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Microware OS-9[®] Release Notes

Version 4.9



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Introduction

Microware OS-9 version 4.9 represents a maintenance and enhancement release to incorporate all of the improvements that have been introduced into the component parts.

Conventions

RSYSxxxx This specifies the ClearQuest issue number.

This identifier should be referenced if additional information about a particular bug-fix or enhancement is required.

How to Use These Release Notes

The release notes in this document reflect only the enhancements and resolved issues implemented after the OS-9 v4.8 release and before this release, OS-9 v4.9. Since all processors are not released at the same time, to read about all the OS-9 changes for a particular processor from one of its releases to another you must read all the release note documents starting with the older release and stopping at the newer release. For example, assume you are currently using OS-9 v4.7 for x86/Pentium® and you want to know what changed for v4.9. You would want to read this document and the release note documents for version 4.8.

Significant changes for release 4.9 include:

- **Low-level USB Support**
The OS-9 boot code was enhanced to include the ability to boot from a USB mass storage device (memory stick) as well as permit a USB keyboard to be used during the boot process.
- **SATA Controller Support**
The OS-9 low-level boot modules and high-level disk system now support AHCI SATA controllers.
- **Reliance™ File System Support**
OS-9 now has an available add-on that introduces support for Datalight's Reliance™ file system. This file system can safely maintain a valid file system, even when the power suddenly goes off. The Reliance™ File System file manager (RFS) is a drop-in replacement for OS-9's RBF or PCF file managers, using the exact same binary drivers and applications.
- **RadiSys Hardware Support**
A customized configuration for the RadiSys Procelerator COM-E 915GM board is now shipped. This allows the board to be easily configured right out of the box.

- Built-in Support for Dual-core Processors
OS-9 for x86/Pentium® now includes the very latest version of the VirtualLogix™ VLX Real-Time Virtualization™ product. This makes it possible to execute OS-9 on one core of a dual-core processor and Linux on the other. OS-9 communicates with Linux and the rest of the world over a virtual Ethernet connection and can read and write files via a fast virtual disk device.

Refer to the following release notes as well as the other related documentation for more information of each of these changes.

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Operating System

This chapter provides an overview of the changes and improvements made to OS-9 for version 4.9.

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Known Issues

- RSYS37838: When using the low-level USB for keyboard support, it's not possible to enter `xrombug` if the high-level USB is being used.
This is a problem related to the saving and restoring of device state. The low-level USB device drivers currently have no entrypoint to allow the USB device state to be saved nor restored.

Enhancements

- RSYS29913: A process should still be able to receive an I/O deadly signal after its signal queue fills up.
The OS-9 kernel was modified to allow one I/O deadly signal to be delivered to a process after its signal queue has filled up. This reduces the number of queued, non-deadly signals a process can hold by one. For compatibility with older releases, increase the `init` module field `m_maxsig` by one.
- RSYS37838: It is very difficult to bootstrap a PC without a floppy drive.
The OS-9 modular ROM boot code was enhanced to include support for low-level USB mass storage devices (memory sticks) and keyboards. The Configuration Wizard was changed to support the creation of a boot image on a removable media device. This allows floppy-free boot images to be created. With proper BIOS configuration, a PC can boot OS-9 from a USB memory stick and use a USB keyboard for console input. Refer to the [OS-9 for x86 Board Guide](#) for more information on creating boots on USB devices.
- RSYS40511: The performance of the FAT file manager needs to be improved.
The overall performance of the FAT file manager (`pcf`) was greatly enhanced by maintaining additional information about open files. Creating a large file can be as much as 400 times faster than the previous version. Reading a large file can be as much as 200 times faster.
- RSYS40569: New USB Mass Storage driver
The USB mass storage driver (`udiskd`) was updated. It is compatible with the OHCI, UCHI and ECHI device drivers. The driver also provides support for floppy devices. RBF and PCF file managers were updated to now query the driver for the sector size of the device.
- RSYS40948: OS-9 cannot boot from FAT32 media.
The low-level PC file format boot locator (`pcman`) was reworked to include support for FAT32 partition table entries and FAT32 volumes.

Resolved Problems

The following section describes the issues related to the OS-9 operating system and how they were resolved for the current release.

