
MPC8306/9 Release 2 for Freescale MQX™ RTOS 3.7.0

Release Notes

PRODUCT:	MPC8306/9 Early Access Release 2 for Freescale MQX™ RTOS 3.7.0
PRODUCT VERSION:	1.1
DESCRIPTION:	Adding support for MPC8306 KIT, MPC8309 KIT and TWR-MPC8309 to Freescale MQX™ RTOS 3.7.0
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1 Read Me First

This release note documents the MPC8306/9 Early Access Release 2 for Freescale MQX™ RTOS version 3.7.0 released for the Freescale MPC8306 and MPC8309 members of the Power Architecture processor family.

For more detailed information about MQX please see Freescale MQX™ 3.7.0 Release notes and Getting started documents.

NOTE

This is an Early Access Release. As such, the contents have not undergone the same level of testing as the final release. Some features, specifically device drivers, are missing from this release. If you experience problems, contact Embedded Access at support@embedded-access.com for updates.

1.1 Requirements

1.1.1 Development Tools

This Freescale MQX™ RTOS Release was compiled and tested with the following development tools:

- CodeWarrior Development Studio for Power Architecture Version 8.8.4 with Service Pack 1 and 2 for 8306 SOM and 8309 SOM installed.
 - o Install the service packs using the CodeWarrior Updater.
 - o See MQX build projects suitable for CodeWarrior environment in `cwmpc88` subdirectories

1.1.2 System Requirements

The system requirements are defined by the development tool requirements. There are no special host system requirements for hosting the Freescale MQX™ RTOS distribution itself.

1.1.3 Target Requirements

The MPC8306/9 Early Access Release was tested with the following hardware configuration:

- o MPC830x Carrier Card Rev. C
- o MPC8306SOM Rev C
- o MPC8309SOM Rev A, Rev C
- o TWR-MPC8309 Tower Card

1.2 Special instructions

1.2.1 Setup Installation instructions

Run the self-extracting MPC830x Early Access Release installer and proceed according to instructions. The files are installed into the Freescale MQX 3.7 MPC830x folder. Current MQX 3.7.0 installation will **not** be overwritten by this release.

2 What's new

Version 3.7.0, EAR 2

This section describes the major changes and new features implemented in this release.

New MPC8306 and MPC8309 support files

- BSP for TWR-MPC8309 Tower Card
- BSP for MPC8306 KIT (SOM) and MPC8309 KIT (SOM) evaluation kit
- Standard set of I/O drivers supporting the MPC8306/MPC8309 peripherals including:
 - o Serial interrupt and polled driver
 - o Ethernet Driver, supports UCC1, UCC2 and UCC3
 - o Support for L2 Switch
 - o Support for I2C
 - o SDHC and SD card driver
 - o GPIO
 - o SPI
 - o RTC
 - o Flash
 - o PCI Driver
 - o DMA Driver
- USB Host drivers and stacks
- RTCS TCP/IP stack, all Ethernet interfaces are enabled
- CodeWarrior 8.8.4 support with External DDR RAM and uBoot CodeWarrior targets
- Example applications demonstrating MQX, RTCS, USB and MFS usage

3 Release Overview

This MQX Release brings initial support of MPC8306 and MPC8309 platform. Standard set of features and example application is provided.

3.1 Supported Features

- RTCS TCP/IP stack
- USB Host stack
- USB Device stack
- MFS File System Libraries (FAT12, FAT16, FAT32)
- Standard I/O drivers including: SD-Card, Serial, Timer.

3.2 Example Applications

MQX 3.7.0 MPC8306/9 Release contains applications demonstrating kernel, peripheral, USB and TCP/IP functionality on MPC8306/9 KIT. The applications can be found on following location:

- <install_dir>/mqx/examples - standard set of examples for kernel features and basic peripheral drivers
- <install_dir>/rtcs/examples - example applications demonstrating the RTCS (TCP/IP stack) features
- <install_dir>/usb/host/examples - examples demonstrating USB Host stack features and class drivers

4 Release Content

This section gives an overview of the release content.

Deliverable	Location
Pre-compiled MQX Libraries	<install_dir>/lib/...
MQX PSP	.../lib/bspname.cwmpc88/psp
MQX BSP	.../lib/bspname.cwmpc88/bsp
MQX MFS (File System)	.../lib/bspname.cwmpc88/mfs
MQX USB Libraries	.../lib/bspname.cwmpc88/usb
MQX RTCS TCP/IP stack libraries	.../lib/bspname.cwmpc88/rtns
MQX Shell Library	.../lib/bspname.cwmpc88/shell
MQX PSP Source Code and Examples	<install_dir>/mqx/...
MQX PSP source code for ColdFire	.../mqx/source/psp/coldfire
MQX PSP build projects	.../mqx/build/cwmpc88/psp_*/...
MQX example applications	.../mqx/examples/...
MQX BSP Source Code	<install_dir>/mqx/...
MQX BSP source code for MPC8306 SOM board	.../mqx/source/bsp/mpc8306kit
MQX BSP source code for MPC8309 SOM board	.../mqx/source/bsp/mpc8309kit
MQX BSP source code for MPC8309 Tower board	.../mqx/source/bsp/twrmpc8309
MQX BSP build projects	.../mqx/build/cwmpc88/bsp_*/...
RTCS Source Code and Examples	<install_dir>/rtcs/...
RTCS source code	.../rtcs/source
RTCS build projects	.../rtcs/build/<compiler>/rtcs_*
RTCS example applications	.../rtcs/examples
MFS Source Code and Examples	<install_dir>/mfs/...
MFS source code	.../mfs/source
MFS build projects	.../mfs/build/cwmpc88/mfs_*
MFS example applications	.../mfs/examples
USB Host Drivers Source Code and Examples	<install_dir>/usb/host/...
USB Host source code and class drivers	.../usb/host/source
HUB Class Driver	.../usb/host/source/classes/hub
Human Interface Device (HID) Class Driver	.../usb/host/source/classes/hid
Mass Storage (MSD) Class Driver	.../usb/host/source/classes/msd
Printer Class Driver	.../usb/host/source/classes/printer
CDC Class Driver	.../usb/host/source/classes/cdc
USB Host build projects	.../usb/host/build/cwmpc88/usb_hdk_*
USB Host example applications	.../usb/host/examples
Shell Library Source Code	<install_dir>/shell/...
Shell source code	.../shell/source
Shell build projects	.../shell/build/cwmpc88/shell_*
CodeWarrior Support	<CodeWarrior_dir>/...
MQX Task-aware Debugger plug-in for CWMPC88	.../tools/tad_cwmpc/EPPCrtos_MQX.dll
PC Host Tools	<install_dir>/tools
TFS Make Utility	.../tools/mktfs.exe
Check for Latest Version tool	.../tools/webchk.exe
Documentation	<install_dir>/doc
User Guides and Reference Manuals for MQX RTOS, RTCS, MFS, IO Drivers, USB etc.	.../doc

