

CodeWarrior for QorIQ LS Series, ARMv8 ISA v11.5.12

NXP Semiconductors

1. Revision History

The following modifications to this release note have been made relative to the note provided with the CodeWarrior for QorIQ LS-Series, ARMv8 ISA v11.5 installation:

Date	Description
Jun 30, 2020	V11.5.0
Jan 29, 2021	V11.5.2
Sept 30, 2021	V11.5.5
Oct, 2022	V11.5.11
Dec, 2022	V11.5.12

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2. About this release

2.1 Version information

This release note provides important information for users of CodeWarrior Development Studio for ARMv8 ISA. You are encouraged to read this document to become familiar with this release's supported targets, new features, errata with workarounds, and other useful information. The latest revision of this document is available in the Documentation tab of the [product support page](#).

The ARMv8 v11.5.x series designates the set of releases based on the 2019.12 eclipse.org release. The 11.5.0 release focuses on platform introduction and layout changes and delivers a small set of incremental improvements over 11.4.x series. Subsequent releases will resume the regular cadence of NPI/maintenance/new feature introductions.

New release of v11.5.12 provides support for Linux Factory LF5.15.52_2.1.0 and integrates GDB 11.1.

New in ARMv8 v11.5.12 (v2022.12)

- Product
 - support for Linux Factory - LF5.15.52_2.1.0
 - GDB 11.1

New in ARMv8 v11.5.11 (v2022.10)

- Product
 - Support for CWTap v2
- CodeWarrior Connection Server
 - CWTap firmware update for redesign parts
 - CodeWarrior Connection Server to work with redesign CWTap parts

New in ARMv8 v11.5.5 (v2021.09)

- Product
 - OS support: Update for Ubuntu 20.04.2 LTS, Ubuntu 18.04.5 LTS, CentOS/RedHat 8.4
- ARMv8 Debugger
 - Synchronize with LSDK 21.08

Important Notes:

- GDB 7.11 is currently not able to deal with some of the new ARM64 features. As a result, stack backtrace will be incomplete in some situations. To work around this limitation, some ARMv8.3 features (e.g. CONFIG_ARM64_PTR_AUTH) must be disabled via menuconfig.
- Please make sure to disable any watchdog timer during debug session when debugging U-Boot or Linux kernel, since watchdog is by default enabled. Please consult LSDK documentation.
- In order to debug a Linux kernel newer than 5.4.3, KASLR must be explicitly disabled by passing 'nokaslr' to the kernel at boot time via bootargs/othbootargs.

- Linux kernel awareness scripts handle SD/USB/SATA boot use case by default. To accommodate FlexSPI/QSPI/NOR boot, manual changes must be done in the scripts. In particular, open `<layout>/CW_ARMv8/ARMv8/gdb_extensions/kernel_awareness/kernel_data/ka_dd_d.py` and follow the instructions from the definition of Linux kernel 5.10. KASLR displacement must be chosen based on the actual use case.
- QorIQ Configuration and Validation Suite 4.24
 - DDR tool: LX2 SPD Mock DIMM generated for TFA
 - DDR tool: DIMM part number in generated file when read SPD
 - DDR tool: LX2162A specific support
 - SerDes tool: LX2162A specific support
 - SerDes tool: Bug fixes
 - PBL tool: LX2162A specific support

New in ARMv8 v11.5.2 (v2021.01)

- Product
 - Added support for LX2162
- ARMv8 Debugger
 - Synchronize with LSDK 20.12 and Yocto 3.1
- QorIQ Configuration and Validation Suite 4.23
 - SerDes tool: Support for LX216x
 - DDR tool: Memtester
 - DDR tool: Warm boot for memory tests
 - DDR tool: New algorithm for ATx delay for LX216x
 - DDR tool: Import DDRC and PHY TFA output for LX216x
 - DDR tool: Import/Export LX216xPHY parameters
 - DDR tool: LX216x maximal debug log for PHY messages

New in ARMv8 v11.5.0 (v2020.06)

- Product
 - Update on eclipse v2019.12 and CDT v9.10.
Important note. Starting with this eclipse version, it is mandatory to have 64bit host OS. 32bit OS version is no longer supported.
Important Note. Do not reuse a workspace created with an older CW version. Create a new workspace and import existing/older projects.
 - Update on gcc 9.2.
Important Note. Due to gcc update, the linker might generate the following error on older projects:

```
in function `__libc_fini_array':
  fini.c:(.text.__libc_fini_array+0x6c): undefined reference to `__fini'
  fini.c:(.text.__libc_fini_array+0x6c): relocation truncated to fit:
  R_AARCH64_CALL26 against undefined symbol `__fini'
collect2.exe: error: ld returned 1 exit status
```

 If you encounter this error, replace in start.S file:

```
FUNCTION (exit)
```

with
FUNCTION (_exit)

- ARMv8 Debugger
 - Synchronize with LSDK 20.04
- **Important note.** In order to debug Linux kernel 5.4.3, kASLR must be explicitly disabled by passing 'nokaslr' to the kernel at boot time via bootargs/othbootargs.
- QorIQ Configuration and Validation Suite 4.22
 - DDR tool: LX2 PHY errata
 - DDR tool: Add quick Rd2D
 - DDR tool: Add High-Effort WrDQ1D
 - DDR tool: Bug fixes
 - SerDes tool: Alpha support for LX2
- Host OS:
 - Update for Ubuntu 20.04 LTS, Fedora 31, Mint 19.3, CentOS/RedHat 7.8/8.2
 - Supported Win 7/10

2.2 Licensing

This release is distributed under an End-User License Agreement. The EULA is displayed during product installation; a copy is also located in the layout. Please read the contents of the document carefully before using this product.

