

Adjust 32 and Select 4

The conclusion of the work done on RISC OS 4 as part of the Select scheme over the past two years is that we now have just one RISC OS source which is suitable for producing versions for both 26 bit processors and 32 bit processors. Select 4 is the first softload version that will be produced from the new source. Adjust 32 will be the hardwired version that will be featured in the FlashROM on the A9 computer which is being publicly launched at the Wakefield Show 2006.

Adjust32 is effectively a 32bit version of RISC OS 4.39 "Adjust" with some additional features essential for the operation of the A9 hardware. The additional features to be introduced in Select 4 will not be included with the A9, but will be available to Select subscribers.

Select 4 forthcoming new Features

Just a few of the new features already developed for Select 4 include ongoing development work on Paint and Draw as well as a considerable number of new graphics renderers. The Filer has been updated to support some more advanced facilities than it has ever had before. This includes features such as keyboard command shortcuts and "search as you type".

Kernel

The kernel has been the major area for update under Select 4. It is now up to version 8.68 (from 6.81 in Select 3i4)

All the source is now updated to be 32 bit safe. Support for 32 bit only processor modes is included. Assembler based components are now built using ObjAsm and a modern makefile.

The Kernel has lots of abstraction of its graphics APIs. It also now correctly supports LD/ST "T" and SWP in abort trap mode. Kernel now has no pointer support (OSPointer module now has this).

FPEmulator no longer explicitly colludes with the kernel for errors flattening the SVC stack.

FileSwitch no longer explicitly colludes with the kernel for file execution flattening the SVC stack.

Kernel has been updated substantially; video hardware is now driven by an external module. The only significant change that has yet to be completed is banking of modes.

RedrawManager has been added, and includes numerous fixes.

Printer buffer has been removed from the kernel.

Basic

BASIC now assembles LD/ST "T" properly and has had updated SYS return of flags to return PSR as expected in 32 bit builds.

Stubs G

A new version of StubsG release 0.5 (which will allow the development of applications that can run on RISC OS 3 -> 5).

32 bit AIF Headers

With the introduction of a 32bit RISC OS environment it is necessary to safely and reliably differentiate between code developed for 26bit and 32bit environment. This ensures that only code which can be safely executed within the environment is ever run. Attempting to use 26bit instructions can have unexpected consequences and must be avoided.

In Application Note 295 published in October 1996 Acorn stated that "All Absolute files must have valid AIF (ARM Image Format) headers. Absolute files without AIF headers and untyped

files are deprecated." In order to ensure that applications are 32 bit compliant the enforcement of a standardised executable file format that includes a header is now essential. The benefits of the enforcement of this standard are not just limited to 32 bit compatibility and ensure that:-

- Enough application memory has been allocated.
- The file has not been truncated or extended (i.e corrupted or infected)
- Read-only areas of the image are protected from alteration.

We see these as positive developments to improve the users experience and prevent inappropriate action when unsuitable applications are run under 26bit or 32bit Operating Systems.

32 bit Shared C library

Select 4 includes a 32bit SharedCLibrary with C99 functionality. This now means that there should be no need for developers to require the use of the 26bit version of the 32bitSharedCLibrary supplied with the Castle C/C++ compiler. Applications which are linked using the StubsG headers can just use the version of SharedCLibrary in ROM on Select 4, without having to check the specific version number of the SharedCLibrary in use. A number of major developers such as Icon Technology, MWSsoftware and RComp have already moved over to using StubsG for their products.

A considerable amount of work has been put into the CLibrary components to provide low-level C99 functions (long long and VLA)

System Stability - Dynamic areas

Badly behaved applications have been the major source of system crashes under RISC OS for many years. The tightening up of checking for AIF headers is just one improvement to prevent such crashes. Memory protection for workspaces is being implemented along with 'abortable dynamic areas'.

DAs can also be created and mapped to physical memory, enabling hardware drivers to access devices more easily.

System Debugger

A new system debugger is included in the Select 4 / Adjust 32 ROM image. Eventually this will be part of a tool to allow software developers to follow the path of an application to find the cause of bugs or crashes. Two tools will be available - DiagnosticDump and BTSDump. The DiagnosticDump module uses the new APCS backtrace augmentation feature of the SharedCLibrary to record details about application failures. This means that should a failure occur (CPU exception, abort, or assertion) and a backtrace be triggered, a record of the failure will be written to disc. These records - known as Diagnostic Dumps, or DiagDump for short - can then be decoded by special tools to provide similar information as was displayed within the backtrace itself. Because these files are self-contained, they can either be interpreted by the user, or be transferred to the original developer of the application. Two filetypes are associated with the debugger - DebImage (&FD3) and DiagData (&1C9)

The purpose of these DiagDumps is to provide a means by which better diagnostics of problems can be obtained by developers, even where they do not have access to the system upon which the failure occurs.

By default, the module will record details about the failure and automatically open a Filer window displaying the saved dump. The filename of the dump will reflect the application run, together with the date and time of the failure.

Because sections of memory are recorded which may not directly relate to the failure, users should be careful about who they give the dump files to.

See the 'Security Issues' section in the full docs for more details.