- RSYS39034: The `:T` macro replacement modifier does not work correctly.
The OS-9 make utility (`os9make`) was fixed to correctly implement all string-end related macro replacement modifiers. Now the correct translation occurs.
- RSYS39829: The `sptsec` driver (MVME3100, TQM85XX, MPX8349, TB0318, and PM854 ports) performs sleeps in IRQ and alarm context and does not synchronize access to the shared MII/PHY registers.
The `sptsec` driver was re-worked to ensure that accesses to the MII/PHY are synchronized and not performed from IRQ nor alarm context. This corrects connectivity and system stability issues, especially when more than one interface is used.
- RSYS39929: When the system is running low on mbuf pool space with the IPv4/IPv6 stack, networking can freeze up.
The IP protocol driver (`spip`) was fixed to no longer use a blocking mbuf "get" call in its receive data handling code. If insufficient mbuf space is available when handling incoming data, the packet is dropped, creating more free space in the mbuf pool.
- RSYS40421: The x86 kernel incorrectly reports system damage with semaphores when none exists.
The x86 kernel was fixed to correctly validate only 2-byte alignment on the process descriptor pointers within a semaphore. Previously, 4-byte alignment was checked and `EOS_DAMAGE` was returned even though the process descriptor pointers were valid.
- RSYS40450: SSM for SH-3 should not restrict the processor to single-virtual mode
The system security module (SSM) for SH-3 was changed to not set the single-virtual bit in the MMU control register. This allows processors for which this mode is not supported, to work with OS-9.
- RSYS41304: `_os_read()` nor `_os_readln()` return an error when a pending `_os_ss_sendsig()` exists
The SCF, FIFO (`pipeman`), and message (`msgman`) file managers were all modified to correctly return `EOS_NOTRDY` when a read is issued on a device/path that already has a pending `_os_ss_sendsig()` request. Previously, the read calls would block waiting for data.
- RSYS41304: Using `_os_ss_sendsig()` on a pipe can result in blocking all readers even after the signal has been sent.
The OS-9 FIFO file manager (`pipeman`) was changed to no longer reserve reading from the pipe for the process that requests a signal on data ready. This standardized its behavior with SCF in terms of how pending signals and reading are handled.

- RSYS42318: RBF does not return errors when invalid operations are attempted on the at-sign (e.g. /r0@) device
RBF was changed to return EOS_PARAM if any of these calls are attempted on the at-sign path: `_os_gs_fd()`, `_os_gs_fdinf()` (with a block number of 0), `_os_ss_rename()`, and `_os_ss_hdlink()`. Previously, memory near address 0 was accessed and values were read from or written to that area.
- RSYS42909: Terminating a device on OS-9 for x86 that shares a vector with another device will cause the other device to stop receiving interrupts.
The programmable interrupt controller library (`piclib.l`) and subroutine module (`picsub`) have been enhanced to keep track of enable/disable nesting. This allows further interrupts on a vector that is disabled by a driver's terminate routine. Generally, legacy PC devices each use a separate vector so this enhancement was not needed. PCI devices more commonly share vectors.
- RSYS42874: Multiple processes or threads renaming files in the same directory can cause file system corruption or unjustified errors.
OS-9's native file system manager (`rbf`) was fixed to correctly handle the case of multiple processes or threads renaming files in the same directory. OS-9 FAT file manager (`pcf`) and reliable file system manager (`rfs`) did not have this same problem.

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Host Applications

This chapter contains release notes for host applications used with OS-9 v4.9.

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Hawk Notes

The following section represents changes and updates to Hawk since the last release.

Resolved Problems

This section provides a list of Hawk-specific issues and how they were resolved for the current release.

