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Microware OS-9[®] Release Notes

Version 4.8



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Introduction

Microware OS-9 version 4.8 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 v4.7 release and before this release, OS-9 v4.8. 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 v4.1 for ARM/StrongARM and you want to know what changed for v4.8. You would want to read this document and the release note documents for versions 4.2 through 4.7.

Significant changes for release 4.8 include:

- A collection of APIs and tools to allow real-time debug logging from your applications and system code. In addition, the memory allocation and threading routines have been heavily instrumented to aid the detection of problems in both of these oftentimes problematic areas.
- A framework for the development of CANbus drivers and communication protocols.
- A large number of additional PowerPC board support packages have been added to the distribution.
- HawkEye now supports customizing the timer it uses.
- The C heap routines (`malloc()`, `free()`, etc.) in the standard C libraries have been rewritten to improve performance in terms of both increased speed and reduced memory usage.
- The CSL strategy has been enhanced to better separate non-threading and threading applications using CSL.

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 4.8.

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Known Issues

- RSYS39829: The VME3100 halts if the FEC interface on the rear transition module is used.
The system is known to lock up if a cable is plugged into the FEC (10/100) port on the MVME721 rear transition module for the MVME3100. This will occur regardless of whether or not the FEC is configured as a supported interface.
- RSYS39624, RSYS39410, RSYS39409: The Kanis 5554EMUF board has some limitations.
 - Low-level debuggers (rombug, SNDP) do not support the trace operation. Other operations perform correctly (go-stop, breakpoint, etc.)
 - An alignment exception will halt the system.
 - The system must be powered off to be rebooted correctly.

Enhancements

- RSYS11656: `editmod` should ignore processor sub-options so `xcc`-like `-tp` options can be used
`editmod` was enhanced to ignore any processor sub-options on the `-tp` option. This allows the same `-tp` option used on `xcc` to be used with `editmod`.
- RSYS30181: When the command-line specified in the init module fails, it's impossible to tell where it failed
The `mshe11` utility was enhanced so that the `-t` option (echo command lines as they are read) causes `mshe11` to echo any further commands on the same line as they are parsed and executed. This makes it very obvious which command caused the failure of the initial command-line.
- RSYS38589: The 8042 driver should have support for Japanese keyboards.
The PCAT port was enhanced to include support for Japanese 106-key keyboards. The new descriptors can be found in `MWOS/OS9000/80386/PORTS/PCAT/CMDS/BOOTOBJS/DESC/SC8042`, `SC8042K`, and `SC8042M`. They have the `.jrp` extension.
- RSYS8852: PowerPC e500 SSM performance improved
Performance for the PowerPC e500 SSM was improved for large programs.
- RSYS37475: OS-9 should have a facility to schedule an alarm without allocating any memory so it can be done from an interrupt service routine.
The OS-9 kernel was modified to allow alarms to be "pre-allocated". That is, an alarm can be allocated, but with no interval nor cycle. Then, at a later time the pre-allocated alarm can be scheduled with `_os_salarm_reset()`. Refer to the *OS-9 Technical Manual* for more information on pre-allocated alarms.

Resolved Problems

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

- **RSYS8724:** The `rb1003` (IDE) driver should be more sensitive to device removal or other malfunction.
The `rb1003` driver has been significantly updated to have timeouts for each wait that it performs. This includes waiting for drive ready and waiting for an IRQ to occur. This will allow errors to be returned to calling applications if the hardware malfunctions or is removed.
- **RSYS8775:** Attempting to create files with very long filenames (over 255 characters) on `pcf` can crash the system.
The PC file manager (`pcf`) was fixed to correctly return an error when any filenames over 255 characters are used. Previously, 2 bytes of unowned RAM were corrupted by PCF when attempting to check the filename's length.
- **RSYS8850:** Updates to MVME5500 port due to GT-64260 errata
Changes were made to the MVME5500 port due to errata of the Marvell Discovery GT-64260 chip. This updated the following modules: `abort`, `gt64260irq`, `tkdec`, and `spgt64260`.
- **RSYS8851:** PowerPC 403 and 405 vector code should be updated for erratum #77.
Code to implement the changes in IBM's erratum #77 in their document 405CR_C document were added for PowerPC 403 and 405 processors.
- **RSYS9175:** `mshell` output redirection can report an incorrect file not found error (`#000:216`)
An obscure use of output redirection from `mshell` to a new file could cause a `#000:216`. `mshell` was altered to reset an error code to prevent this incorrect error from being reported.
- **RSYS9393:** The `pcmcia` utility does not work correctly on systems that are not running at 100 ticks/sec.
The `pcmcia` utility now sleeps for one-half second (specified as 128 256ths) instead of 50 ticks during the card power-on routine.
- **RSYS9521:** The 16450/16550 serial driver does not support cards with multiple serial chips.
Support for cards with multiple serial chips was added to the 16450/16550 serial driver (`sc16450`)
- **RSYS9581:** Some special VME registers are missing from the Universe II IRQ source code.
A few special VME registers were added to the Universe II IRQ source.

