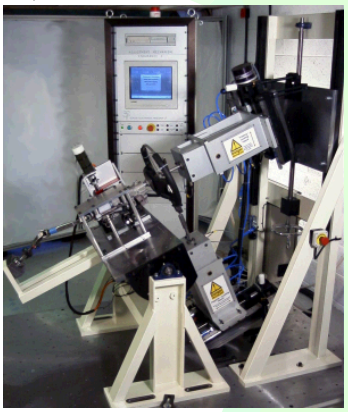


The radar display on the RCS-4000C

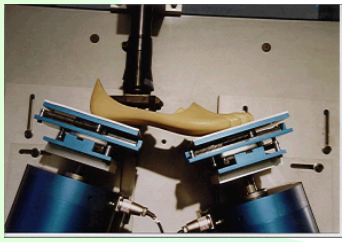
www.denbridgedigital.com

Si-Plan Electronics Research Ltd

Si-Plan Electronic Research produce a wide range of equipment for long term product testing. At the heart of many of them are RISC OS computers which are essential to ensure that the testing procedures are not interrupted by computer failure.



Steering column test rig
Exercises the steering column in all its axes: up and down, in and out, as well as testing the clamp lever. The two actuators have to follow each other as the column is moved to maximum extension, maximum height, minimum height, minimum extension etc. Tests can run for days. Complex test regimes can be programmed in blocks and repeated. Full data logging and displays are included. Rigs like this have been supplied to the UK and the USA.



Limb prostheses test machine.
Fatigue test involves 3 million cycles at 1 per second - therefore one test takes 35 days. The stability and multi-tasking of RISC OS makes it ideal for machine control (applying loading alternately to toe and heel of foot) and data logging. The machine is double sided, so one RISC PC is controlling load on each of 4 servo-pneumatic actuators while logging load and displacement, peak loads, peak displacements etc, displaying 2 loggers and DPMs on screen in real time.

Other RISC OS based applications developed by Si-Plan in the last couple of years have included:

Wind tunnel test control for a university research lab.
Electric sunblind test rigs for production testing
Deflection and torsional strength rig to test components made of rubber.

www.si-plan.com

svd
L'information vidéographique

SVD has been an editor of daily electronic newspapers since 1985. From its production centre in Valence in Southern France more than 200 different newspapers are daily updated and uploaded to more than 2500 screens installed in customers' offices for external or internal communication.
In 1998, SVD needed to renew the display hardware used for its Visionews product and choose the Acorn A7000 as its' new platform.

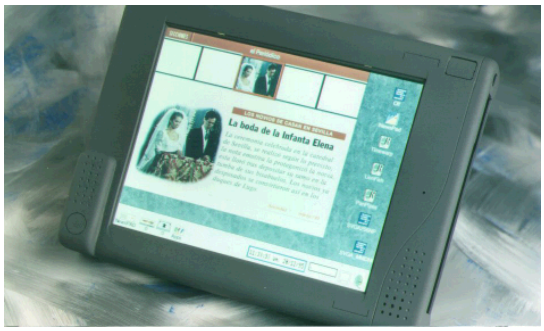
The main reasons for this choice was:
- Low power technology
- Compact ROM based OS suitable for embedded applications.
- OS simplicity and stability
- High quality of displaying and drawing OS functions such as anti-aliasing of text and vectors, JPEG decompressor, interlaced video support, ...

In 2001, SVD decided to renew the hardware used for its' Visiobus product, which is used to display electronic newspapers on public transport buses.

The environmental conditions encountered in buses places quite a physical stress on the hardware used so SVD commissioned the development of its own hardware and again choose an ARM based board running RISC OS.

The display software is provided by X-Ample systems in the Netherlands.

www.svd-info.fr



RISC OS and it's applications have a small memory footprint and are easy to develop and maintain.

RISC OS supports many different programming languages.

Whilst programs for RISC OS can be developed in ARM Assembler, C and many other Scientific Languages, the built in BBC Basic Intrepeter provides an excellent basis for much software.

BASIC

There are two versions of BASIC available with RISC OS.

BASIC VI is the latest version supplied alongside BASIC V. Its main advantage over BASIC V is that it can handle real numbers with greater accuracy. The improved floating point handling means it performs floating point arithmetic to IEEE standard 754, using 8-byte real representation. instead of 5 bytes used by BASIC V.

Both BASICs includes comprehensive built-in help text, and are probably the most powerful and fastest interpreted BASICs found on any computer in the world.

BASIC consists of special keywords with which you create sequences of instructions, called programs, to be carried out by the computer. You can use programs to perform complicated tasks involving the computer and the devices connected to it, such as:

* performing calculations
* creating graphics on the screen
* manipulating data.

The BASIC language operates within an environment provided by RISC OS. RISC OS is responsible for controlling devices available to the computer, such as:

* the keyboard
* the screen
* the filing system.

You can enter operating system commands directly from within BASIC, by prefixing them with an asterisk (*).

Both BASICs are less than 64Kbytes in size.

