



# **Microware OS-9<sup>®</sup> Release Notes**

## **Version 4.3**

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March 2004  
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# Contents

## Chapter 1: Introduction

## Chapter 2: Operating System

Enhancements.....	8
Resolved Problems.....	8

## Chapter 3: Host Applications

Configuration Wizard Notes.....	12
Resolved Problems .....	12
Hawk Notes .....	12
Enhancements .....	12
Resolved Problems .....	12

## Chapter 4: Components

OS-9 Compiler Notes .....	16
Enhancements .....	16
Resolved Problems .....	16
Networking Notes .....	17
Enhancements .....	17
Resolved Problems .....	18
Known Issues .....	19
OS-9 Utilities Notes .....	19
Enhancements .....	19
Resolved Problems .....	20
MAUI Notes .....	20
Resolved Problems .....	20
Add-Ons.....	21
Enhancements .....	21
Resolved Problems .....	21
Java Notes.....	21



# 1

## Introduction

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Microware OS-9 version 4.3 represents a maintenance and update release to incorporate all of the improvements that have been introduced into the component parts.



### **XScale Users:**

This is the first official release of OS-9 for XScale.



In addition, it is recommended that you read the release notes from your previous version of OS-9 in conjunction with the notes for the current release.

The following list describes the major enhancements that were made to OS-9 for this release:

- Updated Network Functionality
- Hawk and the Hawk Debugger



# 2

## Operating System

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This chapter provides an overview of the changes and improvements made to OS-9 since the last release.

<b>For information about...</b>	<b>Go to this page...</b>
<a href="#">Enhancements</a> .....	8
<a href="#">Resolved Problems</a> .....	8

## Enhancements

This section describes operating system enhancements made since the last release.

- CF16045: Modify `flashcache.c` for detection of a 8245.  
`\MWOS\SRC\ROM\FLSHCACH\flashcach.c` has been modified to detect and support the 8245.

## Resolved Problems

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

- CF14122: Ethernet boot finds modules from ROM/Boot image. Adding `nokrs` option to eb booter

Normally, the kernel will have access to all modules found by the low level memory scan in addition to modules found during the high level memory scan. The eb booter has been modified to support an argument, `nokrs`, to prevent the eb booter from passing the ROM module list to the kernel. `nokrs=0` is the default (report modules found to the kernel) and `nokrs=1` prevents the kernel from seeing any modules found by the ROM memory scan. This allows booting using only modules from the ethernet boot without seeing older modules being found first in the ROM. To use from the boot menu:

Select a boot method from the above menu: eb **nokrs=1**

- CF15080: The low-level PC Card booting software cannot handle PC Cards formatted with Windows XP.

When Windows XP formats Flash disk PC Cards it reserves 6 sectors instead of the normal 1. The low-level PC format disk handler (`pcman`) was assuming that PC cards always only had 1 reserved sector. This problem has been corrected.

- CF15480: `sc16550` doesn't allow arbitrary device driver global data.

The parameters to `_os_irq()` used by `sc16550` were only correct if the `drvstatic` variable was the first item in the static storage. This problem has been corrected by passing the correct value to `_os_irq()`. This is not a problem unless you modify the shipping sources for `sc16550`.

- CF15523: `rom_fprintf` doesn't always terminate number strings correctly.

On some platforms the `rom_fprintf` console service would print extra "garbage" characters after numbers. This problem has been corrected by always correctly NUL terminating the strings.

- CF15566: Problem changing the keyboard repeat rate because lack of ACK for some commands after they are sent.

Added ACK for `keyboard_write()` in `led_command()`, `setstat SS_SCAN_RATE`, and in `keybd_init()` (`init.c`). Also added error check in some `keyboard_write()` and `keyboard_ack()` calls.