- RSYS10280: SSM for MIPS32 allows access to some protected pages.
The SSM module for MIPS32 (`ssm32`) was allowing access to "odd" pages that were not permitted to the user-state process. This problem has been corrected by validating both the start and end address during the "odd" segment table search.
- RSYS10644: `bootgen` fails to recognize that a non-RBF disk is being used
The disk bootstrapping utility (`bootgen`) was updated to ensure that an RBF formatted device is being used as the target device.
- RSYS10736: The PowerPC kernel can start threads incorrectly if the `FE0` or `FE1` bits are set in the main thread.
The PowerPC kernel was fixed to no longer start new threads with arbitrary values for the `FE0` and `FE1` bits in the `MSR`. Now, all threads are created with the `FP`, `FE0`, and `FE1` bits of the `MSR` clear.
- RSYS10902: `dsave` can crash due to long filenames.
The `dsave` utility will now copy PCF files with names longer than 44 characters.
- RSYS11456: The SH-4 and SH-4A cache modules flush/store/invalidate 32 extra bytes if the specified base address is on a cache line boundary or this equation holds true: $((\text{size} \% 32) \neq 0 \ || \ (\text{base} \% 32) == 0) \ \&\& \ (32 - (\text{size} \% 32) \geq \text{base} \% 32)$.
The SH-4 and SH-4A cache modules were corrected to act on the correct memory addresses regardless of what address and size are passed. They were also changed to correctly return an error when an invalidate request with size 0 is attempted.
- RSYS11456: The SH-4 and SH-4A cache modules cause a system crash if the data or instruction cache is disabled and then re-enabled.
The SH-4 and SH-4A cache modules were fixed to invalidate the cache contents prior to re-enabling the cache. This prevents the system from crashing during this operation.
- RSYS11456: The SH-4 and SH-4A cache modules fail to store any of the data cache when asked to store all of the data cache.
The SH-4 and SH-4A cache modules were fixed to correctly handle a `C_STODATA` request with a size of 0. The correct behavior is to store all "dirty" contents of the data cache. `C_STODATA` requests with a size other than 0 were already correctly handled.
- RSYS11496: The short and long stacks on MIPS64 should include `cause` and `badvaddr`.
The MIPS64 implementation was changed so that the short and long stacks now include members for the `cause` and `badvaddr` `CP0` registers. Previously, `cause` was passed as a fourth parameter to exception handlers and `badvaddr` was passed as a fifth parameter. Any code requiring these extra parameters to exception handlers should be changed to get `cause` and/or `badvaddr` from the short stack (second parameter to IRQ service routine).