When used for evaluation purposes CodeWarrior will generate a temporary license valid for 15 days from installation date. Please note that the generated license certificate is node-locked to the machine running the installer; evaluation on multiple machines requires separate installs.

Past expiry, external users can solicit an evaluation extension by opening a licensing SR – please see section 2.4. The license certificate (license.dat) needs to be placed in the CW4NET_<version>/Common/ folder.

2.3 Download information

CodeWarrior for Networked Applications v2020.06 can be downloaded from the Software & Licensing section of the NXP.com account. Product updates are delivered online and installed as follows:

- Help > Install New Software
- Choose “ARMv8 Eclipse Update Site”
- Select all components
- Proceed with the installation.

2.4 Getting Help

Product documentation is included with the layout, available for off-line from the Documentation folder in the link above, or from [NXP Infocenter](#).

If you have questions, issues, or want to provide feedback, please use the NXP online support web page. To use this page, follow these steps:

1. In a web browser, go to <https://www.nxp.com/support/support:SUPPORTHOME> .
NXP **Technical Support** web page appears.
2. For general purpose questions/support please follow the Technical Communities link. Note this is a public, moderated forum.
3. For specific questions please follow the Support Requests link and instructions listed in the Web wizard.

3. System Requirements

Operating System

Windows		
Host OS	Version/SP Level	64-bit
Windows 10	21H2	X
Windows 11	22H2	
Windows 7	SP1	X
Linux		
Host OS	Version	64-bit
Ubuntu	18.04.6, 20.04.2	X
Mint	19.3	X

- *Windows® OS*: Intel® Pentium® 4 processor, 2 GHz or faster, Intel® Xeon™, Intel® Core™, AMD Athlon™ 64, AMD Opteron™, or later
- *Linux® OS*: 3 GHz Intel® Pentium® class processor (or better). **64-bit host OS required.**
- At least 2 GB of RAM (minimum 5 GB / recommended 8 GB if using the Layerscape device simulator)
- At least 6 GB of free disk space.
- Internet connectivity for web downloads and update access.

NOTES CodeWarrior installation on 64-bit Linux hosts requires presence of dependent 32-bit libraries in the system. For supported distributions the installer detects missing dependencies and provides options to install them automatically.

For unsupported distributions please follow the instructions provided by the installer and/or installation README. Installation on non-LTS distributions (e.g. Ubuntu 13.x) is not recommended as the package repository changes URL once support for that particular version ends. Please consult the vendor web site for finding out the new repository location and proceed with manual installation of CW dependencies.

It is recommended (although not required) that all product maintenance operations be done with administrative privileges. When running the installer in GUI mode with admin privileges please use the graphical sudo command recommended by your Linux distribution (ie. gksu/gksudo).

CodeWarrior installer may update system drivers for probe connectivity. It is highly recommended that any CW NetApps versions or products should be closed before installing or updating an existing CW. Installation of QCVS component in particular requires any instances of CCS to be closed before attempting the install.

Microsoft Windows XP and Vista hosts are not supported.

4. Release Contents

4.1 Device Support Matrix

The following hardware devices and boards are supported by this release:

Device	Board	# GPP cores	# AIOP cores
LA1575 (rev. 1)	LA1575-RDB	4 (A53)	4
LS1012A (rev. 1)	LS1012A-RDB LS1012A-QDS LS1012A-FRDM	1 (A53)	-
LS1012A (rev. 2)	LS1012A-FRWY	1 (A53)	-
LS1023A (rev. 1, rev. 1.1)	LS1043A-RDB LS1043A-QDS	2 (A53)	-
LS1043A (rev. 1, rev. 1.1)	LS1043A-RDB LS1043A-QDS	4 (A53)	-
LS1026A (rev. 1)	LS1046A-RDB LS1046A-QDS	2 (A72)	-
LS1046A (rev. 1)	LS1046A-RDB LS1046A-QDS	4 (A72)	-
LS1044A (rev. 1, rev. 1.1)	LS1088A-RDB LS1088A-QDS	4 (A53)	-
LS1048A (rev. 1, rev. 1.1)	LS1088A-RDB LS1088A-QDS	4 (A53)	4
LS1084A (rev. 1, rev. 1.1)	LS1088A-RDB LS1088A-QDS	8 (A53)	-
LS1088A (rev. 1, rev. 1.1)	LS1088A-RDB LS1088A-QDS	8 (A53)	4
LS2044A (rev. 1, rev. 1.1, rev. 1.1.1)	LS2088A-RDB (rev. D, rev. F) LS2088A-QDS	4 (A72)	-
LS2048A (rev. 1, rev. 1.1, rev. 1.1.1)	LS2088A-RDB (rev. D, rev. F) LS2088A-QDS	4 (A72)	16
LS2084A (rev. 1, rev. 1.1, rev. 1.1.1)	LS2088A-RDB (rev. D, rev. F) LS2088A-QDS	8 (A72)	-
LS2088A (rev. 1, rev. 1.1, rev. 1.1.1)	LS2088A-RDB (rev. D, rev. F) LS2088A-QDS	8 (A72)	16
LX2160A (rev. 2)	LX2160A-RDB LX2160A-QDS	16(A72)	-