- CF15593: lmm writing to address 0.  
The `_os_vmodul()` system call was writing to address 0. This has been fixed with edition 175 of the kernel.
- CF15676: Time zone problems.  
Corrected standard library TZ time zone conversion for CAT from GMT-60 to GMT+120. Also, the Ultra C Library Reference Manual and Using OS-9 Manual had several errors regarding the supported time zones. Corrected the time zone tables.
- CF15758: PCF may loop forever when trying to delete a file on a corrupt file system.  
PCF has been modified to detect this case and resolve the problem.
- CF15849: The RAMdisk driver source code is misleading in regards to static storage.  
The RAMdisk driver source code was fixed to keep all device driver global static storage in a single structure. This is important because RBF expects a structure of type `rbf_drvr_stat` to appear as the first item in the static storage. If everything is in a single structure and the first item of the structure is of type `rbf_drvr_stat`, then this requirement will be met.
- CF15854: Alias memory leak when the device does not exist.  
When trying to add an alias for an existing device, IOMAN would reserve memory to store the name of the device (or alias). If it ran into errors while trying to verify the device (could not attach, device is non-sharable, or could not allocate a path descriptor) IOMAN used to exit without freeing the memory it reserved for the device name. This has been resolved with IOMAN edition 39.
- CF16364: Threads can accumulate even though they try to terminate.  
An issues was corrected in `ioman` that now allows threads to completely terminate even if a path within the process is busy.
- CF16486: `_os_ev_wait` can not use negative numbers as a range.  
When blocked while waiting on an event, if one of the activation values was negative, the process would never resume. This was caused by the use of unsigned values rather than signed.



# 3

## Host Applications

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This chapter contains release notes for host applications used with OS-9 v4.3.

<b>For information about...</b>	<b>Go to this page...</b>
<a href="#">Configuration Wizard Notes</a> .....	12
<a href="#">Hawk Notes</a> .....	12

## Configuration Wizard Notes

The following sections represent changes and updates for the Configuration Wizard.

### Resolved Problems

This section provides a list of CustomerFirst incidents related to the Configuration Wizard and how they were resolved for the current release.

- CF15453: Wizard dialog update problems.  
The **Interface Configuration Tab** in the **Network Configuration** dialog would incorrectly enable the IPv6 address boxes when IPv6 auto configuration was selected if you exited the dialog and returned. This was corrected in edition #155.
- CF15475: Cancel button does not work in **Select System Type** dialog.  
The dialog was failing to return to the initial state after Cancel was used to dismiss the dialog. The dialog handler was fixed to remember the initial state and restore it if Cancel was used.
- CF16492: Telnet and FTP to local hostname does not work when using IPv4/IPv6 networking stack.  
The Configuration Wizard was building an incorrect hosts entry when the hostname was to be resolved to an IPv4 address. The Configuration Wizard now creates a correct hosts entry.

## Hawk Notes

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

### Enhancements

The following list describes the general enhancements made to Hawk for the current release. Where applicable, CustomerFirst incidents are included.

- CF15872: Fix VT100 emulation for Process I/O window.  
The Process I/O window didn't handle arrow key sequences properly for VT100 emulation. Now, there is a `hawkterm.txt` file that determines the keymapping of the non-ASCII keys - such as keypad, arrow, delete, etc. The user can edit this file to achieve the desired key sequences.

### Resolved Problems

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

- CF15251: Hawk fails to execute some programs.

Hawk was failing to set up a forked process standard input correctly. Thus, any program that performed any operations with standard input would fail. This problem was more frequently seen when older MS-DOS based programs were forked from a MS-DOS batch file.

- CF15616, CF15682, CF15704: `_MicrowareErrorInfo` error parser missing. Unable to click on compile error and have source automatically opened.

The UltraC error parser function, `_MicrowareErrorInfo` was missing. It has been added to `hawkprj.dll` version 2.3.4.3. Now, clicking on a compile error line in the output window will open the appropriate source and place you on the offending line of code.

- CF15638: Hawk/Hawk Debugger Process IO Window carriage return and backspace problems.

Corrected problems in the Hawk and Hawk Debugger Process IO window that would eat or double backspace and carriage returns. This was due to a third party vt100 emulation package used by the Process IO window. Reverted to a simple TTY package to correct the problem.

- CF15673: Hawk does not terminate `spfndpdc` on target after a module load.

After a Hawk module load, the `spfndpdc` process on the target would not terminate. This has been corrected.

- CF15972: Several messages are coming up when debugging threads.

When debugging threads, debug message boxes were displayed on the screen. These messages have been removed.

- CF16047: System state debugging through a gateway does not work.

The `llarp` library improperly implemented hooks for gateway/route support for low level drivers to use. The code has been modified to resolve the problem.

