User Manual

for S32K3 FLS Driver

Document Number: UM34FLSASR4.4 Rev0000R3.0.0 P01 Rev. 1.0

Chapter 1

Revision History

Revision	Date	Author	Description
1.0	31.03.2023	NXP RTD Team	S32K3 Real-Time Drivers AUTOSAR 4.4 & R21-11 Version 3.0.0

Chapter 2

Introduction

This User Manual describes NXP Semiconductors' AUTOSAR Flash Driver for S32K3XX. AUTOSAR Flash Driver configuration parameters description can be found in the configuration_parameters section. Deviations from the specification are described in the additional_requirements section. AUTOSAR Flash driver requirements and APIs are described in the Flash Driver Software Specification Document (version 4.4.0) [1] and in the api_reference section.

2.1 Supported Derivatives

The software described in this document is intended to be used with the following microcontroller devices of NXP Semiconductors:

- s32k310_mqfp100
- s32k310_lqfp48
- s32k311_mqfp100 / MWCT2015S_mqfp100
- s32k311_lqfp48
- s32k312_mqfp100 / MWCT2016S_mqfp100
- s32k312_mqfp172 / MWCT2016S_mqfp172
- s32k314_mqfp172
- s32k314_mapbga257
- s32k322_mqfp100 / MWCT2D16S_mqfp100
- s32k322_mqfp172 / MWCT2D16S_mqfp172

- s32k324_mqfp172 / MWCT2D17S_mqfp172
- s32k324_mapbga257
- s32k341_mqfp100
- s32k341_mqfp172
- s32k342_mqfp100
- s32k342_mqfp172
- s32k344_mqfp172
- s32k344_mapbga257
- s32k394_mapbga289
- s32k396_mapbga289
- s32k358_mqfp172
- s32k358_mapbga289
- s32k328_mqfp172
- s32k328_mapbga289
- s32k338_mqfp172
- s32k338_mapbga289
- s32k348_mqfp172
- s32k348_mapbga289
- s32m274_lqfp64
- s32m276_lqfp64

All of the above microcontroller devices are collectively named as S32K3.

Note: MWCT part numbers contain NXP confidential IP for Qi Wireless Power.

2.2 Overview

AUTOSAR (AUTomotive Open System ARchitecture) is an industry partnership working to establish standards for software interfaces and software modules for automobile electronic control systems.

AUTOSAR:

- paves the way for innovative electronic systems that further improve performance, safety and environmental friendliness.
- is a strong global partnership that creates one common standard: "Cooperate on standards, compete on implementation".
- is a key enabling technology to manage the growing electrics/electronics complexity. It aims to be prepared for the upcoming technologies and to improve cost-efficiency without making any compromise with respect to quality.
- facilitates the exchange and update of software and hardware over the service life of the vehicle.

2.3 About This Manual

This Technical Reference employs the following typographical conventions:

- **Boldface** style: Used for important terms, notes and warnings.
- *Italic* style: Used for code snippets in the text. Note that C language modifiers such "const" or "volatile" are sometimes omitted to improve readability of the presented code.

Notes and warnings are shown as below:

Note

This is a note.

Warning

This is a warning

2.4 Acronyms and Definitions

Term	Definition
API	Application Programming Interface
AUTOSAR	Automotive Open System Architecture
DET	Default Error Tracer
ECC	Error Correcting Code
VLE	Variable Length Encoding
N/A	Not Available
MCU	Microcontroller Unit
ECU	Electronic Control Unit
EEPROM	Electrically Erasable Programmable Read-Only Memory
FEE	Flash EEPROM Emulation
FLS	Flash
RTD	Real Time Drivers
XML	Extensible Markup Language

2.5 Reference List

#	Title	Version
1	Specification of Fls Driver	S32K3 Real-Time Drivers AUTOSAR Release 4.4.0
2	Reference Manual	S32K3xx Reference Manual, Rev.6, Draft B, 01/2023
		S32K39 and S32K37 Reference Manual, Rev. 2 Draft A, 11/2022
		S32M27x Reference Manual, Rev.2, Draft A, 02/2023
3	Datasheet	S32K3xx Data Sheet, Rev. 6, 11/2022
		S32K396 Data Sheet, Rev. 1.1 — 08/2022
		S32M2xx Data Sheet, Rev. 2 RC — 12/2022
4	Errata	S32K358_0P14E Mask Set Errata — Rev. 28, 9/2022
		S32K396_0P40E Mask Set Errata, Rev. DEC2022, 12/2022
		S32K311_0P98C Mask Set Errata, Rev. 6/March/2023, 3/2023
		S32K312: Mask Set Errata for Mask 0P09C, Rev. 25/April/2022
		S32K342: Mask Set Errata for Mask 0P97C, Rev. 10, 11/2022
		S32K3x4: Mask Set Errata for Mask 0P55A/1P55A, Rev. 14/Oct/2022

Chapter 3

Driver

3.1 Requirements

Requirements for this driver are detailed in the Autosar Driver Software Specification document (See Table Reference List).