The BASIC programming language uses procedures and functions, making GOTOs, GOSUBs and line numbers redundant. BASIC can be used to write simple programs through to very complex Desktop applications. Acorn's first release of the Desktop in 1987 was in fact written in BASIC. BASIC includes its own ARM assembler.

C / C++ /Assembler

For major program development the Acorn C/C++ development environment is available for producing RISC OS desktop applications and relocatable modules written in ANSI C and/or in C++. It consists of a number of programming tools which are RISC OS desktop applications. These tools interact in ways designed to help your productivity, forming an extendable environment integrated by the RISC OS desktop.

Acorn C/C++ may be used with Acorn Assembler to provide an environment for mixed C, C++ and assembler development.

Acorn C/C++ includes tools to:

* edit program source and other text files
* search and examine text files
* convert C source and header text between ANSI and UNIX dialects
* examine some binary files
* compile and link C programs
* compile and link C++ programs
* construct relocatable modules entirely from C or C++
* compile and construct programs under th e control of makefiles, these being set up from a simple desktop interface
* squeeze finished program images to occupy less disk space
* construct linkable libraries
* debug RISC OS desktop applications interactively
* design RISC OS desktop interfaces and test their functionality
* use the Toolbox to interact with those interfaces.

Most of the tools in this product are also of general use for constructing applications in other programming languages, such as ARM Assembler.

The C compiler

The Acorn C compiler for RISC OS is a full implementation of C as defined by the 1989 ANSI language standard.

The C++ translator

The C++ translator for RISC OS (the tool C++ supplied as a part of this product) is a port of Release 3.0 of AT&T's CFront product.

GCC

The GCC Software Development Kit for RISC OS

GCC is a free collection of compilers that provide the user with a powerful tool for translating C, C++ and Fortran source into fast ARM assembler that is suitable for execution on RISC OS.
GCC is the common shorthand term for the GNU Compiler Collection. This is both the most general name for the compiler and the name used when the emphasis is on compiling C programs.

There also exist front ends for other languages, such as Objective C, Ada 9X, Modula-3, Pascal, Cobol and Java, however these have not been ported to run on RISC OS.

GCCSDK is a portable build environment for creating ARM executables to be run natively on RISC OS. The build environment is designed to be hosted on a Unix-like system, such as GNU/Linux, FreeBSD or Solaris. GCCSDK releases are tied-in with the corresponding RISC OS GCC releases.

It contains a C, C++ and Fortran 77 compiler along with an assembler, a linker and the standard run-time libraries, Libio, Libstdc++, UnixLib and headers/stubs for the SharedCLibrary.

Powerful Text Editing

All programming languages require a powerful text editor to provide fast editing features.

RISC OS users have a choice of three Text Editors. Zap and StrongED are very powerful shareware programs which supplement the basic facilities offered by !Edit.

Consistent look and feel

All applications have a consistent look and feel due to the excellent Toolbox facilities.

RISC OS Toolbox

The RISC OS Toolbox was designed with the following goals:

- to facilitate writing consistent, high-quality desktop applications
- to encourage the writing of applications whose user interface complies with the RISC OS Style Guide
- to be easy to learn
- to be language-independent
- to make it no harder to do operations which can be done using the Wimp.

The Toolbox has the following characteristics:

- it is structured as a set of RISC OS relocatable modules
- it does not directly call back to code in the client application
- it is SWI-driven
- it can be used from C, C++, BASIC or Assembler with equal ease
- communication back to the client application is via events
- the client application does not have direct access to data structures maintained by the Toolbox
- it uses a new resource file format to hold templates for the user interface objects which the application will use at run-time.

Practical Applications of RISC OS

Thanks to the low power requirement of the ARM processor RISC OS is ideal for a wide range of products:-

Desktop Computers

Portable Computers

Embedded controllers

Information Kiosks

PAL and NTSC TV resolution screen displays

EPOS (Point of Sale) Terminals

PC Compatible Network Terminals (Thin Clients)

VPN

Portable control units

Extensive back catalogue of software

Since the launch of RISC OS many thousands of applications have been produced for use with it.

These cover subjects as diverse as Model Railway simulation, Music scoring and publishing, Video Graphics, Databases, MP3 playback, Chemical modelling, Language learning, Photo retouching, Personal contact management, Farm administration, MIDI sequencing, Games, Multimedia authoring, 3D animation, DeskTop publishing, Genealogy, Presentation .....
and many more.

The major advantage of all these packages are that because of the compact code produced by RISC OS it is very rare that any individual RISC OS application ever exceeds 1MB in size. Thus machines with very little RAM and very small permanent storage can store and run a large number of applications.

The world renowned Sibelius music scoring program was first produced on the RISC OS platform.

Features List

RISC OS
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RISC OS is customisable with a complete suite of built in applications.

RISC OS is a comprehensive package.

Paint

A bitmapped editor which can handle the native RISC OS sprite format. Many other formats such as JPEG, GIF, PNG and TIFF files can be loaded with the help of additional convertors.
It is mainly used for designing icons and capturing screen shots; it can load JPEGs.