Fonts

The FontMap now has initial support for foreign font name mapping.

In order to better integrate with Postscript printers a full set of Standard Postscript compatible Fonts is to be included.

The new fonts are:-

Clare (AvantGarde)
Robinson (Bookman)
NewHall (NewCenturySchoolbook)
Pembroke (Palatino)
Churchill (ZapfChancery)

A collection of extra Fonts will also be included on the Select 4 CD release.

ATA Hard Drives

Select 4 will include Enhanced ATA Hard disc drivers. These will only support ATA-4 and above compliant drives. This means drives there were manufactured some time after 1996/7.

The reason is that the ATA committee currently only support these. Drives as small as 1GB will fall into this spec and of course, if your drive is 8 years old, you probably shouldn't be using it for data!!! Filecore and HForm have been totally overhauled to support the latest ATA standards and SMART features.

Graphics

Video Hardware abstraction is now provided to remove dependency on VIDC and IOMD architectures.

VideoHWVIDC provides the entire hardware driver for video. VideoSW provides the software implementation of certain graphical operations.

To work along side this suitable graphics cards can now provide EDID monitor support - see next item.

SpriteExtend has is now capable of rendering CMYK and YCbCrK JPEGs.

GIF Image File renderer now included as Unisys patent has expired.

Further enhancement to Paint and Draw packages.

e.g Paint - can now re-order sprite files

ConvertBMP can now take CMYK sprites and convert to BMPs.

ConvertICO can now create ICOs from multi-sprite files and CMYK sprites; sprites created from 16 colour icos are now 16 colour.

ConvertPNG can now convert CMYK sprites to PNGs.

ConvertPCX now supports 24 bit images.

Image Viewer now has support for exporting the viewed file in whatever types are known to the converter.

Monitor configuration

Modern CRT and LCD/TFT monitors have long had plug and play capabilities to allow themselves and their features to be announced to connected PCs. Now those features are available under RISC OS, on suitably equipped machines such as the A9, or a Risc PC equipped with a Viewfinder card. The EDID data supplied by monitors can now be read and used to automatically configure a Monitor Definition File for that monitor. Further information supplied by the EDID data such as actual physical screen size could in future be used to allow applications to display 100% sized graphics on screen, regardless of the actual monitor screen size.

Internet / Networking

The Internet stack, and related components, have undergone a number of changes in order to address problems and provide new features to developers and, ultimately, users. The primary improvements have been the addition of new modules for particular Internet facilities - RouterDiscovery, InternetTime and ResolverMDNS.

Resolver has been updated to address significant issues with its implementation of expiry (i.e. it now has expiry), now provides DCI4 statistics and actually bothers to check that memory allocations succeed.

Internet now supports multicast filtering for drivers. There is also support for auto-detection of DNS servers for dynamic and static addresses and the InternetModule now supports syslog debugging.

Virtual Ethernet Interfaces are supported to allow access to multiple subnets. e.g `ifconfig eh0:1 201.122.12.26` would configure a machine for use on the internet at the same time as `ifconfig eh0 192.168.1.1` would configure the same interface for use on a local network.

Appearance

The WindowManager has been updated significantly. From this work, it is now possible for button icons to be 'highlighted' when the mouse is over them. This is not used by the built in borders. However, a number of new borders will be supplied which will use this feature.

The FilerSpeedBar application provides an additional topbar on filer windows using the Pane interface. It's really just a test and isn't finished. It needs a bit of a redesign as it's only used to demo the functions which work.

The FilerImageBar application provides an additional sidebar on filer windows using the Pane interface.

Filer

The Filer now has easy system recognition of registered file types and can embed panes in its windows. This will be used by the new filer add-ons.

Filer uses `Filer$Types` to set the types that can be used (use hex values, comma separated, eg 'fff,faf').

Toolbox

A considerable amount of work has been done on the Toolbox modules. All toolbox modules should now work correctly if ResourceFS is restarted.

Window toolbox module now allows an expanded range of gadget operations in order to provide greater flexibility for the range of gadgets which can be provided - in particular gadget timers, gadget redraw events and the ability to add and remove icons from a gadget during its lifetime.

There is a new ColourSwatch gadget and the Toolbox includes support for timers.

Window provides vertical labels and has much improved support for Fonts in gadgets.

ScrollList can now decode click and DataLoad positions.

TextGadget has new features to support new text area background sprite handling.

Keyboard

International Keyboard now generates different codes for left and right meta keys. These are in order to fall in line with CTLs change to the design. Support for Multimedia Keyboards is also being developed.

Developers Tools

ResEd has been updated to support plugins for its gadgets, allowing it to be extended to use other gadgets as they become available. This is very incomplete, but works well enough to replace earlier versions. This also includes full support for the ColourSwatch gadget.

Further Info

The following pages will give you some idea of the changes involved with 4.4X

<http://www.riscos.com/adjust/AdjustROMchanges.htm>

<http://select.riscos.com/S4Features.html>

Further programmers details are available at:-

<http://select.riscos.com/Developers/Issue1overview.htm>

<http://select.riscos.com/DBChanges/>

A comparison of features between Select and RISC OS 5 can be found at

http://select.riscos.com/iyonix_select.htm