3.2 Driver Design Summary

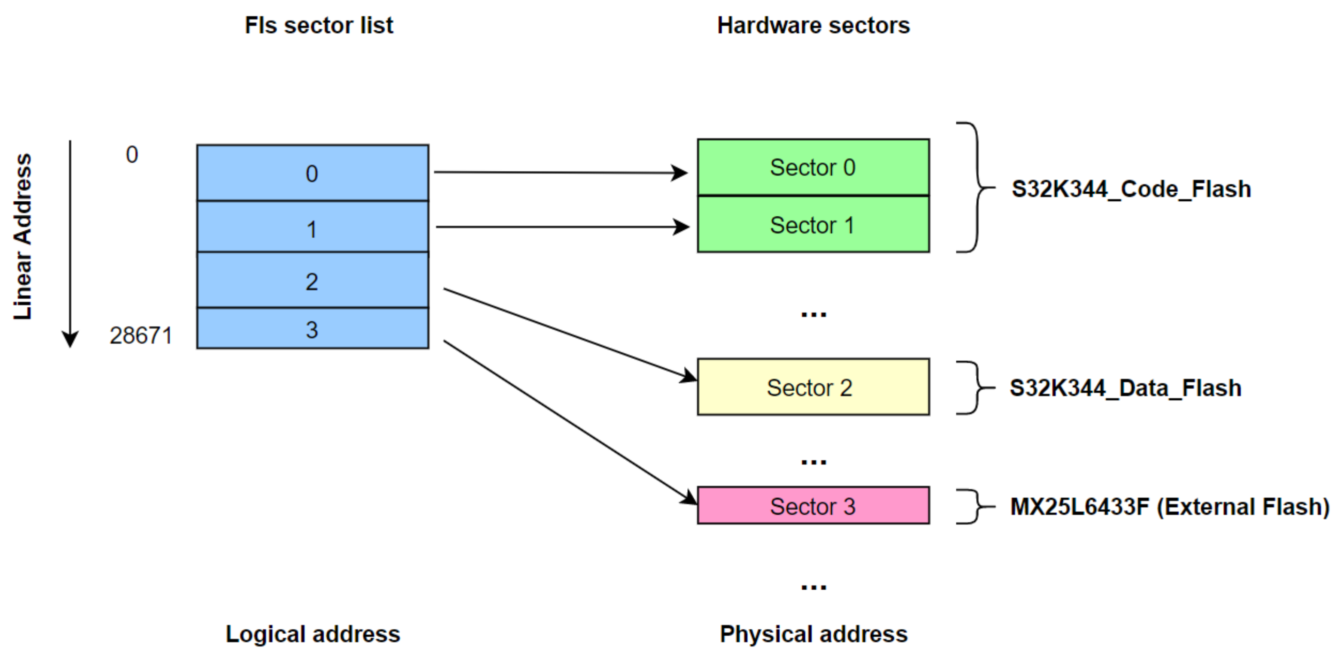
3.2.1 Linear Address

The FLS driver provides services for reading, writing and erasing flash memory and it combines configured flash memory sectors into one linear address space. The FLS module shall combine all available flash memory areas into one linear address space, it will always start at address 0 and continues without any gap.

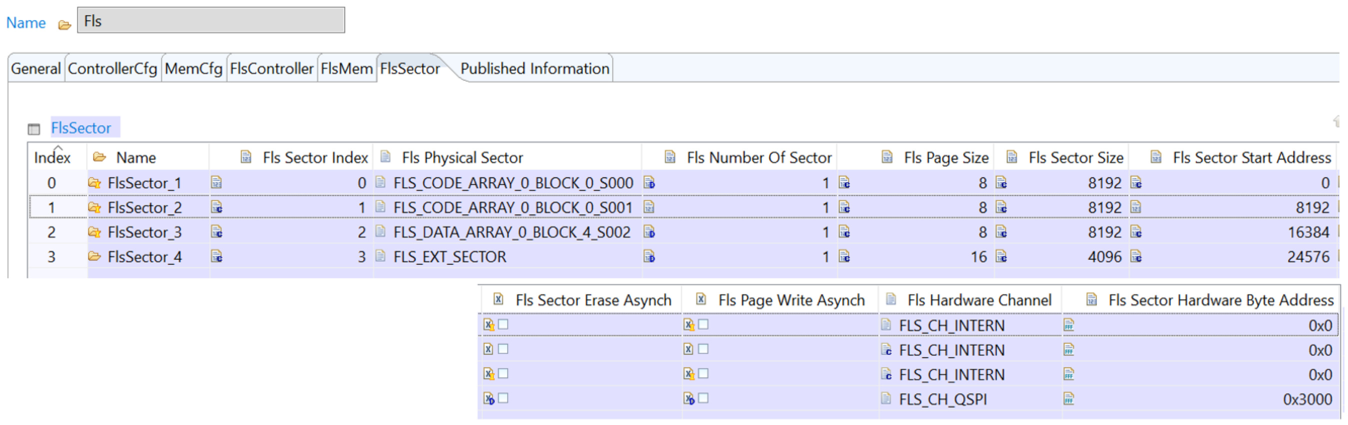
- Sectors details Example: Suppose user want to configure following sectors

Fls Physical Sector	Fls Logical Start Address	Fls Physical Start Address	Fls Sector Size
FlsSector_0	0 (0x0000)	0x00400000	8192 (0x2000)
FlsSector_1	8192 (0x2000)	0x00402000	8192 (0x2000)
FlsSector_2	16384 (0x4000)	0x10004000	8192 (0x2000)
FlsSector_3	245762 (0x6000)	0x00030000	4096 (0x1000)

The layout of configured sectors:



The FlsSector List should be configured in the following way:


Name Fls
General ControllerCfg MemCfg FlsController FlsMem FlsSector Published Information
FlsSector

Index	Name	Fls Sector Index	Fls Physical Sector	Fls Number Of Sector	Fls Page Size	Fls Sector Size	Fls Sector Start Address
0	FlsSector_1	0	FLS_CODE_ARRAY_0_BLOCK_0_S000	1	8	8192	0
1	FlsSector_2	1	FLS_CODE_ARRAY_0_BLOCK_0_S001	1	8	8192	8192
2	FlsSector_3	2	FLS_DATA_ARRAY_0_BLOCK_4_S002	1	8	8192	16384
3	FlsSector_4	3	FLS_EXT_SECTOR	1	16	4096	24576

Fls Sector Erase Asynch	Fls Page Write Asynch	Fls Hardware Channel	Fls Sector Hardware Byte Address
☐	☐	FLS_CH_INTERN	0x0
☐	☐	FLS_CH_INTERN	0x0
☐	☐	FLS_CH_INTERN	0x0
☐	☐	FLS_CH_QSPI	0x3000

As you can see Fls Sector Start Address for FlsSector_0 will be 0x0000 and Fls Sector Start Address for FlsSector_1 will be 0x2000 (8192). If user want to write FlsSector_1, user need to write to the logical address 0x2000 - 0x3FFF. If user want to erase it, user need to erase sector from address 0x2000 with size 0x2000.