Draw

A Scaleable vector graphic package. Which as well as the native Drawfile format, can also generate SVG format files.

Edit

A text editor, which also provides command line control and editing facilities. Edit is a multi-file multi-window text editor - you can have different views on the same file - you can have as many open documents as you want.
The pathname of a file can be easily written at the current cursor position, simply by holding down shift and dropping the file over the window. Any type of file file can be loaded into the text editor simply by holding down the shift key whilst double-clicking on the file's icon.

Calculator

A scientific calculator is standard part of RISC OS.

Printing

A full printing support package is available for RISC OS supporting HP PCL 5 printing, PostScript, Canon CX printing, Epson ESC P/2 and Lexmark printer formats.

Email client

The Marcel email client developed by ANT Limited is shipped with RISC OS.

Web Browser

The Fresco web browser developed by ANT Limited with 128 bit SSL support is shipped with RISC OS.

PDF file support

The RISC OS Printer Drivers can generate Adobe Acrobat compatible PDF files. There are also PDF files readers available.

Speech support

Phoneme based text to speech translation is available to support many RISC OS applications.

Connectivity to PC, Unix, Mac

The OmniClient program is a universal desktop filer for network-based filing systems running on Acorn RISC OS computers. It allows Acorn platform users to store and retrieve files in conjunction with `alternative' file servers, and makes the most of hardware and software located on local area networks (LANs) that use Acorn machines.

It embraces the following network filing systems:

* Acorn Access and Acorn Access+
* NFS (TCP/IP Protocol Suite)
* Lan Manager (NT workstation 3.1 and 3.5, NT Server 3.5, NT Advanced Server 3.1 and Windows for Workgroups).

OmniClient provides a simple, consistent view of network file services to RISC OS users, irrespective of the server type or protocol used.

Easy application installation

Applications are easily installed - usually you just copy from the original master disc to the hard disc. Many applications can be run from floppy disc. Applications can be just as easily removed with no left-behind 'hidden' files.
Most applications can be run from any storage location you choose; the location is not normally fixed when the software is 'installed'.
Each application resides in an 'application directory'. Just double-click on such an application directory and the application will be run. All the files making up the application are 'hidden' from view of the average user inside the application directory. An application directory can however be opened just like a normal directory by double-clicking with shift held down.

No file extensions

RISC OS does not use file extensions; it uses file types instead. This allows linking of filetypes with applications enabling double-clicking on a document to load or run the appropriate applications. Under most other operating systems, you could have two files, foo.txt and foo.pl, in the same directory. With RISC OS, you could not have two files named foo in the same directory even if they're of different types. There is nothing to stop you naming them foo/txt and foo/pl where the /... part has no meaning under RISC OS except as a way of handling MS-DOS/Windows files. It is impossible to give a file two filetypes unlike under Windows where 'foo.txt.pl' would be allowed.

Ongoing development

RISC OS is under constant development.

A project to port RISC OS to run on the SA1100 based Psion netBook is underway and we are in discussions with ARM over possible solutions to the provision of new compilers and tools based on the developments that ARM have done to improve.
It is possible that we could migrate to the ARM compiler, but this would require some changes to RISC OS itself. The ARM compiler has moved on significantly and therefore no longer supports certain RISC OS features such as module building. ARM are working on an Embedded Application Binary Interface (EABI) that may prove suitable for RISC OS.
`http://www.armdevzone.com/EABI/`

Risc PC

Reference Designs

RISC OS based hardware is available from a number of manufacturers.
Castle Technology provide the original Acorn designed StrongARM SA110 based Risc PC and ARM 7500FE based A7000+ which are manufactured under licence. They are also now offering a series of small form factor boards for embedded applications under the Neuron brand.
`www.castle.uk.co`

RiscStation currently offer two ARM7500 based products. The desktop R7500 and the portable.
`www.riscstation.co.uk`

Embedded RISC OS

As well as complete desktop environments, RISC OS is easily customisable for dedicated purposes where a limited feature set is required.

Supported Processors

Intel SA110
Intel SA1110 (under development)
Cirrus Logic 7500FE
ARM 720 core (under development)
ARM 9 core (under development)
XScale (under development)

RISCOS Ltd welcomes enquiries from any manufacturers wishing to licence RISC OS for embedded applications such as Point of Sale Kiosks, Information Displays, Portable devices etc.

Web Sites

There are a large number of web sites and news groups dedicated to RISC OS. RISCOS Ltd itself has a group of sites centred around its home site at `http://www.riscos.com/`

`http://select.riscos.com/`
`http://sales.riscos.com/`
`http://embedded.riscos.com/`
`http://acorn.riscos.com/`
`http://developer.riscos.com/`
`http://support.riscos.com/`
`http://foundation.riscos.com/`

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RISC OS is in constant development. Nothing in this brochure shall be taken to imply an offer to supply the product described herein. Some of the features described are under development or require third party addons or licenses.

RISC OS is developed by RISCOS Ltd under license from Pace Micro Technology plc

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