LX2080A (rev. 2)	LX2160A-RDB LX2160A-QDS	16(A72)	-
LX2120A (rev. 2)	LX2160A-RDB LX2160A-QDS	16(A72)	-
LS1028A, LS1027A (rev. 1)	LS1028A-RDB LS1028A-QDS	2 (A72)	-
LS1018A, LS1017A (rev. 1)	LS1028A-RDB LS1028A-QDS	1 (A72)	-
LX2162A	LX2162A-QDS	16(A72)	-
LX2122A	LX2162A-QDS	16(A72)	-
LX2082A	LX2162A-QDS	16(A72)	-

4.2 Flash Device Support Matrix

The following flash devices are supported by the 11.4.0 release. Please note that not all combinations between devices and flash models are supported out of the box.

Device	Company	Type
JWA57	Micron	eMMC
EMMC_MTFC16_LSCH2	Micron	eMMC
MMCP1xxx_LSCH2	-	eMMC
MMCP1xxx_LSCH3	-	eMMC
MMCP1xxx_LSCH3_v2	-	eMMC
MMCP1xxx_LSCH3_v3	-	eMMC
MT29F4G08ABBDA	Micron	NAND
MT29F4G08ABBEA	Micron	NAND
MT29F16G08ABABA	Micron	NAND
S29GL01GP	Spansion	NOR
S29GL01GS	Spansion	NOR
MT28EW01G	Micron	NOR
JS28F00AM29EWHA	Micron	NOR
S29GL01GN	Spansion	NOR
S29GL032P	Spansion	NOR
N25Q512A	GigaDevice	QSPI NAND
GD5F1GQ4	GigaDevice	QSPI NAND
GD5F2GQ4	GigaDevice	QSPI NAND
MT29F1G01ABBFDSF	Micron	QSPI NAND
MX25UM51245G	Macronix	QSPI NAND
W25N01GW	Winbond	QSPI NAND
N25Q128A	Micron	QSPI NOR
S25FL128S	Spansion	QSPI NOR
S25FS256S	Spansion	QSPI NOR
S25FS512S	Spansion	QSPI NOR
W25Q64F	Winbond	QSPI NOR
MT25QU128ABA	Micron	QSPI NOR
MT25QU512ABA	Micron	QSPI NOR
MT35XU512ABA	Micron	QSPI NOR
MX66U51235F	Macronix	QSPI NOR

W25Q16	Winbond	QSPI NOR
W25Q16DW	Winbond	QSPI NOR
W25Q16FW	Winbond	QSPI NOR
W25Q32	Winbond	QSPI NOR
W25Q80	Winbond	QSPI NOR
SP016GBSDHAU1V10	Silicon Power	SD
SDSP16GB_i.MX6	SanDisk	SD
SDSP16GB_LSCH2	SanDisk	SD
SDSP16GB_LSCH3	SanDisk	SD
SDSP16GB_LSCH3_v2	SanDisk	SD
SDSP16GB_LSCH3_v3	SanDisk	SD
SST25WF040B	Microchip	QSPI NOR
EN25S64	EON	QSPI NOR
MT25QU01GBBB	Micron	QSPI NOR

Getting Started Guides

Getting Started for CW ARMv8

The CodeWarrior for ARMv8 Getting Started guide explains how to install the CodeWarrior Development Studio for ARMv8 software. Additionally, it describes how to use the software to create, build, and debug a demonstration multi-core processor project.

Application Notes

AN5172: Trace Compass from CodeWarrior for ARMv8

This document describes how to use the Trace Compass from CodeWarrior for ARMv8. Trace Compass is an open source toolkit that integrates open source trace frameworks / toolkits. It is based on a couple of Eclipse plugins (views) and a lot of binaries, shared libraries.

AN4940: NADK Reflector Application Debug

This document explains how you can build a real hardware setup for running the reflector. It also explains how to import, download, run, and debug the reflector application from CW, and how you can attach to a running NADK reflector application and debug it using CW.

AN5129: Linux hardware trace for ARMv8 user space and kernel space applications.

This document describes the Linux probe-less trace component and presents multiple execution flows of it. The objective of this component is to encapsulate the trace configurator and probe into one small and cross-compiled component that will be uploaded on target machine. Its main use is to collect trace of a

program that crashes without known reasons. This feature will be delivered as an archive or part of the ARMv8 CodeWarrior.

AN5128: Linux Kernel & User Applications Debug Print Application Note

This document describes the Linux Debug Print tool and presents the execution flow. Its main objective is to provide a user friendly way of monitoring kernel and user space applications activities in a CodeWarrior console.

AN4950: Simultaneous Debug using CW for ARMv8/APP

This application note depicts the steps required to debug both the GPP and LDPAA cores simultaneously using CW for ARMv8 and CW for Advanced Packet Processing.