- **RSYS29956:** Hawk's "source next" operation doesn't work over a call-by-pointer when debugging a process on ARM or PowerPC.
The Hawk source-level debugger shared library (`mwsrdbg.dll`) was fixed to correctly identify a call-by-pointer when the debug target is either ARM or PowerPC. Previously, Hawk would step into the called function even though a "next" operation was requested.
- **RSYS38560:** Hawk debuggers can crash during startup.
Problems that caused the Hawk integrated debugger (`hawkdbg.dll`) to crash on entry were corrected. In addition, a number of problems affecting the stand-alone Hawk debugger (`hawkdbgr.exe`) that caused various access violations when starting up the application were fixed.
- **RSYS38632:** Clicking the Cancel button while being asked for a source file location causes the Hawk debugger to crash.
The Hawk debuggers (`hawkdbg.dll` and `hawkdbgr.exe`) were fixed so that aborting the process of locating source files does not cause exceptions in the debugger.
- **RSYS38632:** When the Hawk debugger asks for the location of a source file it incorrectly changes Hawk current working directory to that directory.
The Hawk debugger engine (`mwsrdbg.dll`) was fixed to not change the current working directory when the file dialog is brought up to locate a source file. The file dialog still records where the last file was located for any subsequent file dialogs.
- **RSYS38632:** When projects are compiled outside of Hawk, with relative paths, the Hawk debuggers require you to locate every file, even if it's in the same directory as a previously located file.
The Hawk debugger engine (`mwsrdbg.dll`) was fixed to keep a list of directories in which files have been located and search those prior to requiring the user to locate the file. Further, this list of directories containing source files is saved across sessions so subsequent debugging of the same source code requires no manual source file locating.
- **RSYS39450:** The directories displayed in the combo box when selecting components to add to a project can be incorrect and traversing them can be unstable.
The combo box that displays your current directory tree when adding a component was revised to correctly show the directory names and not go into an infinite loop when the "go up one directory" button is clicked.

- RSYS39457: Hawk's "return from function" button causes a strange error number to occur if used from non-standard locations within the program.
Hawk was fixed to better communicate the problems that can occur when attempting to use the "return from function" button when the current C stack frame is not in a normal configuration. Examples include signal handlers, hand-written assembly language, and the stack checking C run-time code. Hawk now reports that an invalid operation has been attempted and returns control of the debugged application to the user.
- RSYS39545: The Hawk stand-alone debugger displays a MEM_BAD_POINTER dialog box when it terminates on Windows XP.
The source-level debugger dynamic library (`mwsrdbg.dll`) which is used by the Hawk stand-alone debugger was fixed to not display this dialog when terminating on Windows XP.
- RSYS40644: The initial display of the Hawk debugger's memory window is not correct.
The Hawk debuggers (integrated Hawk debugger `hawkdbg.dll` and stand-alone debugger `hawkdbgr.exe`) were fixed to no longer require a format change to correctly display the memory window. Now, the initially displayed window reflects the current target state.
- RSYS40644: The version of the memory display copied to the clipboard does not match the display.
The Hawk debuggers were fixed to correctly reflect the values of the bytes when copying the memory window's contents to the clipboard. Previously, the high bit of each byte was stripped off.
- RSYS40644: The Hawk debugger memory window does not correctly display word, longword, nor quadword values.
The Hawk debuggers were fixed to take the target's endianness into account when displaying non-byte integer values in the memory window. Previously, all targets were considered big-endian.
- RSYS40746: Hawk goes into an infinite loop if it cannot locate compiler components when building.
The Hawk project manager (`hawkprj.dll`) was fixed to correctly indicate when it was not possible to run a command line. An error message will now appear in the output window.

OS-9 Configuration Wizard Notes

The following section represents changes and updates to the OS-9 Configuration Wizard since the last release.

Resolved Problems

- RSYS9867: The user options from the .ini are not visible in user tab when `OPTIONS_USER` is used.
Options defined with `OPTIONS_USER` in the .ini file are now correctly displayed in the User Options dialog of the Wizard.
- RSYS29777: The Wizard unchecks User State Debugging box on build screen.
The Wizard incorrectly disables user-state debugging option when SPF support is disabled. User state debugging is still possible through the low-level networking stack.
- RSYS39441: Checking the MAUI check-box in the MVME500 Wizard causes the boot to fail to build.
The MVME5500 port was corrected to include the makefiles and objects related to MAUI. The Cirrus Logic 5446 chip is supported. The MAUI options can now be successfully used.
- RSYS00039600: The Wizard would include ethernet drivers and descriptors when no ethernet interfaces were selected.
A logic error was corrected in the Wizard to prevent it from including ethernet driver modules in the case where SPF was enabled but with no ethernet interfaces selected.