- CF16484: The Profiler can not show symbol information for ARMv4 big endian, XScale, nor SH-5m.

These newer module header sync codes have been added to the profiler's `.stb` file parser so that the symbols will now be displayed correctly.



# 4

## Components

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

<b>For information about...</b>	<b>Go to this page...</b>
<a href="#">OS-9 Compiler Notes</a> .....	16
<a href="#">Networking Notes</a> .....	17
<a href="#">OS-9 Utilities Notes</a> .....	19
<a href="#">MAUI Notes</a> .....	20
<a href="#">Add-Ons</a> .....	21

## OS-9 Compiler Notes

The following sections contain release notes for the OS-9 Compiler.

### Enhancements

The following list describes general enhancements made to the Ultra C/C++ compiler for this release. Where applicable, CustomerFirst incidents are included.

- CF15546: Ultra C should support `pthread_mutexattr_getkind_np` and `pthread_mutexattr_setkind_np`.

The Ultra C threading libraries were modified to include support for these two functions. Ultra C now supports three different kinds of mutexes:

1. POSIX standard, non-recursive
2. POSIX super-set, recursive
3. high-speed, non-recursive

Refer to the Ultra C Library Reference and Using OS-9 Threads manuals for more information.

### Resolved Problems

This section describes Customer First incidents related to the Compiler and how they were resolved for the current release.

- CF15541: `editmod` fails to ignore illegal `#` directives in unincluded text.

`editmod` has been corrected to properly ignore any illegal `#` directives within text that is not included. For example, this sequence will no longer result in an illegal directive error:

```
#if 0
#unknown_directive
#endif
```

- CF15576: `optmips` can incorrectly common tail merge code.

The MIPS assembly language optimizer was fixed to compare all arguments to branch instructions, rather than just the destination label, when considering equality. This prevents creating branches to code that has different semantics than the prior code.

- CF15732: Complex expressions containing many comma operators can lose expressions.

The C/C++ front-end has been fixed to properly handle expressions containing many comma operators. Previously, depending on the configuration of the expression tree, parts of an expression could be lost in the translation from C/C++ source code to I-code.

- CF15885: The `functional` C++ header file doesn't compile correctly.  
The `functional` C++ header file was fixed to be syntactically correct. Previously, the `mem_fun1_t` and `mem_fun1_ref_t` template types would instantiate with type errors.
- CF15935: `iopt` needs to better optimize calls to functions returning struct.  
`iopt` was fixed to eliminate useless structure assignments that happen on the right-hand-side of other assignment statement. For example, for automatic structure variables `a` and `b` and function returning structure `c()`:  

```
a = b = c();
```

  
If `b` was not used after this assignment, `iopt` failed to remove the assignment. `iopt` now correctly turns this expression into:  

```
a = c();
```

  
and deletes the variable `b`.
- CF15955: String objects don't follow stream width, justification, or fill values for the stream.  
The "put to" (`<<`) operator on string class objects was fixed to properly respect the justification, width, and fill values for the output stream. Previously, the string data was written without any of these settings.
- CF16035: `mem_fun_ref_t` templates don't compile when non-pointer types are used.  
The `functional` header file was modified to allow such template instantiations to compile and work correctly.
- CF16113: ARM big-endian code generation is wrong for some narrowing in-memory conversions.  
The ARM big-endian back-ends have been fixed to correctly handle memory references resulting from narrowing conversions of objects.

## 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 SoftStax and Lan Communications for this release. Where applicable, CustomerFirst incidents are included.

- CF15252: Apply better security against ISN attacks.  
NetBSD1.5.1-based TCP does not have strong security against Initial Sequence Number attacks. Enhanced SoftStax TCP to be NetBSD1.6-based since it uses MD5 and SHA1 (Secure Hash Algorithm 1).

- CF16072: PKMAN update with `getstat` call for Write Ready.  
PKMAN has been enhanced with an additional `getstat` call for Write Ready (SS\_WRDY (0x99) & SS\_WREADY (0x201)). This call is very important for the MGR Graphical User Interface.