AN5028: Configuring and Decoding Trace without using CodeWarrior

Explains use of command-line trace configuration and decoder utilities.

AN5054: CodeWarrior and Simulator setup for multiple users

Explains product setup and configuration for a single installation shared by multiple users in parallel.

User Guides

CodeWarrior for ARMv8 Targeting Manual

This document is a comprehensive reference of all major CodeWarrior product features, including:

- Creating sample bare-metal/Linux projects through the New Project Wizard
- Build tool configuration panels
- Target connection using the CodeWarrior TAP and CMSIS-DAP debug probes
- CodeWarrior Debugger reference
- U-boot debugging flow
- Linux kernel and Linux module debugging flow
- Linux application debug
- UEFI debug
- OS Awareness configuration reference
- Flash programmer
- Troubleshooting

CodeWarrior for ARMv8 Tracing and Analysis User Guide

This document explains the purpose and use trace decoders and configurators. As of the v11.2 release additional details have been added around Analysis Results, Trace Commander, and Trace Viewer.

CodeWarrior TAP Users Guide

Explains how to set up the CodeWarrior TAP debug probe so it can communicate with the debugger and the target hardware.

Cheat Sheets

Use cheat sheets to complete moderate-to-complex tasks by following instructions that you execute real-time within the CodeWarrior IDE. Select **Help > Cheat Sheets > CodeWarrior for ARM V8 ISA** in CodeWarrior IDE to run a cheat sheet.

4.3 Product Documentation

Product documentation is available in several formats:

- Integrated with the help system
- In the product layout in PDF format (CW_ARMv8/ARMv8/Help/PDF/)
- CW4NET documentation page on nxp.com
- [NXP Infocenter](#)

4.4 Debugger/IDE

4.4.1 Board Support

This release includes board configuration and initialization files for:

- LA1575 device on the LA1575-RDB board
- LS1012A device on LS1012A-QDS, LS1012A-RDB and LS1012A-FRDM and LS1012A-FRWY boards
- LS1043A device on LS1043A-QDS, LS1043A-RDB, LS1043RDB-PD rev X4 and MPC-LS-VNP-RDB rev B boards
- LS1046A device on LS1046A-QDS, LS1046A-RDB, LS1046FRWY-PA boards
- LS1088A device on LS1088A-QDS and LS1088A-RDB boards
- LS2088A device on the LS2088A-QDS and LS2088A-RDB boards
- LX2160A rev 2 device on the LX2160A-QDS and LX2160A-RDB boards
- LS1028A device on the LS1028A-QDS and LS1028A-RDB boards
- LX2162A device on the LX2162A-QDS board

4.4.2 DAP Mode Required

Starting with the 11.1 release the tools assume the target board is configured for ARM debugger compliant mode, as opposed to Boundary Scan mode. Please refer to the board documentation and/or the README associated with the project stationery for the relevant switch configuration. Failure to configure the board properly results in inability to connect to the target.

The following switches need to be applied:

- LS1088A-QDS: SW5.8 set to ON (TBSCAN_EN_B=1)
- LS1088A-RDB: SW4.8 set to ON (TBSCAN_EN_B=1)

4.4.3 New Debugger Features

The following features have been introduced in the 11.5.0 release series:

- Based on CDT 9.10
- LSDK 21.08 compatibility
- Compatible with gcc 9.2
- Sync with Yocto 3.1
- LX2162 device support

The following features have been introduced in the 11.4.0 release series:

- Linux kernel version 4.14.140 updates/4.19.68/ LSDK 19.09 compatibility
- TFA-aware (only) Linux kernel debug
- LS1028A-RDB and LS1028A-QDS board support
- LS1043RDB-PD rev X4 and LS1046FRWY-PA board support
- MPC-LS-VNP-RDB rev B board support
- Sync with Yocto 3.0
- LX2 rev2 device support

The following features have been introduced in the 11.3.x release series:

- Based on CDT 9.3
- Linux kernel version 4.4/4.9 recognized / LSDK 18.03 compatibility
- PPA-aware Linux kernel debug
- GIC registers for LS1046A
- JTAG Connection Diagnostics from gdb command line

The following features have been introduced in the 11.2.x release series:

- Based on CDT 8.8.1
- Linux kernel version 4.1 recognized / QorIQ SDK 2.0 compatibility
- LA1575 and LA1575-RDB board support
- LS1012A-RDB, LS1012A-QDS and LS1012A-FRDM board support
- LS2088A-RDB and LS2088A-QDS board support
- LS1046A-RDB and LS1046A-QDS board support
- LS1088A-RDB and LS1088A-QDS board support
- CMSIS-DAP connectivity for LS1012A-RDB, LS1012A-FRDM and LS1046A-RDB
- NPW allows display between little/big type of projects only if a matching toolchain is installed
- User-added toolchain support
- Tooltips for Inspect/Connect buttons
- UART library updated to account for different clock divisors (SVR based)
- Launch time slightly improved / CCS kept resident across sessions

- Memory translations displayed properly for AArch64/BE
- Flash Programmer support for LS2088A NOR, NAND and QSPI
(All supported devices listed in ...*CW_ARMv8\Config\flash\flash_devices.html*)
- Flash Programmer automatically connects to the target if no session exists
- Erase option enabled for Flash Program actions
- Support for side-by-side flash devices
- Dedicated icon for in-progress flash programmer actions
- Flash Programmer command-line operations now respond to ^C
- Connection error messages include a link to connection diagnostics
- OS Resources now displays which modules have loaded symbolics