Note

The user do not need to calculate the Fls Sector Start Address and Fls Sector Size they can be automatically computed.

3.2.2 Page Programming Size

- Every write access to the underlying hardware memory will be done by using writes that are as big as allowed on the hardware
  - Internal flash: quad pages of C40 (128 bytes)
  - External flash: maximum of QSPI Tx buffer size
    - 128 bytes for S32K341 / S32K322 / S32K342 / S32K314 / S32K324 / S32K344
    - 1024 bytes for S32K396
  - Fls QuadSPI driver architecture

3.2.3 Fls QuadSPI driver architecture

This section describes the detail for a high-level overview of QuadSPI components in Fls driver, how they interact and how the driver should be used.

Table of content:

- High-level overview
- Use cases
- Supported memories

Related information:

- Clocking and IOMUX for QuadSPI (chapter "3.3 Hardware Resources" in User Manual)
- QuadSPI in multicore context (if supported by the platform, chapter "5.8 Multicore support" in Integration Manual)
- QuadSPI external memory assumptions (chapter "9 External assumptions for driver" in Integration Manual)

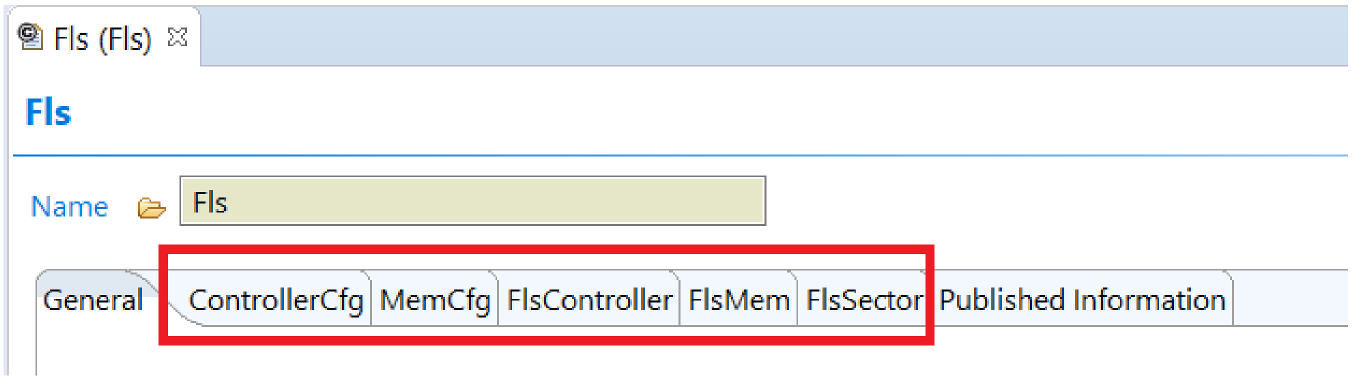
3.2.3.1 High-level overview

This sub-chapter describes the the architecture of the driver:

- The interaction between the HLD, Controller and Memory components
- What each part does and how they interact
- Examples of configuration

3.2.3.1.1 QuadSPI components in Fls driver

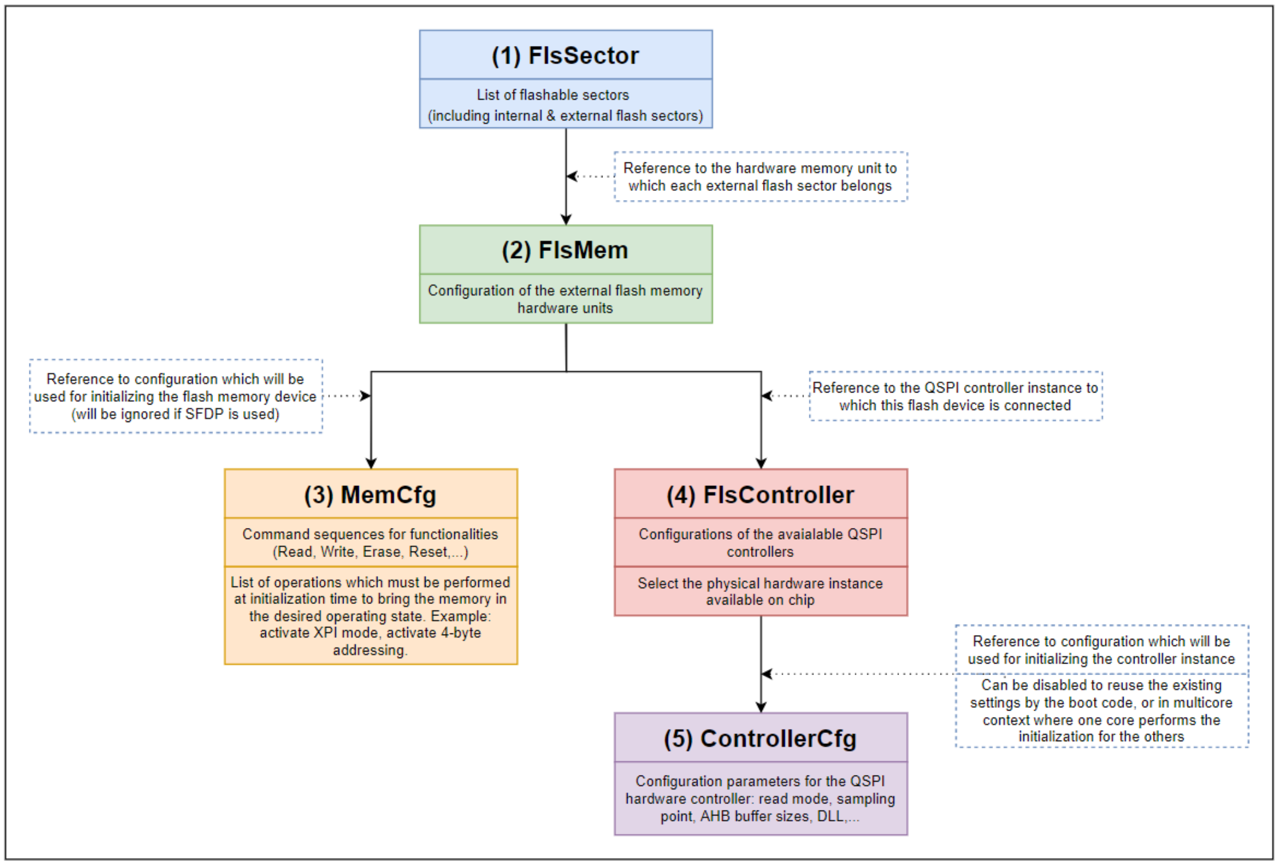
QuadSPI components user interface:



There are five components connect together in the order below:

#	Device name
1	FlsSector
2	FlsMem
3	MemCfg
4	FlsController
5	ControllerCfg

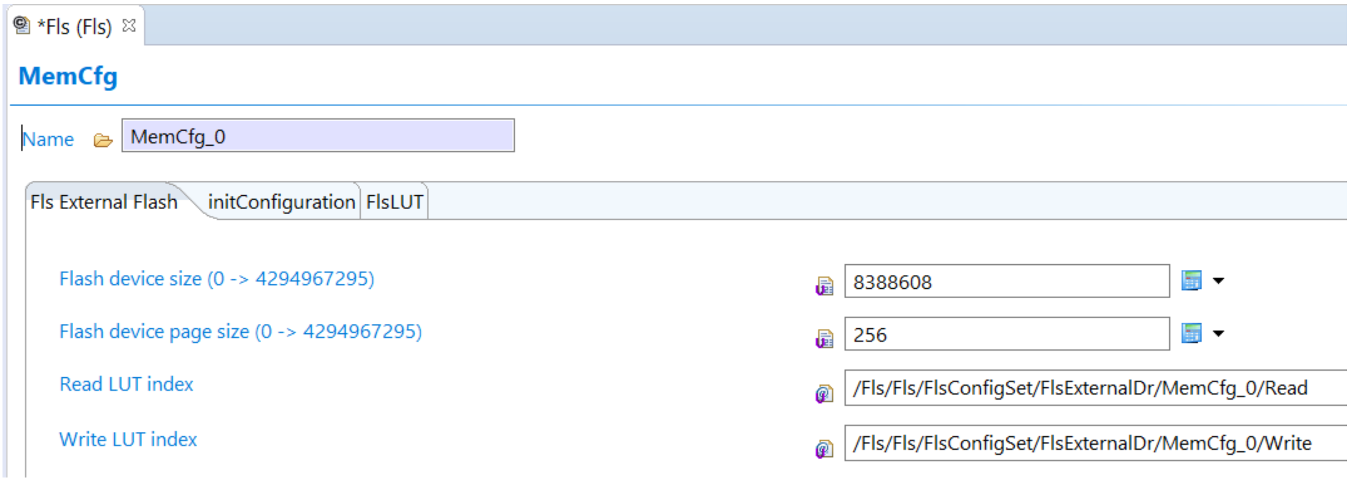
Connections between components:


(1) FlsSector
List of flashable sectors (including internal & external flash sectors)
Reference to the hardware memory unit to which each external flash sector belongs
(2) FlsMem
Configuration of the external flash memory hardware units
Reference to configuration which will be used for initializing the flash memory device (will be ignored if SFDP is used)
Reference to the QSPI controller instance to which this flash device is connected
(3) MemCfg
Command sequences for functionalities (Read, Write, Erase, Reset,...)
List of operations which must be performed at initialization time to bring the memory in the desired operating state. Example: activate XPI mode, activate 4-byte addressing.
(4) FlsController
Configurations of the avaialable QSPI controllers
Select the physical hardware instance available on chip
Reference to configuration which will be used for initializing the controller instance
Can be disabled to reuse the existing settings by the boot code, or in multicore context where one core performs the initialization for the others
(5) ControllerCfg
Configuration parameters for the QSPI hardware controller: read mode, sampling point, AHB buffer sizes, DLL,...

3.2.3.1.2 MemCfg

This container contains all specific settings for the memory device:

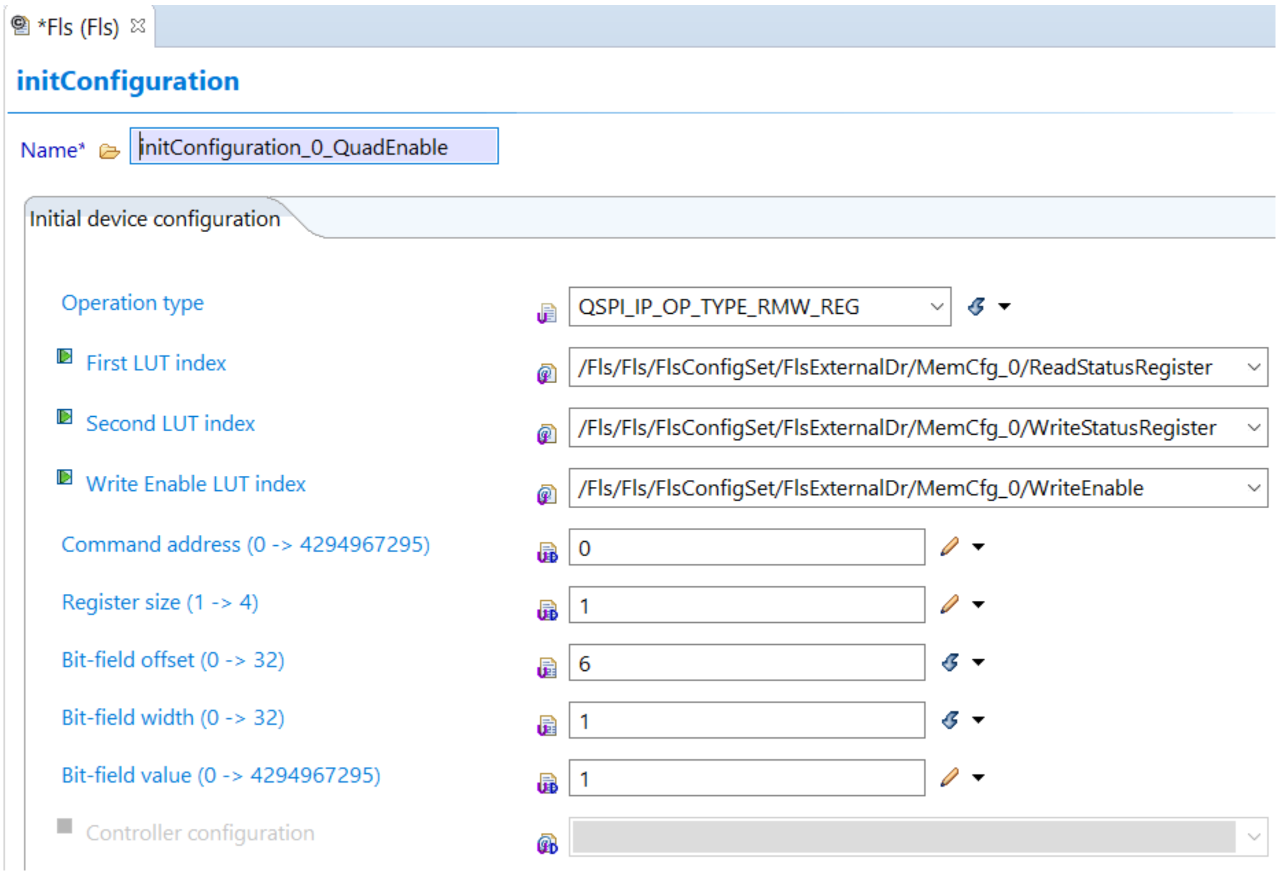
- Memory characteristics: device size, page size
- LUT command sequences for basic functionality



Name: MemCfg_0

Flash device size (0 -> 4294967295)	8388608
Flash device page size (0 -> 4294967295)	256
Read LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/Read
Write LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/Write

It also provides a list of operations (**initConfiguration**) which must be performed at initialization time to bring the memory in the desired operating state (for example: setting registers value). Here is an example of an operation to enable the Quad mode by set bit 6th in the Status register:


*Fls (Fls)

initConfiguration

Name* initConfiguration_0_QuadEnable

Initial device configuration

Operation type	QSPI_IP_OP_TYPE_RMW_REG
First LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/ReadStatusRegister
Second LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/WriteStatusRegister
Write Enable LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/WriteEnable
Command address (0 -> 4294967295)	0
Register size (1 -> 4)	1
Bit-field offset (0 -> 32)	6
Bit-field width (0 -> 32)	1
Bit-field value (0 -> 4294967295)	1
Controller configuration	

In this example, QuadSPI driver will:

- Read 1 byte value of the status register by using the **First LUT index**
- Modify the **6th** bit to the desired value is **1**
- If needed, the **Write Enable LUT index** will be issued before a write command
- Write back that byte value to memory device by using the **Second LUT index**

Note

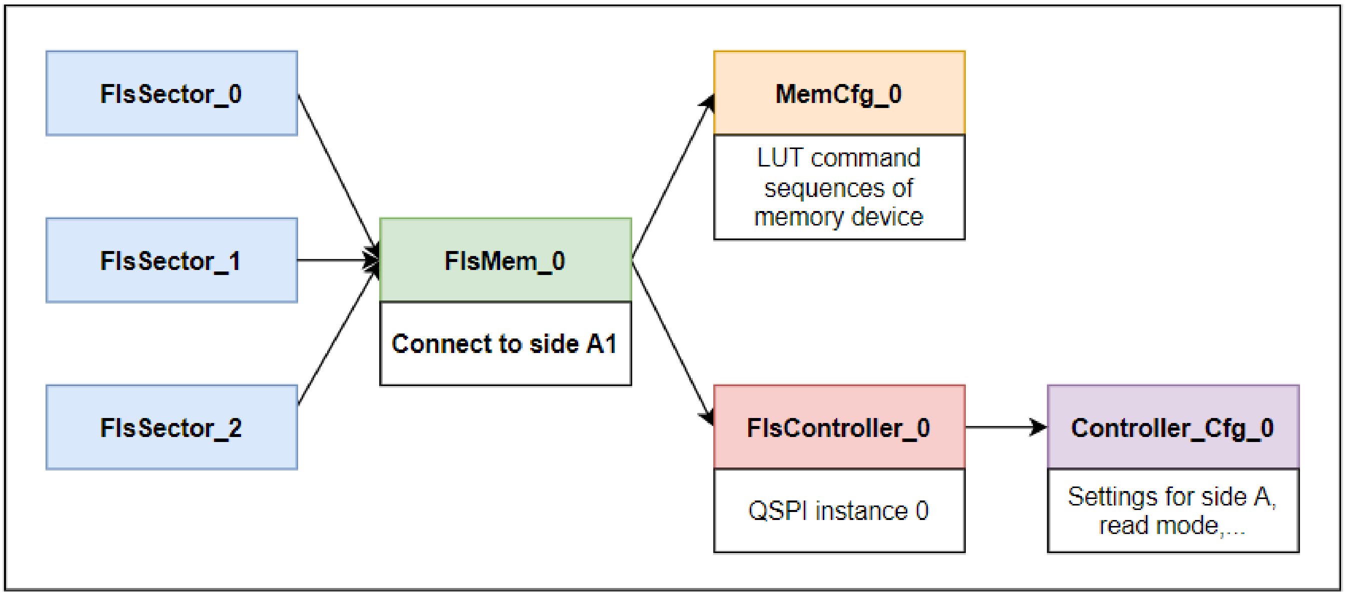
- When changing the value of non-volatile bits, users need to insert one more read operation (QSPI_IP_OP_TYPE_READ_REG) right behind to wait for the write operation to complete