- RSYS11603: The USB OHCI device can cause the system to lock up after a warm restart (<ctrl><alt>)
The initialization routine was changed to properly reset the OHCI device when initializing. This keeps the system from hanging during initialization.
- RSYS30207: Attaching with the Hawk debugger sometimes fails on OS-9/68K
The `dbgextns` and `kernel` modules for OS-9/68K were updated to include better support for attaching to running processes. Now, the process will be sent a wakeup signal if it is in a queue in which a wakeup signal would not be harmful. Further, the calling process is marked such that the next transition to user-state execution by the debug child will transfer control to the debug parent. The debug child's time-out flag will be set to encourage such a transition.
- RSYS37387: `pcf` for OS-9 for 68K calls `rombug` when used with a write-protected disk.
The Windows file system manager (`pcf`) was fixed to not call the system debugger when write errors occur. The file manager was previously built in an incorrect configuration.
- RSYS37421: `fdisk`'s IDE max size is being incorrectly calculated
When using `fdisk` to partition an IDE hard drive, the default size was one cylinder too large. `Fdisk` was also only recognizing devices `hc` and `hd` as IDE drives. `fdisk` edition 29 now reports the proper size, and defaults to IDE devices unless the descriptor is a `/hs` SCSI device. Large drives can now be correctly partitioned and used with `fdisk`.
- RSYS37474: Support for Freescale e200 processors needs to be added to the `flashcach` module.
The low-level cache maintenance module (`flashcach`) module now supports Freescale e200 processors.
- RSYS37475: Large-value alarm creations are incorrectly inserted in the presence of pending alarms.
The kernel was updated to correctly maintain the pending alarm list on an insertion of a new alarm with a very large interval time (`0x7ffffffffff` in this case). Previously, if there were any previously pending alarms that were overdue, the kernel would place the new alarm before these type of alarms. Alarms would then stop going off since the next alarm to go off appeared to be in the very distant future.
NOTE: The use of large-value alarms to keep from having to allocate alarms in IRQ service routines is no longer necessary. Refer to the *OS-9 Technical Manual* for information on "pre-allocated" alarms.
- RSYS37518: The Intel Ethernet Pro 100 usually mis-identifies the PHY on PowerPC processor boards
The Intel Ethernet Pro 100 driver (`sppro100`) was updated to validate the identified PHY and choose an alternate if the one in the EEPROM is not correct. This was most commonly a problem on PowerPC processor boards.

- RSYS37594: The `iocpm` driver can't enter and exit `rombug` cleanly.
The low-level serial driver on the PowerPC 8260 (`iocpm`) was updated to correctly restore the state of the CPM when returning from system debugger mode.
- RSYS37802: Renaming a directory on a FAT format disk can cause lost data.
Resolved an issue in the PC format file manager (`pcf`) where renaming a directory to a longer name, which requires allocating new directory slots, could cause the directory and all of its contents to disappear as lost clusters.
- RSYS37920: The 3K IRQ stack for OS-9 is too small.
The size of the IRQ stack for all OS-9 processors was raised from 3K or 4K, depending on the processor, to 16K. This stack is used for IRQ handling.
- RSYS37942: The USB mouse driver doesn't report the wheel and right buttons correctly and doesn't support data from the wheel.
The USB mouse driver was changed to correctly report the wheel and right mouse buttons. Additional support was added to report the wheel data from wheel mouses.
- RSYS38112: Passing `NULL` pointers for names into `ioman` causes it to access address 0.
The OS-9 I/O manager (`ioman`) was modified to check all name parameters on I/O system calls to ensure the pointer is not `NULL`.
- RSYS38219: The `OCIC` bits should be ignored by the USB UHCI driver.
The hardware `OCIC` bits were being processed by the UHCI driver even though they are not part of the UHCI v1.1 spec. This was causing the driver to fail. These bits are now ignored.
- RSYS38221: Non-blocking I/O in `msgman` could block indefinitely
Multiple calls to a non-blocking, empty I/O queue in `msgman` would result in an indefinitely blocked queue. This has been corrected.
- RSYS38300: Systems using the `scsi8xx` second-level SCSI module can leave system paths open when threaded processes terminate.
The second-level SCSI module was fixed to no longer send duplicate signals to a process when an IRQ occurs. This was causing I/O queueing to fail so the path was not getting closed properly.
- RSYS38437: User-state alarms do not change the signal value upon `_os_alarm_reset()`
The OS-9 kernel was changed to update the signal code sent when a user-state alarm gets reset via `_os_alarm_reset()`.
- RSYS38437: User-state alarms allow the cyclic time to be set to 0 via `_os_alarm_reset()`.
The OS-9 kernel was changes to disallow setting a cyclic alarm's period to 0 ticks. Interval alarms may have their interval set to 0, causing the alarm to go off immediately.