The following features have been introduced in the 11.2 release:

- Support for Flash Programmer GUI. It offers details of flash devices, validation, commands can be added in a flash sequence, execute/import/export flash sequences.
- Support for multicore debugging on aarch64 big endian targets.
- Provided UART and Syscall libraries for big endian bare-metal targets.
- Added support to create stationery projects targeting aarch64 big endian.
- Linux application support to debug executables and shared libraries compiled for aarch64 big endian mode.
- Linux KA support for Big Endian targets.
- Added support to perform debug on LS1012A Interposer board with LS1043 processor.
- Added support for I2C transactions from different devices.
- New "JTAG Connection Diagnostics" option visible from Target Connections view. It launches a series of connection tests and provides hints in case such a test fails.
- Added commands for callback registration for Linux/u-boot awareness events like u-boot relocation, Linux MMU initialization, Linux Kernel module init/removal.
- Support to inform user if a UEFI boot session is not in progress.
- [Linux] Wizard support to generate a kernel project matching the corresponding Linux SDK (the one configured via ADT).

- Debug support for LS2088A emulation target.

The following features have been introduced or refined in the 11.2 Beta 1 release:

- Flash Programmer support for LS1012 Emulator (Palladium) QSPI.
- Support for Flash Programmer protect operations.
- “CodeWarrior ELF Importer” has been renamed to “CodeWarrior Executables Importer”.
- Support for UEFI awareness in "CodeWarrior Executable Importer" wizard.
- Debug support for all the phases from an UEFI boot flow.
- UEFI Awareness support for LS2085A RDB.
- UEFI Awareness support for LS2080A RDB.
- Support for LS1047A Simulator (core registers currently supported).
- Support to automatically load symbols for firmware UEFI files.
- Support to view in the OS Resources view details about UEFI modules.
- Debug support for LS2088A emulation target.
- Export a target configuration now displays a file system browser instead of a workspace browser.
- Support for Save As operation in Target Connection editor.
- Re-designed Duplicate action in Target Connection view, now it just asks for the name of the new configuration.
- Transitioned to Eclipse Mars (4.5) and CDT 8.8: <https://wiki.eclipse.org/CDT/User/NewIn88>.
- ROM target skeleton has been created for C bare-metal stationery as a separate build configuration (ROM). Memory address parameters need to be updated manually for each specific SoC/board from the separate linker configuration file. For details please see the 'ROM target' section in the readme file, corresponding to each Target Connection Configuration (TCC).
- Support for Flash Programmer blank check operation.
- Supported flash models are documented in <layout>\CW_ARMv8\Config\flash\flash_devices.html.
- Support to annotate CCS log with register names.

The following features have been introduced or refined in the 11.2 Alpha 1 release:

- Linux support for LS1023 rev.1, QDS and RDB boards.
- Flash Programmer commands can now be invoked directly from the GDB console.
- The C/C++ Development Toolkit has been updated to version 8.7 and Eclipse 4.5. New and noteworthy in the community page:
<https://wiki.eclipse.org/CDT/User/NewIn87>
<https://www.eclipse.org/eclipse/news/4.5>
- Added support for selecting USB devices (cmsis-dap, cwtap/usb) based on serial number.
- Changed default cable type in the Predefined Target Connection Configurations, for hardware targets is USB TAP, for emulation targets is CodeWarrior TAP.
- Fixed typo in New Project Wizard, "Stationery" instead of "Stationary".
- Added debug support for LS1088A emulator (ZeBu) target.
- Added support to flash the NOR device for LS1088A emulator (ZeBu) target.
- Added debug support for LS2088A Emulation target.
- Added debug support for LS2088A Simulator target.
- The board readme file, included in the stationery project, is now accessible directly from the Predefined Target Connection Configuration as a separate tab.
- The Target Connection Configuration can now be opened as a multipage editor.
- Added support to edit board GDB initialization file in editor area and use all editor facilities for easier navigation.
- Two or more Target Connection Configurations can have the same name (each can be exported to any location within the workspace).
- Changed icon for "Reset Board" action in Eclipse toolbar.
- After viewing or changing a Target Connection Configuration it automatically becomes the active one.

- User defined Target Connection Configurations are now backward compatible between workspaces/products.
- Added UEFI command, uefi-show-images, to query the list of UEFI modules.
- Updated GDB version to 7.8.