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Components

This chapter contains processor-independent release notes for OS-9 components.

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OS-9 Compiler Notes

The following sections contain release notes for the OS-9 Ultra C/C++ compiler.

Resolved Problems

This section discusses problems that were resolved in the Ultra C/C++ compiler and libraries:

- **RSYS29961:** Complex expressions can generate incorrect code when they contain symbolic code or data references if compiling for 68000.
The Ultra C/C++ back-end for the 68K family of processors (be68k) was fixed to correctly recognize the potential use of d7 and avoid it if the expression contains a possible use of the 68000 span register (d7). This is only a problem when compiling for the 68000 processor, not CPU32 nor 68020 and above.
- **RSYS40621:** Linking `dbglog.l` before `d_os_lib.l` causes duplicate symbol errors.
The OS-9 libraries (`d_os_lib.l` and variants) were fixed to separate the symbols `_d_oscall()` and `_oscall()` into their own psects. This allows `dbglog.l` to define `_oscall()` and the debug system calls in `d_os_lib.l` to use `_d_oscall()`.
- **RSYS40621:** `d_sys_oscall.i` and `d_sys_oscall.r` are missing from distributions.
In order to use both the system-state system call shortcut (`sys_oscall.r` or `sys_oscall.i`) and still get the error checking versions of the debug system calls, these libraries are required. They have been created for this version of OS-9. Note: Builds that use `sys_oscall.r` or `sys_oscall.i` generally specify it directly on the command line. This will bypass the library name mangling that `xcc` does when building with the `-cd` (debug enable) option. Conditionalize the build to add the `d_` prefix for debug builds.
- **RSYS41390:** The `_gs_opt()` and `_ss_opt()` functions on OS-9 for /pipe paths do not behave like these same functions on OS-9 for 68K
The `_gs_opt()` and `_ss_opt()` functions in the OS-9 system C library (`sys_clib.l`) have been fixed to correctly emulate the OS-9 for 68K behavior. OS-9's pipe file manager (`pipeman`) does not support path nor logical unit options, but `_gs_opt()` will return an OS-9 for 68K style `struct sgbuf`. `_ss_opt()` does not perform any function, but does return `SUCCESS`.
- **RSYS41551:** Illegal code is generated when `-c` option used on x86 with pointers to functions at non-zero offsets from the base of their structure
The x86 back-end (be386) was fixed to correctly emit the assembly language for a `const`-qualified pointer to function at a non-zero offset from the base of its structure. This problem generated syntactically incorrect assembly language, so no recompilation of source code is required.

- RSYS41605: Illegal code is generated when for an 8-bit multiply-equals (*=) operation with a constant
The x86 back-end was fixed to correctly emit the assembly language for an 8-bit multiply-equals (*=) operation with a constant. This problem generated syntactically incorrect assembly language, so no recompilation of source code is required.

Networking Notes

The following sections include the release notes for the current versions of SoftStax and LAN Communications.

Resolved Problems

This section discusses problems that were resolved for SoftStax and LAN Communications:

- RSYS41985: `idbgen` silently omits seemingly valid IP addresses from the database

The `idbgen` utility was fixed to emit warnings for invalid IP addresses encountered. Note that leading 0's in IPv4 addresses are not permitted. Previously, illegal addresses were simply omitted from the generated data modules.

MAUI Notes

The following section represents changes and updates to MAUI since the last release.

Enhancements

- RSYS18732: MAUI API's should have a way to get the error action.
The MAUI ANM, BLT, CDB, DRW, GFX, INP, MEM, MSG, TXT, and WIN APIs were modified to include a function `xxx_get_error_action()` that can be used to query the error action levels. This might be used by a routine that needs to temporarily change the error action. This function allows the routine to get, change, and then restore the error action. Refer to the [MAUI Reference Manual](#) for more information.

Resolved Problems

- RSYS42800: Loading an IFF image from a file on a little-endian machine crashes the application.
The MAUI demo library (`mauidemo.1`) was fixed to correctly load an IFF image from a file on little-endian machines (i.e. ARM/StrongARM, x86/Pentium). Previously, it was incorrectly swapping already-swapped values, leading to unpredictable behavior.