- RSYS38592: USB access to a disk causes significant memory leakage.
The USB manager (`usbman`) was updated to correctly free all resource upon the completion of a transfer. Previously, a system-state alarm was left allocated after the transfer was completed.
- RSYS38592: USB code (drivers and manager) are too sensitive to fatal signals.
The USB stack cannot simply return an error upon a fatal signal in blocking cases. The code was changed to ignore signals (fatal or otherwise) if signals are masked at the time of the system call. If signals are not masked, only fatal signals other than `^C` or `^E` are observed.
- RSYS38920: The baud rate calculation for SMC1 and SMC2 for PowerPC is incorrect
The baud rate generator calculation for SMC1 and SMC2 on the PowerPC 8260, 8270, 8280, and 8560 CPUs was fixed to correctly compute the initialization value.
- RSYS38920: The FAT file system file manager creates incorrect short filename for some filenames.
The FAT file system file manager (`pcf`) was fixed to correctly decide what the short filename should be in all situations.
- RSYS38645: `_os_ev_info()` can return `EOS_EVTID` for a valid event ID
The kernel was fixed to return `SUCCESS` and the event information for all valid event IDs.
- RSYS37834: SSM for MIPS64 should partition the TLBs between system and user state.
The MIPS64 SSM module (`ssm64`) was updated to include a feature that separates the user-state TLB entries from the system-state TLB entries. User-state code uses 40 of the 48 TLB entries. System-state uses the remaining 8 entries. This keeps a user-state task switch from invalidating valuable system-state TLB entries and keeps system-state TLB refills from invalidating valuable user-state TLB entries. It also increases the performance of task switches by reducing the number of TLB entries refilled. The possible downside is the fact that user-state processes have 8 fewer TLB entries to use, even if few are used by system-state code.
- RSYS10573: SSM for MIPS64 need to consult the system-state cache list before creating a TLB entry for a system-state TLB miss.
The MIPS64 SSM (`ssm64`) has been modified to determine the cache mode for system-state TLB misses by referencing the system-state cache list. Any miss for an address not covered by the system-state cache list is given the default cache mode: copy-back.

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Host Applications

This chapter contains release notes for host applications used with OS-9 v4.8.

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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.

- RSYS9261: When the stack trace window is updated, it can sometimes crash Hawk. A problem with with an internal exception handler was fixed so that Hawk no longer crashes when an invalid stack frame is returned from the target.
- RSYS10859: Hawk directory paths longer than 512 bytes are truncated. Hawk was changed to allow much longer Source and Object Code paths to be specified.
- RSYS21076: Dependencies are incorrectly generated with no warnings. The Hawk project manager (`hawkprj.dll`) was changed to display a warning dialog when the project's source files cannot be successfully pre-processed.
- RSYS37392: Hawk can crash during link phase in the project build process. Hawk was fixed to no longer crash during the link phase.
- RSYS37407: Attempting to launch the profiler from the Hawk IDE causes an error. The `Target --> Profiler` menu option was fixed to no longer generate an error when it is used.
- RSYS38560: `hawkdbg.dll` sometimes reports exceptions on startup or when starting to debug. The Hawk debugger shared library (`hawkdbg.dll`) was fixed to prevent various exceptions from happening during its initialization sequence.

OS-9 Configuration Wizard Notes

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

Resolved Problems

- **RSYS29932:** Wizard's Check button doesn't do anything when `Coreboot + Bootfile` image is too large
The Wizard was fixed to correctly provide size information when the Check button is used with an over-sized `Coreboot + Bootfile` image. Previously, no size information was provided.
- **RSYS38150:** The Configuration Wizard does not maintain the state of the last build correctly.
The Configuration Wizard (`os9p.exe`) was update to correctly maintain the state of the most recent build (`Coreboot`, `Bootfile`, or `Coreboot + Bootfile`). In addition, the Wizard was made more sensitive to changes in the Master Builder window so that it now more often saves the settings for the next restart.
- **RSYS38620:** The OS-9 Configuration Wizard no longer accepts previously accepted `.ini` files.
The OS-9 Configuration Wizard (`os9p.exe`) was fixed to allow whitespace (space and tab) around the equals sign (=) in `.ini` file name/value pairs. Wizards prior to version 4.5 of OS-9 accepted this syntax. Version from 4.8 any beyond will accept this syntax.
- **RSYS39412:** The "Save As" button doesn't save the correct file when ARM compressed boots are built.
Various ARM `.ini` and `make` files were fixed to specify the correct name for the high-level boot file.

HawkEye Notes

The following sections represent changes and updates to HawkEye since the last release.

Enhancements

- RSYS29966: HawkEye should have a way to use a custom timer, even if it has a built-in timer.

The HawkEye logging monitor (`s1m`) was modified to first check for the availability of a `hcsub` subroutine module before using its built-in assumptions about which timer/counter to use. In addition, a template version of an `hcsub` module was added to the product. This allows users to customize what HawkEye uses for a timer on any platform.