The following features have been introduced or refined in the 11.1 release series:

- Eclipse 4.4.2 / CDT 8.6, and inclusion of the Mylyn framework.
- IDE support for license management (Help > Freescale Licenses)
- Eclipse support for OS Resources.
- ASM/C stationery projects updated to support both SMP/AMP applications. Use the dedicated switch in the start.S file.
- Cache is now enabled by default in stationery projects.
- New ELF importer wizard - CodeWarrior Debug Projects – assisting with generation of launch configurations suitable for bare-board, Linux application, kernel and u-boot scenarios. Relevant awareness settings (ie. Linux or u-boot) are automatically set.
- U-boot awareness for simulator/hardware targets. Similar to Linux Kernel awareness, the debugger is now able to detect changes in the MMU configuration done by u-boot and adjust symbolic display accordingly. The feature can be activated from the OS Awareness tab.
- Debugging a SMP session will target the secondary cores only after Linux kernel resumes them from hold-off.
- Interrupts are now inhibited during single-stepping operations.
- The GDB Hardware Launcher now displays an error if an old GDB version is detected. CodeWarrior requires gdb versions greater than 7.4.
- Default connection timeout reduced to 10 seconds in order to avoid apparent hangs with a slow/unresponsive target.
- Automatic choice of debugger server port if no user port selection exists.
- CodeWarrior will display a detailed warning dialog when "Verify memory after Download" fails. The warning dialog will list the elf section, the download address and verification status.

- Flash Programmer, enable unprotect command for all supported devices.
- Simple single-stage MMU configuration dump implemented as a GDB/Python extension. To use please type the following commands in the GDB console:

```
source -s mmu/scripts/mmu_init.py
mmu
```
- "Attach" action from Target Connections view was moved to the view's toolbar and renamed to "Inspect". Similarly, a new action was added for the connect flow which resets the target and runs the initialization file.
- "Use target init" option from Target Connection Configurator page was renamed as "Execute target initialization file" and moved in Debugger tab from launch configuration.
- Support for Linux kernel, module and application debug on the LS1043A-RDB board.
- Support for Linux kernel, module and application debug on the LS1043A-QDS board.
- Support for bare-metal debug for the LS1023A rev. 1 QDS and RDB.
- Support for debugging Linux application executables and shared libraries compiled for AArch32 mode.
- Added support for the case when the Linux kernel is compiled for AArch64 and user space runs in AArch32.
- Added new entry in ARMv8 New Project Wizard targeting AArch32 Linux application projects.
- Debugger support for LS2080/40A with LS2085A-RDB board.
- New Reset action was added in the Debug view. This option resets the board and, depending on the user choice, may run the target initialization file.
- Added support for CMSIS-DAP probe.
- Discontinued support for Windows XP and Windows Vista.
- Added new option in Launch Configuration, Debugger tab: "Synchronize with breakpoints set in GDB console". This option toggles synchronization of breakpoints set in GDB console with the CodeWarrior UI.
- Added a new Flash Programmer command, fl_info, to obtain info (in a human readable format) about a flash device.

- File "exceptions.c" was added in the New Project Wizard projects to incorporate exception handlers for C development purposes.
- Linux support for kernel version 4.0.
- Added new "UEFI" type in OS Awareness type with the option to use the CodeWarrior defined UEFI initialization script or to use a custom script. When the UEFI Awareness is enabled, the command uefi-add-symbols (used to add symbol files for all UEFI modules loaded in memory) is enabled.
- Target Connection view automatically makes the last edited board configuration the default.
- The details area in Target Connections view now shows the connection information of the selected configuration.

Notes:

- If the TCP connection between ARM1 (virtual NIC on the Linux Host PC) and eth0 (embedded Linux) is slow when the ping command is executed (e.g. the time is more than 200 ms) the user need to increase the timeout limit in GDB to wait for the remote target to respond. To do that, add the command 'set remotetimeout 10' in .gdbinit script to set the timeout limit at 10 seconds (the default value is 2 seconds).
- CodeWarrior will do source level debugging using symlink destination file path instead of original source path. For this, create a source path substitution gdb command to point to a non-existing path. Place gdb command in "Startup" sequence from "Debug Configurations". The command syntax is: set substitute-path <from> <to>. Alternatively, create a gdb init file located near the debugged file with '-gdb.gdb' extension, e.g. 'apploder.elf-gdb.gdb' with the gdb command substitution.
- In some cases user cannot download and debug the linux application project. This has been observed when connection between host PC and target board has very small delay, e.g. a cross-connect cable.

As a suggested workaround set the "ttywait" value to 1 in the Remote System properties, Connector Service page, "SSH Settings" group.

- The ARM core can enter in a non-recoverable state when a speculative access to an unmapped memory happens. Also this can happen for accesses to memory regions that are marked as valid in the MMU, but the underlying memory interface is either misconfigured or absent. For example, access to a memory range dedicated to PCIe without a proper initialization for the PCIe controller or access to memory holes as defined in the SoC memory map can cause core to enter in a non-recoverable state.

If the debugger detects a failed attempt to stop the core in such situation, it samples the value of the External PC Debug register (EDPCSR) in order to provide the program location where the program has hanged. An error message is displayed informing the user that the stop attempt has failed and listing the collected PC sample value.

Although the debug session is not reliable from this point onwards and must be terminated, the PC value allows the user to identify and fix the application problem that has caused the core to enter into the non-recoverable state. The user needs to make sure that the MMU is configured from the application in such a way that all valid translations point to the actual memory.