3.2.3.1.3 Examples of configuration

3.2.3.1.3.1 Example 1

Below is the diagram to depict the example from the section "3.2.1 Linear Address". Assume that the memory device connects to the side A1 of QuadSPI controller, we need:

- 01 hardware memory unit (reference to MemCfg_0): contains the LUT command set for initializing the memory device
- 01 controller configuration set (ControllerCfg_0): contains the configuration parameters for QuadSPI hardware instance 0



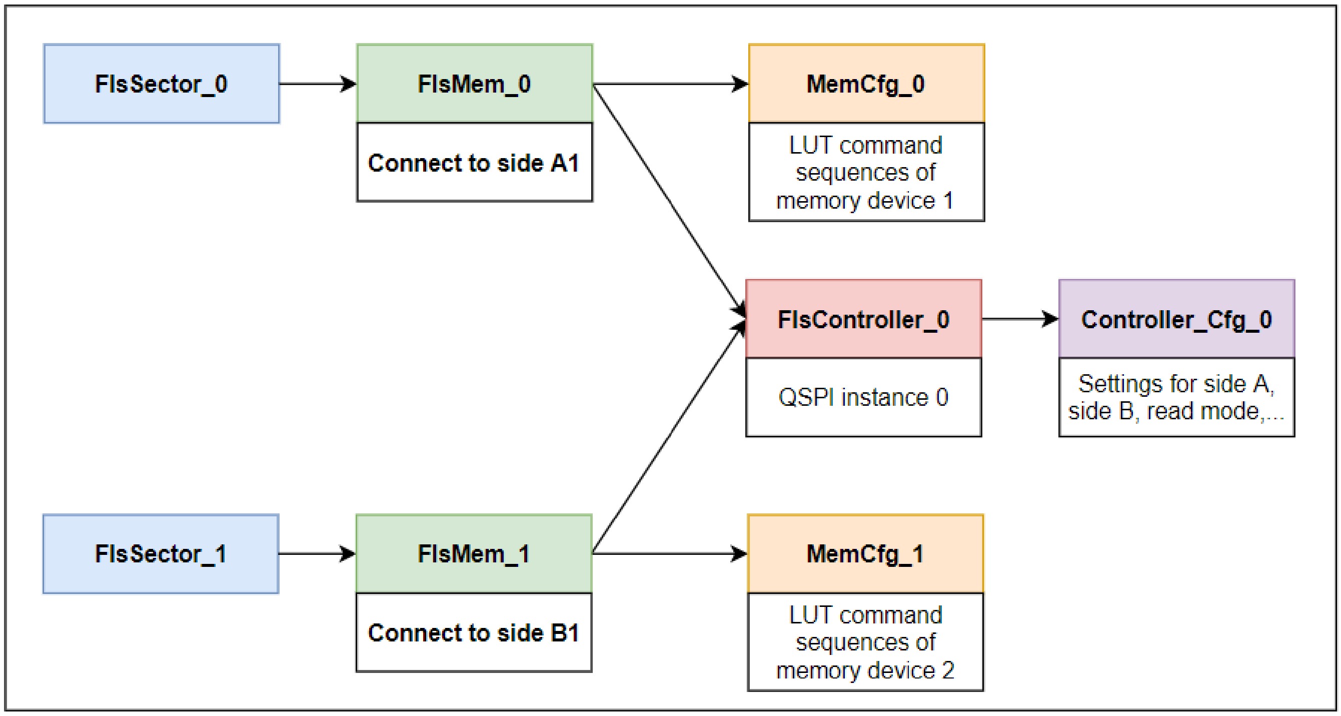
3.2.3.1.3.2 Example 2

Suppose we have 02 different external flash memory devices, one connects to side A and one connects to side B of the QuadSPI controller. And we want to configure 02 external sectors, the first sector in each memory device

FlsSectorList	Fls Sector Size	Fls Number Of Sector	Fls Logical Start Address	Fls Hardware Start Address	Fls Hardware Memory Unit
FlsSector_0	4096 (0x1000)	1	0 (0x0000)	0 (0x0000)	FlsMem_0
FlsSector_1	4096 (0x1000)	1	4096 (0x1000)	0 (0x0000)	FlsMem_1

In this example, we need:

- 02 hardware memory unit (reference to MemCfg_0 and MemCfg_1): contain the LUT command sets for initializing each memory device (if they have different command sets)
- 01 controller configuration set (ControllerCfg_0): contains the configuration parameters for QuadSPI hardware instance 0



As you can see:

- Any operations on the FlsSector_0 will be mapped to the hardware sector 0 (0x0000 - 0x0FFF) of the memory device 1
- Any operations on the FlsSector_1 will be mapped to the hardware sector 0 (0x0000 - 0x0FFF) of the memory device 2
- The QuadSPI controller communicates with each memory device by using the commands set from the corresponding **MemCfg**