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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.

Enhancements

The following list describes general enhancements made to the Ultra C/C++ compiler for this release.

- RSYS10175: The OS-9 development tools need an e200 target processor. The Motorola e200 core processor target was added to all the relevant OS-9 development tools in the compiler, utilities, and IDE.
- RSYS11212: The penalty for running with `mt_csl` is too severe. The CSL strategy for Ultra C was changed in the following ways:
 - A new file `mt_csl_module` is included with the distribution. This file contains a module called `mt_csl`.
 - Threaded CSL-using applications now try to use a module called `mt_csl` before falling back to a module called `csl`.
 - Wizard `bootfile.m1` files were updated to include both the files `csl` and `mt_csl_module` in the bootfile if threaded support is requested. All bootfiles include the file `csl`.

Threaded CSL-using applications should be recompiled with the new libraries so the system can be reconfigured to use the dual-CSL configuration. Non-threaded, CSL-using applications need not be recompiled to take advantage of the improved performance.

Refer to *Using Ultra C/C++, Chapter 1* for more information.

- RSYS11495: The C heap functions should be faster and use less system memory. The C heap functions (`malloc()`, `calloc()`, `realloc()`, `free()`, `_mallocmin()`, `_freemin()`) were reimplemented using a segmented, tree-based allocator. This resulted in more frequent system memory frees and faster allocation and freeing.
- RSYS11495: The overhead of maintaining suspendability is too high considering most applications do not use the suspension API. Two new C library calls were added: `_pthread_getflags()` and `_pthread_setflags()`. These allow application-wide threading flags or thread-specific flags to be retrieved or set. With these calls you can now specifically enable the suspension API via `_PTF_SUSPEND` if your application uses it. The default for the suspension API is disabled since very few applications actually use the suspension API. Disabling the suspension API results in improved efficiency without code changes for those applications that do not use suspension.
- RSYS39003: Strings containing 8-bit character codes cause the `printf` family of functions to crash the application. The C libraries and CSL modules were updated to include a new locale called `ASCII8` that supports 8-bit ASCII values. The remainder of the locale matches the

default "C" locale. If an application is required to process strings containing 8-bit ASCII values via the standard C library functions, it must call `setlocale(LC_CTYPE, "ASCII8")` or set the `LC_CTYPE` environment variable to `ASCII8` and call `setlocale(LC_CTYPE, "")` before calling any standard C library functions requiring ASCII8 support.

- RSYS37560: Using the same ROF or I-code files for multiple C++ applications can lead to prelinker errors about duplicate template instantiations. The prelinker was enhanced to be able to remove instantiations from ROF or I-code files. The prelinker will leave an instantiation in the first file it appears in. It is removed from any subsequent files it appears in. This allows the same set of ROF or I-code files to be used to compile multiple applications.

Resolved Problems

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

- RSYS9178: Using the `get_sysglobs()` function in `p2lib.1` for MIPS processors leads to an unresolved reference to `SYSGLOBS_ADDR`. The `p2lib.1` library's `get_sysglobs()` function was fixed to not have an outstanding reference to the C pre-processor macro `SYSGLOBS_ADDR`. `get_sysglobs()` now correctly has no external references for MIPS.
- RSYS9472: `scanf()` does not work correctly when it encounters characters with ASCII codes greater than 127. The `scanf()` functions were fixed to use the character code as an unsigned value when indexing an internal array. This corrects their behavior for character codes greater than 127.
- RSYS10109: The `unix.1` function `dup2()` does not return errors correctly. `dup2()` was fixed to properly return -1 when the `_os_dup2()` system call fails. Previously, an uninitialized value was returned upon error.
- RSYS10153: `_offsetto()` and `_offsetafter()` should be added to `stddef.h`.
`_offsetto()` and `_offsetafter()` macros added to `stddef.h`.
`_offsetto()` is used to compute the offset of a possible non-constant index into an array within a structure. `_offsetafter()` computes the offset of the byte after a field within a structure. This is useful for OS-9 calls like `_os_gprdsc()` and `_os_gs_fd()`.
- RSYS10559: Some `_os` calls do not initialize the `cb.param_size` field of the parameter block. All system call bindings in `os_lib` have been fixed to correctly initialize the `cb.param_size` field. The system calls that were fixed were: `_os_abort()`, `_os_thexit()`, `_os_thfork()`, `_os_thread()`, `_os_siglnj()`, `_os_setcrc()`, and `_os_waitid()`.