4.5 Software Analysis

The following features have been introduced or refined in the 11.2 release series:

- Linux kernel and application trace support - code coverage and profiling statistics generated based on hardware trace.
- Linux Debug Print functionality - provides a user-friendly way of monitoring kernel and user space applications activity in a CodeWarrior console.
- Overwrite mode support – continuous trace collection using wrap mode in a dedicated buffer, useful for crash analysis.
- Trace decoding and display for the following trace sources:
 - ETM
 - STM
 - PXDI
 - DDDI
 - NoC
- Linux and bare-metal Profiling views:
 - Timeline - shows the evolution of the execution in time.
 - Code coverage – presents code coverage data into two views; the top view displays the summary of the functions, and the bottom view displays the statistics for all the instructions executed in a particular function.
 - Performance displays the count and invocation information for each function that executes during the measurement, enabling you to compare the relative data for various portions of your target program.
 - Call tree - shows the biggest depth for stack utilization in Call Tree and the functions on this call path are displayed in green color.
- Known issues:
 - For LS1043A/23 only kernel trace collection is available due to some hardware limitations.

4.6 QorIQ Configuration and Validation Suite

The CW4NET installer provides the option to integrate the QorIQ Configuration and Validation Suite with LA1575, LS1012A, LS1043A, LS1046A, LS1088A, LS2088A, LX2160A support with the base CodeWarrior for ARMv8 layout. QCVS is a collection of graphical tools assisting with configuration of various software or hardware modules, generation and validation of configuration data provided in a variety of formats.

QCVS 4.24 release highlights:

- DDR tool: LX2 SPD Mock DIMM generated for TFA
- DDR tool: DIMM part number in generated file when read SPD
- DDR tool: LX2162A specific support
- SerDes tool: LX2162A specific support
- SerDes tool: Bug fixes
- PBL tool: LX2162A specific support

QCVS 4.23 release highlights:

- SerDes tool: Support for LX216x
- DDR tool: Memtester
- DDR tool: Warm boot for memory tests
- DDR tool: New algorithm for ATx delay for LX216x
- DDR tool: Import DDRC and PHY TFA output for LX216x
- DDR tool: Import/Export LX216xPHY parameters
- DDR tool: LX216x maximal debug log for PHY messages

QCVS 4.22 release highlights:

- DDR tool: LX2 PHY errata
- DDR tool: Add quick Rd2D
- DDR tool: Add High-Effort WrDQ1D
- DDR tool: Bug fixes
- SerDes tool: Alpha support for LX2

QCVS 4.21 release highlights:

- DDR tool: LX2 phy driver updated to version 2019.04
- DDR tool: Support for LX2 rev 2
- DDR tool: DDR data rate should be included in exported file

QCVS 4.20 release highlights:

- Add stress tests scenarios
- LX2 Configure Auto config for 16GB DIMMs
- LX2 Mocked SPD for discrete DDR4 with TFA

QCVS 4.19 release highlights:

- PBL tool: Bug fixes
- DDR tool: Bug fixes

QCVS 4.18 release highlights:

- PBL tool: Bug fixes
- DDR tool: LX2 Diagnostic data Eye
- DDR tool: Export validation results as JPG
- DDR tool: Bug fixes

QCVS 4.17 release highlights:

- PBL tool: Bug fixes
- DDR tool: Compatibility with A-TF
- DDR tool: Bug fixes
- PinMux: Support for LS1028A

QCVS 4.16 release highlights:

- LS1028A support in PBL and DDR Configuration + Validation
- DDR tool: [LS1028A] Add DD3L support

QCVS 4.15 release highlights:

- PBL tool: Significant refactoring in PBL component enabling easier implementation of erratas in the future
- PBL tool: Regenerate PBL for LS1088 based on latest RCW
- DDR tool: LX2 Improve per bit Read Margins results
- DDR tool: DDR4 address parity settings

QCVS 4.14 release highlights:

- LX2160A support (DDR and PBL)
- DDR tool: Add Walking Ones/Zeros tests for LS1012A
- DDR tool: Data driven support for DDR wizard
- DDR tool: DMA test does not accept address range higher than 0x7FFFFFFF
- DDR tool: Bug fixes
- PBL tool: Bug fixes
- PinMux tool: LS1012 - QCVS doesn't make the difference between CPU revisions for PinMux

QCVS 4.13 release highlights:

- DDR tool: Bug fixes
- DDR tool: RCW override GUI support
- DDR tool: DMA test for LS1012
- DDR tool: Allow skipping WRLV start search table
- PBL tool: Bug fixes
- PinMux tool: Bug fixes
- SerDes tool: Bug fixes
- SerDes tool: Support for LS1012

QCVS 4.12 release highlights:

- DDR tool: Data eye display for Read and Write margins for DDR4 working above 1600MT/s.
- DDR tool: Option to select Write leveling searching method
- DDR tool: Message saying which method is selected for WRLV searcher
- DDR tool: DDR clock default values per target provided in wizard
- DDR tool: Any tables from Centering the clock should be disable/enable by user
- DDR tool: Fixes for LS2088 3rd DDR controller

QCVS 4.10 release highlights:

- DDRv: Target reset can now be optionally turned off between tests. Drastically improves test execution time.
- DDRv: Tweaks for read margins algorithm
- DDRv: Write leveling values recognition based on skews
- Automatic determination of DDR data rate based on DDR PLL ratio in DDR wizard page
- DDRv: Option to generate random patterns for BIST tests
- SerDes: LS1046/26A support
- PinMux: LS1043A 23x23 die

NOTE: Support for the ARM 32-bit LS102xA targets has been relocated in the QCVS 4.9.1 component installable over CW-ARMv7 only. CW-ARMv7 users can update to QCVS 4.9.1 by using the in-product update advisor.