## Resolved Problems

This section discusses problems that were resolved for SoftStax and LAN Communications. Where applicable, Customer First incidents are included:

- CF15467: `rpclib` expected `select()` to return `EINTR`.  
OS-9 `select()` returns (via `errno`) `EOS_SIGNAL` if a signal interrupts the call. The UNIX version of `select()` returns `EINTR`. It was determined that we could not break compatibly with existing OS-9 applications and change the behavior of `select()`. Instead, `rpclib` was enhanced to test for both `EOS_SIGNAL` and `EINTR`.
- CF15611: Tx/Rx enable bit in 8260 FCC driver.  
The values for the `GFMR_ENT` and `GFMR_ENR` macros for the PowerQUICC II Ethernet driver were transposed in `misc.h`. They have been swapped to their correct values.
- CF16149: Multiple `sptcp4` updates.  
Corrected problems with memory corruption in `TF_NODELAY` cases. Also resolved problem referencing a NULL pointer.
- CF16257: Frequent outgoing connection via TCP/IP is crashing the system.  
Changed `in.h` to move the ephemeral port range from 1024-5000, to 49152-65535. Also changed the loop in `in_pcb.c` to only loop through the port range once and then exit with an `EADDRNOTAVAIL` error if no free port is found.
- CF16393: Networking stack can incorrectly respond to UDP broadcast packets.  
`spenet` edition #62 or better has been corrected to maintain the broadcast/multicast status of a packet as it flows up the stack.
- CF16408: Socket reads can prematurely return "connection reset by peer" errors.  
The combined IPv4/IPv6 networking stack was fixed so that socket reads return "connection reset by peer" only after the pending, readable data is exhausted. Previously, it was possible to get a positive number back from `_os_gs_ready()`, but not be able to read those bytes due to the error.
- CF16444: `select()` now returns `EOS_SIGNAL` when an unexpected signal arrives and no timeout was specified.  
Previously, no error was returned when an unexpected signal arrived during a blocking `select()` call. Now, -1 is returned and `errno` is set to `EOS_SIGNAL`. Third-party source applications may be expecting `errno` to be `EINTR` in this case.

## Known Issues

- Networking interfaces using the spethix (EXS-6424 and IXDP425) device driver should not be stopped. The third-party source code used in this driver is not capable of "stopping" without leaking significant resources. Further, any attempt to restart the interface will fail. The workaround for this problem is simply to never stop an interface that is using the spethix driver.
- The EXS-6424 board port lacks low-level Ethernet support. The third-party source code used to drive the NPE Ethernet interfaces is not suitable for use within OS-9 low-level system. Thus, the EXS-6424 cannot boot from Ethernet nor can Ethernet low-level system-state debugging be used. There is no workaround for this issue.

## OS-9 Utilities Notes

The following section represents changes and updates to OS-9 utilities for this release.

## Enhancements

The following list describes general enhancements made to the OS-9 Utilities for this release. Where applicable, Customer First incidents are included.

- CF15240: `fdisk` can't be run from a batch file.  
The `fdisk` utility previously required the user to press 'ESC' to move between screens and exit. This did not work well if `fdisk` was run from a batch file. The `fdisk` utility now allows the user to select either 'ESC' or 'Q'. In addition, the user no longer has to press ENTER after making menu choices.
- CF15560: Enhancement request for a utility to print the current boot file.  
Enhanced `bootgen #29` for OS-9 and `os9gen #33` for OS-9 for 68K. Added `-v` to print current boot file information and `-vv` to print identification sector information.
- CF15820: `mshell` suspends background output after first input character at a prompt  
`mshell` was enhanced to allow background process output regardless of how many characters had been entered at the prompt. `mshell` now uses a non-blocking read for all characters read from the console (if `-nf` is in effect, all output is blocked).
- CF16319: Enhance the `paths` utility to show more than the first 32 paths.  
If a process had an extended path table, the `paths` utility would not print out any elements from the extended table. The `paths` utility now shows all open paths for a process.

## Resolved Problems

This section describes Customer First incidents related to the OS-9 utilities and how they were resolved for the current release.