- RSYS10606: Some 64-bit multiply operations are not performed correctly for the PowerPC processor.
The PowerPC back-end (`beppc.exe`) was updated to correct its behavior when a signed 64-bit value was multiplied by a converted, signed 32-bit value. Also, the 64-bit multiply of two converted 32-bit values was fixed to correctly maintain the signedness.
- RSYS10609: Source filenames starting with a digit and having more than 32 digits cause an error in Ultra C/C++.
The code generator (`beXXX.exe`) was fixed to add an underscore to the emitted psect name if a source filename begins with a digit. Although many numerical psect names will not generate an error, all psect names that begin with a digit are technically illegal.
- RSYS11651: `xcc` shouldn't I-code link with the C application root psect when standard I-code libs and a custom O-code psect is being used.
The Ultra C/C++ executive (`xcc.exe`) was changed to not include the C application root psect (`cstart`) when `-j` (standard I-code libraries) and a custom psect file (`-cs`) is specified. This will make it easier to create a non-application module when I-code linking with standard libraries.
- RSYS38323: The C++ prelinker will not operate correctly if an `xcc` command-line argument ends in backslash.
The Ultra C/C++ prelinker (`prelink.exe`) was fixed to correctly create the `xcc` command-line if arguments in the instantiation information (`.ii`) file had backslashes at the end of them. Previously, incorrect command-lines were built that would fail due to mis-configured arguments (missing target processor, no source file, etc.)
- RSYS38366: `creat()` for OS-9 for 68K does not correctly handle the case of an existing file.
The `creat() sys_clib.1` function was fixed to correctly attempt to open and truncate an existing file. Only the object-code library version of `creat()` was incorrect; the I-code version behaved correctly.
- RSYS38485: `ilink` can create illegal I-code file when used with threading and `quietlink` option
The I-code linker (`ilink.exe`) was fixed to generate valid I-code files when the `quietlink` option was used. Previously, the I-code file was invalid and not recognized by later phases of the compilation process.
- RSYS38509: The `compat` mode of Ultra C can allow illegal source code to be compiled.
The Ultra C compiler front-end (`cpfe.exe`) was modified to no longer allow arbitrary field names to be used on the right-hand-side of the dot (`.`) operator. This was behavior allowed by the PCC compiler, but not Microware's 3.2 compiler so it is now disallowed.

Networking Notes

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

Enhancements

The following list describes general enhancements made to the SoftStax and LAN Communications packages for this release:

- RSYS37865: `ping` should have an option to have it exit with an error if there's no answer from the host
 The ping utility was modified by adding an additional command-line option, `-e`, that can be specified to cause ping to exit with `EXIT_FAILURE` (1) if there is no answer from the specified host. The default exit status is still `EXIT_SUCCESS` (0).
- RSYS38590: `telnetd` should be more sensitive to the far side going down
 The telnet connection handler (`telnetd`) and the telnet daemon (`telnetd`) were enhanced to have a `-k` option that can be used to specify how often the connection should be validated. It also enables the `SO_KEEPALIVE` socket option so that TCP will shut down the connection when the far side stops responding.
- RSYS38914, RSYS39418: The throughput of FTP ASCII transfers in the IPv6 stack needs improvement
 The performance of ASCII transfers for FTP 'put' and 'get' for both the server and client was increased. The speed of an ASCII transfer is now much closer to the speed of a binary transfer.

Resolved Problems

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

- RSYS3846: An IP address is incorrectly swapped in PPP's `ipcp` module
 The `ipcp` module in the PPP stack was corrected to swap the IP address correctly.
- RSYS9559: The Ethernet buffer length in `spmv643x0` driver is incorrect.
 The `spmv643x0` (Marvell Discovery II) driver's Ethernet buffer was fixed to be properly padded.
- RSYS10114: FTP does not show time zone adjusted time.
 When FTPing into an OS-9 machine, the date code returned would always be system time and not local/adjusted time zone. The FTP connection handler (`ftpd`) was updated to allow the `TZ` time zone environment variable to be honored in its date display.
- RSYS10665: User-state debugging with the system-state debug stack does not work with the `3COM` driver (11e509)
 The `3COM` driver was fixed to correctly manage the buffer descriptor, making sure to mark it available only when it was ready for new receive data.