5 Known issues

5.1 Unfinished Drivers

The following drivers have either not yet been completed or fully validated:

- FlexCAN
- PCI
- DMA
- 1588

The code for these drivers is included in the release; however they are not fully functional.

5.2 Code Size Benchmark

The code size benchmark does not properly parse CodeWarrior 8.8 map files, which results in a blank code size report. This issue is being worked on and will be resolved in a subsequent release.

5.3 USB Device

The USB device does not function correctly. At least three issues are present:

- USB Device does not operate with cache enabled
- USB HID device intermittently fails to respond.
- USB MSD device does not function.

It is not recommended to use the USB device software in this release.

5.4 NAND Flashing

NAND flashing is not supported in CodeWarrior 8.8. uBoot must be used to load an image in flash.

5.5 D-Cache support

USB Host does not operate with D-Cache enabled yet. UCC Driver has not been tested with D-Cache enabled yet.

6 Board-specific information related to MPC8306/9 Release

Ethernet Port Mapping

The MPC8306/9 contains three UEC modules.

On the SOM modules, UEC1 is configured as Ethernet device 0, and is connected to the single RJ-45 connector on the SOM card. UEC2 is configured as Ethernet device 1, and is connected via the 5-port switch to the quad RJ-45 connector on the carrier card. UEC3 is configured as Ethernet device 2, and is connected to the single RJ-45 connector on the carrier card (J9, not to be confused with J5).

Board-specific build targets:

uBoot (Debug and Release) - these targets build applications suitable for booting the system up from external NAND Flash memory via U-Boot.

Ext RAM (Debug and Release) - these targets build applications suitable for downloading directly to SDRAM from CodeWarrior.

See the MQX Getting Started document chapter 2.2 for more details about standard build targets.

6.1 Using U-Boot to load and execute in SDRAM

MQX binary images can be loaded into flash using U-Boot. This requires u-boot flashed to the onboard NAND Flash and a network connection between the board and the host computer.

The board comes pre-programmed from the factory with U-Boot. On power up, the processor boots from the NAND Flash and u-boot takes control. U-Boot initializes the board and enables SDRAM. For information on U-Boot see the board user's guide.

- Configure your CodeWarrior project to generate a binary image. Go to the target settings panel, click EPPC linker, and change the Binary File: drop down item to One.
- On the host computer, open a TFTP Server of your choice. If you do not have a TFTP Server, there are a number of free TFTP servers available for download from the internet.
- Set the TFTP directory to C:\tftp.
- Copy your application binary file to C:\tftp.
- Ensure switches are set correctly to allow for nand booting. See the board user's guide.
- Power up the board.
- At the U-Boot prompt type the following commands to set the network connection settings (change the IP address to appropriate values for your environment):

```
set ipaddr 192.168.1.9
set serverip 192.168.1.101
set gatewayip 192.168.1.1
set netmask 255.255.255.0
save
```

- Transfer the binary file to the on-board memory. At the U-Boot prompt, type:
tftp 10000 uboot_d.bin
- Follow the directions below which are applicable to your board type.

6.1.1 NAND Flash

Follow these steps for the MPC8309SOM and MPC8309SOM:

- Erase the NAND Flash:
`nand erase`
- Write from SDRAM to the NAND Flash:
`nand write 0x10000 0 0xf8000`
- Then make a command to boot MQX:
`set mqxboot "nand read 0x10000 0 0xf8000; go 0x10000"`
`save`
- To make the MQX application the auto-boot option:
`set bootcmd run mqxboot`
`save`

6.1.2 NOR Flash

Follow these steps for the TWR-MPC8309:

- Unprotect the flash
`protect off all`
- Erase the NOR Flash:
`erase 0xfe800000 0xfef00000`
- Write from SDRAM to the NOR Flash:
`cp.b 0x10000 0xfe800000 $filesize`
- Then make a command to boot MQX:
`set mqxboot "cp.b 0xfe800000 0x10000 $filesize; go 0x10000"`
`save`
- To make the MQX application the auto-boot option:
`set bootcmd run mqxboot`
`save`