4.7 Scenarios Tool

This release incorporates Scenarios Tool version 2.1.0.716-g467dff4

5. Fixed Issues

Issue Type	Issue key	Summary

6. Known Issues

The following defects are known to be present in this release.

Issue Type	Key	Summary
Defect	DTDBG-4687	Debugger is currently unable to read debug symbols for Linux kernel modules from Linux kernel 5.10. As a result, loadable module debug support is not functional.
Defect	DTDBG-4656	[LX216x][LSDK20.12] Board gets reset if the debugger is attached when a watchdog timer is enabled. <i>Workaround: disable the watchdog timer</i> <i>WDOG_TIMER_NON_SECURE_CONTROL_FRAME (WDOG_EN=0) before attach, from u-boot prompt (write 0x0 at 0x023A0000).</i>
Defect	DTCCS-525	[LS1046A FRWY PA] Reset skid on reset to debug command, in the case of Linux booted. Planned to be fixed in the next board revision. <i>Workaround: sometimes works after few trials</i>
Defect	DTDBG-4360	Loading a kernel module using the Modules Management UI, might cause the IDE to be freezed for a few minutes. Problem occurs only when manually loading symbols using the previously mentioned method. The recommended way to load debug symbols for kernel modules is to add them in the appropriate debug configuration in the OS Awareness section and instruct the IDE to automatically load debug symbols.
Defect	DTDBG-4375	Disassembly view won't be able to display disassembled instructions during kernel module debug session in the exit functions. This happens because debug symbols are not generated for the closing bracket of the exit function, thus making GDB to read too much memory (not mapped in MMU). As a workaround, users can manually mark various memory areas from within the module (e.g. memory after the end of the exit function range) as write-only.
Defect	DTCCS-543	Linux (seen on RHEL 7.2 only): OS doesn't allocate an IP for the USB Cwtap interface <i>Workaround: Follow the steps from</i> <i><CW_installation>\ccs\drivers\usb\readme.cwtap.txt. This will force reload procedure for plug/unplug usb actions.</i> <i>If still doesn't work, manually assign an IP address to CWTAP USB interface (if it is not done by the system).</i>
Defect	DTSA-1536	SA linux trace not working on LS1028A
Defect	QCS-5983	If you create a Serdes component and try to open it immediately, before the progress bar being finished in Progress view, the component will break and it won't open even after the progress bar will be completely loaded. An error appears and it tells you to recreate the component. <i>Workaround: When create a SerDes component, wait until the progress bar from bottom right of CodeWarrior's window is finished.</i>

Defect	QCS-5982	Incorrect generated files to match tfa/uboot needs. <i>Workaround: User needs to manually adjust the configuration</i>
Defect	DTCCS-559	Cmsisdap and usbtap is not working on CentOS 8.2, CentOS 7.8, Ubuntu20, Mint 19.3, RedHat 7.8 <i>Workaround for USBTAP: use CWTAP through ethernet (IP address)</i> <i>Workaround for CMSISDAP: CCS started with sudo permissions (workaround for MBED USB dev access permission issues) and the board configured in hard-coded RCW (SW1[1]), to avoid problems caused by reset skid and u-boot platform initialization.</i>
Defect	DTDBG-4728	C-Stationary ROM image for LS1043/23A spins in defaultHandler

NOTE. On some RedHat OS systems, occasionally, installer (using “yum install” command) might generate the following error:

```
[Errno 14] HTTP Error 404 - Not Found
Trying other mirror.
```

This has typically several root causes (firewall configuration, repos issues, yum cache) and the resolution is documented on <https://access.redhat.com/solutions/203603>

NOTE: A known issue with JRE7 based CW-ARMv8 11.2.x series and Yocto based Linux distributions has been resolved in the JRE8 based CW-ARMv8 v11.3.x series. Workaround below may not be required in v11.3.x but still listed:

Several connection problems might be encountered when trying to debug a Linux application with Eclipse. They are caused by the existing implementation of SSH client in Eclipse plus the limitations of JRE 7. Problems can be worked around by applying some special configurations to the SSH server on target.

Solutions:

1. "diffie-hellman-group1-sha1" key exchange parameter needs to be enabled in SSH server. This can be done either by adding in sshd_config file a line containing "KexAlgorithms+=diffie-hellman-group1-sha1" or by starting a new SSH server instance on a non-default port by using "/usr/sbin/sshd -o KexAlgorithms+=diffie-hellman-group1-sha1 -p 22222".
2. If an 1024-bit Diffie-Hellman key is necessary on the target and it can't be generated based on the existing /etc/ssh/moduli file, a new moduli file needs to be generated by using the commands below. Replacing the system-wide moduli file with the output file moduli-1024 is then required.
 - ssh-keygen -G moduli-1024.candidates -b 1024
 - ssh-keygen -T moduli-1024 -f moduli-1024.candidates
3. Root access is controlled by PermitRootLogin preference. Its value needs to be set to "yes" either by adding "PermitRootLogin yes" in sshd_config file or by starting the new SSH instance with "PermitRootLogin=yes".

After applying the changes described above, SSH server needs to be restarted.

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