- RSYS10806: Old code recompiled with new networking libraries gets stack overflow or crashes
The name resolution library (`netdb_dns.1`) and trap handler (`netdb_dns`) were changed to use dynamic memory allocations rather than stack-based allocations while resolving hostnames. The stack usage was reduced by as much as 8K for particular functions.
- RSYS11106: `spip` is corrupting the system by sending a signal to an invalid process ID.
`spip`, when sending a wakeup signal in certain situations, was not checking to verify a process ID existed so the signal code was broadcast to many processes.
- RSYS9680: `ftpd` does not time out if connection is lost.
`ftpd` did not support "quote site idle xx" command so if a connection was lost or timed out, the `ftpd` process would remain. `ftpd` for the IPv4-only stack was modified to allow limited support of "quote site idle xx" to specify an idle timeout before it disconnects. In addition, an `FTPD_IDLE` environment variable can also be set to the number of seconds before timeout. The IPv4 version of `ftpd` already supported timeout (no environment variable needed) but it was using a Unix alarm value which did not abort blocking I/O on OS-9.
- RSYS37155: The Intel Pro 100 driver is missing some device IDs.
The Intel Pro 10/100 (`sppro100`) driver was enhanced to include three new device IDs:
 - 0x1039 - EtherExpress Pro/100
 - 0x2449 - Pro/100 V Network
 - 0x103A - Pro/100 82562ET
- RSYS37384: `sp860t` can sometimes have delayed packet ISRs.
The `sp860t` driver was modified to ensure that all arriving packets generate an IRQ. Previously, some were missed so the packet would not be processed until a subsequent IRQ.
- RSYS37961: The FTP server does not set group ID correctly
The FTP server (`ftpd`) now correctly sets the group ID.
- RSYS38152: Header files conflict between `SPF/BSD/SYS/types.h` and `sys/ctypes`
Type declarations in `SRC/DEFS/SPF/BSD/sys` header files now have the proper protection to avoid conflicts with `SRC/DEFS/sys/ctypes`.
- RSYS39184: The PPP stack can corrupt the system integrity and signals can cause the PPP daemon to malfunction
Updates were made to the PPP stack and utilities:
 1. `IPCP`, `HDLIC`, and `LCP` drivers were updated to correctly set static storage before using global variables.

2. Signal handling was improved in the `pppd` utility.

- RSYS8920: The PPP stack in the IPv6/IPv4 networking package cannot successfully disconnect and reconnect
The `ipcp` module was fixed to ignore an `EXIST` error when configuring the IP address. This error is returned when reconnecting a previously connected link.
- RSYS8920: Terminating FTP transfers with `^C/^E` can cause the TCP layer to call `RomBug`
The IPv6/IPv4 version of the TCP layer (`sptcp`) was fixed to return an error rather than calling `RomBug` when output errors occur.
- RSYS8920: The gigabit Ethernet interface on the MVME3100 can overload the system with packets.
The gigabit Ethernet driver (`sptsec`) for the MVME3100 was enhanced to include configuration parameters to prevent it from overloading the system when a large amount of network traffic arrives.
- RSYS8920: The MPC5xxx fast ethernet controller driver does not receive all multicast packets correctly
The MPC5xxx fast ethernet controller driver (`spxec`) was updated to correctly configure the `dmi_addr` register so that all multicast packets are correctly filtered.
- RSYS8920: The Intel Ethernet Pro 10/100 interface can overload the system with packets.
The Intel Ethernet Pro 10/100 driver (`sppro100`) was enhanced to include configuration parameters to prevent it from overloading the system when a large amount of network traffic arrives.
- RSYS39406: SPF Ethernet drivers that use alarms can fail to function when they are being used with the IPv4-only IP stack.
The SPF receive thread (`spx_rx`) was fixed to no longer delete all alarms owned by the system process if an SPF timer is started and then stopped after it had already expired, but before the receive thread could execute to deliver the time-out call.

MAUI Notes

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

Enhancements

- RSYS30296: `maui_win` can only handle graphics device at index #1.
The MAUI windowing process (`maui_win`) was changed to support the graphics device being at any index in the CDB module. It searches for the correct device name and uses that index to determine the correct shade to create.