- **CF15608:** Problems using `fdisk` on large drives.  
`fdisk` did not support LBA mode for large IDE drives such as 20 GB, 40 GB, or 60GB. `fdisk` edition 28 now properly reads the correct size of a hard disk greater than 8 GB and properly converts to CHS (cylinders, heads, sectors).
- **CF16080:** `frestore` can not restore files saved by `fsave` edition 34.  
 When trying to do a `frestore` of files saved with `fsave` edition 34, an error "frestore: can't identify volume, ident block is corrupt." would be returned. This was due to differences in the identification block structure made by `fsave` edition 34. `frestore` has been updated to restore either style of archive.
- **CF16081:** `bootgen` is exiting if no original file exists and no `-n` specified.  
 When using the `bootgen` utility to create a boot image on a disk, if the `sysboot` file did not exist and `-n` was not specified, the program would exit with an error saying it would not rename the `sysboot` file. This issue has been resolved.
- **CF16116:** Updated `-x` option for `procs`.  
 Updated `-x` so it can show event ID for system state processes; also enhanced to show event name that is being waited on.
- **CF16230:** `mv` command did not handle moving busy files gracefully.  
 When `mv` tries to move a file, it creates the destination link then tries to delete the source link. If the source file was busy (in use), the delete would fail, leaving both the source and destination link. This fix sets `FAM_NONSHARE` when opening the source entry. This will cause the open to fail if the file is in use/busy/nonshareable. That way, if you try to `mv` a busy file, it will fail immediately rather than copying/linking the file, then failing, leaving you with both the source and destination files.

## MAUI Notes

The following sections contain release notes for MAUI.

### Resolved Problems

This section gives a description of CustomerFirstCustomerFirst (CF) incidents related to MAUI and how they were resolved for the current release.

- **CF16357:** JAVA SWING text displayed with a white background with an MAUI IOBLT driver.  
 JAVA composes its display off screen and then copies it on screen. There was a bug in `$MWOS/SRC/DPIO/MFM/DRVR/GX_COMM/gdv_blt.c` (MAUI graphics driver IOBLT common code) that caused the MAUI high level BLT code's mixing mode to change from `BLT_MIX_RWT` or `BLT_MIX_RWM` to `BLT_MIX_REPLACE`, even if no graphics RAM was involved in the operation. This fix only applies to graphics

drivers that define `GDV_INCLUDE_IOBLT` and BLTs from non-graphics memory to non-graphics memory.

## Add-Ons

This section describes the enhancements, resolved problems, and known issues for the add-on products in this release. CustomerFirst incidents and workarounds are provided, where applicable.

### Enhancements

- CF16238: Remove 16 MB barrier in `RBFTL`.  
`RBFTL` was updated to be able to access drives larger than 16 MB. This enhancement will break backwards compatibility. `RBFTL` has also been modified to store files in their native Endianness.

### Resolved Problems

- CF15501: `SNMPLite common-v1c.tpl` missing `DEBUG= -DSR_DEBUG`.  
`SR_DEBUG` was not defined in `common-v1c.tpl`. This caused linker errors when compiling the v2 `snmpd_log` example MIB. By defining `SR_DEBUG` and rebuilding the SNMP libraries, this problem has been resolved.

### Java Notes

- CF4910: `eraser2` and `hanoi` applets don't draw images correctly  
These two applets were drawing scaled images with clipping rectangles. This scenario was causing the VM to ignore the clipping completely. This problem has been corrected in `libmawt`.
- CF9355: `PersonalJava` can crash if it's started with too few colors available  
On a 256 color or less system, the JVM could crash if it was started with too few colors available. This stemmed from the fact that it assumed that a certain number of colors would be available so it didn't expect to use a particular data structure early in the color allocation process. This has been fixed.
- CF15465: The `MWOS/SRC/PJAVA/LIB` directory should be lowercase (`lib`)  
The `LIB` directory was renamed to `lib`. This allows the directory structure created from extracting `pjava.mat` to be hosted on a case-sensitive file system and NFS mounted from OS-9.
- CF15782: Problems viewing gray scale images using `PJava`.  
The gray colors in `winmgr.txt` have been modified to their previous pre-NTSC conversion values. It was determined that the older color values rendered better gray colors.

- CF15905: Certain image draw operations can result in NullPointerException. PJava has been fixed so that an image draw that would result in an actual draw width or height of 0 no longer throws a NullPointerException, it just does not draw anything.
- CF16204: PJava can not handle applet parameters with capital letters. getParameter() calls in PJava applets were unable to retrieve values of parameters that contained capital letters. When looking for parameters, they are first converted to lower case. PJava now stores the parameters in lower case so they can be found properly.