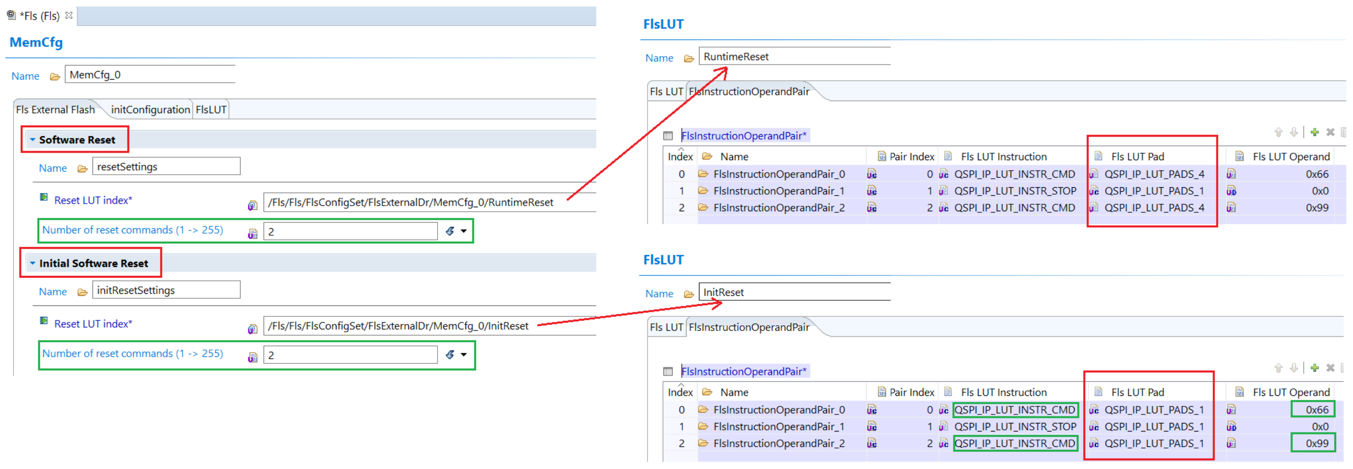
3.2.3.2 Use cases

This sub-chapter provides various useful practical examples.

3.2.3.2.1 Software reset

The driver provides two ways to use the software reset command, for resettings the flash device:

- Software Reset (used by Fls_Cancel() and Qspi_Ip_Reset(), at any time during runtime)
- Initial Software Reset (used by Fls_Init(), only one time)



*Fls (Fls)

MemCfg

Name: MemCfg_0

Fls External Flash | initConfiguration | FlsLUT

Software Reset

Name: resetSettings

Reset LUT index*: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/RuntimeReset

Number of reset commands (1 -> 255): 2

Initial Software Reset

Name: initResetSettings

Reset LUT index*: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/InitReset

Number of reset commands (1 -> 255): 2

FlsLUT

Name: RuntimeReset

Fls LUT | FlsInstructionOperandPair

FlsInstructionOperandPair*

Index	Name	Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_4	0x66
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_1	0x0
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_4	0x99

FlsLUT

Name: InitReset

Fls LUT | FlsInstructionOperandPair

FlsInstructionOperandPair*

Index	Name	Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0x66
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_1	0x0
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0x99

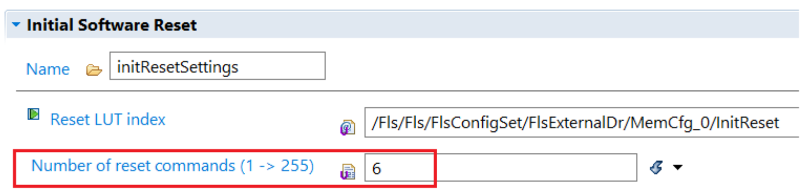
Note

- The number of reset commands is the number of sequences needed by the reset operation, separated by a stop phase
- A stop phase will be inserted automatically at the end of each command sequence

The **Initial Software Reset** procedure applies only at driver intialization. It might be different from the normal reset command, depending on the initial state of the flash. If not, set the same as reset command. In the above example, the memory device works in quad mode (4S-4S-4S), hence we need the reset commands in quad mode.

- The **Initial Software Reset** feature is useful in case we do not know the current state of the device memory (for example when bootrom leaves the memory in a certain state), and we need a reset sequence to bring it to the default state before performing initialization.

Here is an example of a combination of reset command sets (in three modes: SPI, QPI and OPI) to force memory device into its default state:

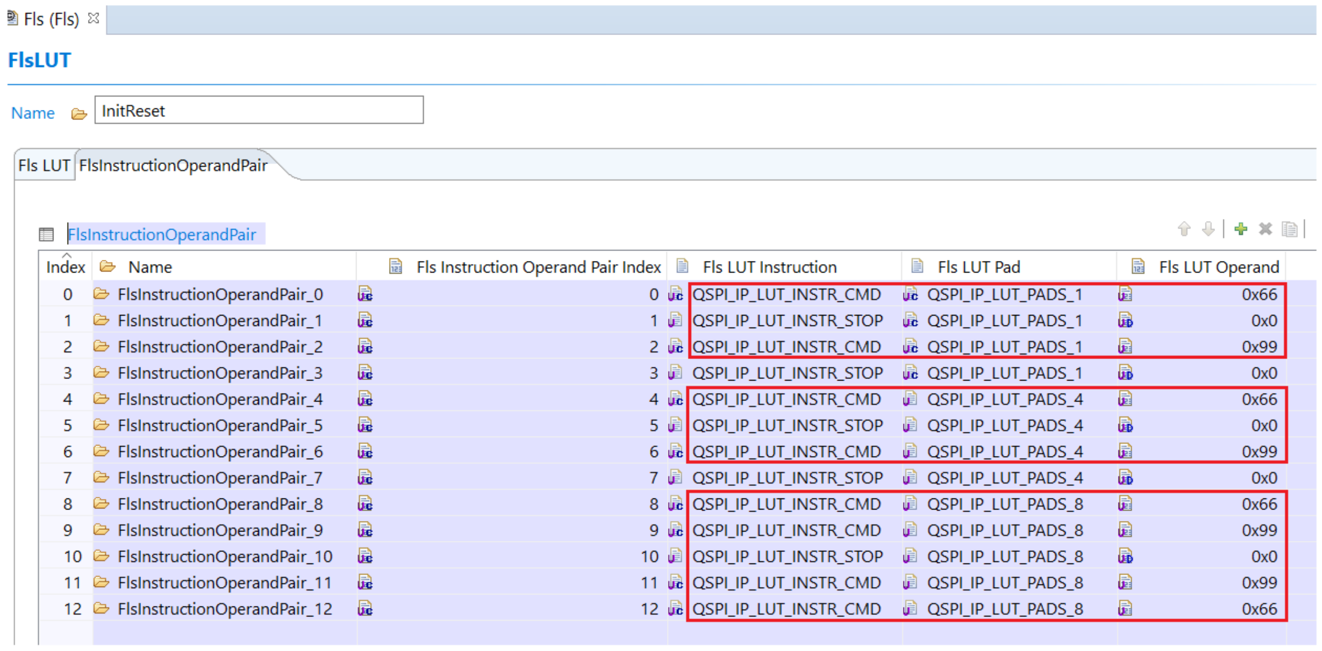


Initial Software Reset

Name: initResetSettings

Reset LUT index: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/InitReset

Number of reset commands (1 -> 255): 6



Fls (Fls)

FlsLUT

Name: InitReset

Fls LUT | FlsInstructionOperandPair

FlsInstructionOperandPair

Index	Name	Fls Instruction Operand Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0x66
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_1	0x0
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0x99
3	FlsInstructionOperandPair_3	3	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_1	0x0
4	FlsInstructionOperandPair_4	4	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_4	0x66
5	FlsInstructionOperandPair_5	5	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_4	0x0
6	FlsInstructionOperandPair_6	6	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_4	0x99
7	FlsInstructionOperandPair_7	7	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_4	0x0
8	FlsInstructionOperandPair_8	8	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_8	0x66
9	FlsInstructionOperandPair_9	9	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_8	0x99
10	FlsInstructionOperandPair_10	10	QSPI_IP_LUT_INSTR_STOP	QSPI_IP_LUT_PADS_8	0x0
11	FlsInstructionOperandPair_11	11	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_8	0x99
12	FlsInstructionOperandPair_12	12	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_8	0x66

Note

- Fls_Cancel() will use **Software Reset** to abort the on-going write/erase operation
- This action causes loss of synchronization between QuadSPI controller and memory device (for example when working in DOPI mode with external DQS)
- The next section will describe the solution to deal with this situation

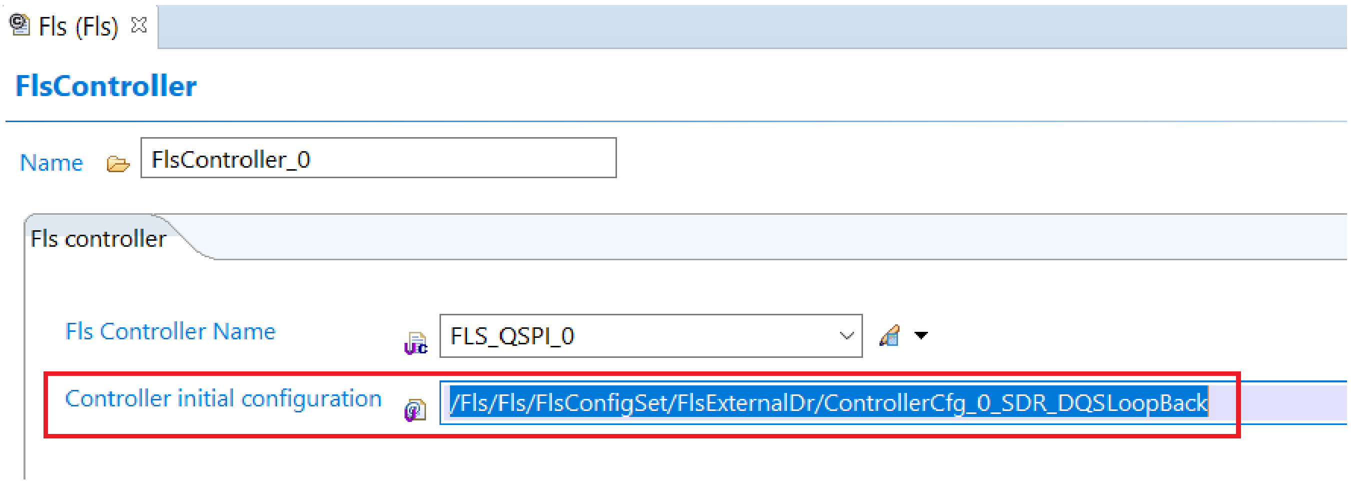
3.2.3.2.2 Controller configuration

There are several controller configuration points in the driver:

#	Controller configuration point	Location	Description
1	Controller initial configuration	FlsController	Configure QuadSPI controller
2	Controller configuration	MemCfg (operations list)	Re-configure QuadSPI controller during memory device initialization
			E.g: switch the controller to External DQS after activating DOPI mode
3	Configure controller on flash Init	MemCfg	Re-configure QuadSPI controller when resetting the memory device
			E.g: switch the controller to initial configuration before re-init the memory device

3.2.3.2.2.1 Controller initial configuration

This is the first initialization point which will be done once by Fls_Init():



Fls (Fls)

FlsController

Name: FlsController_0

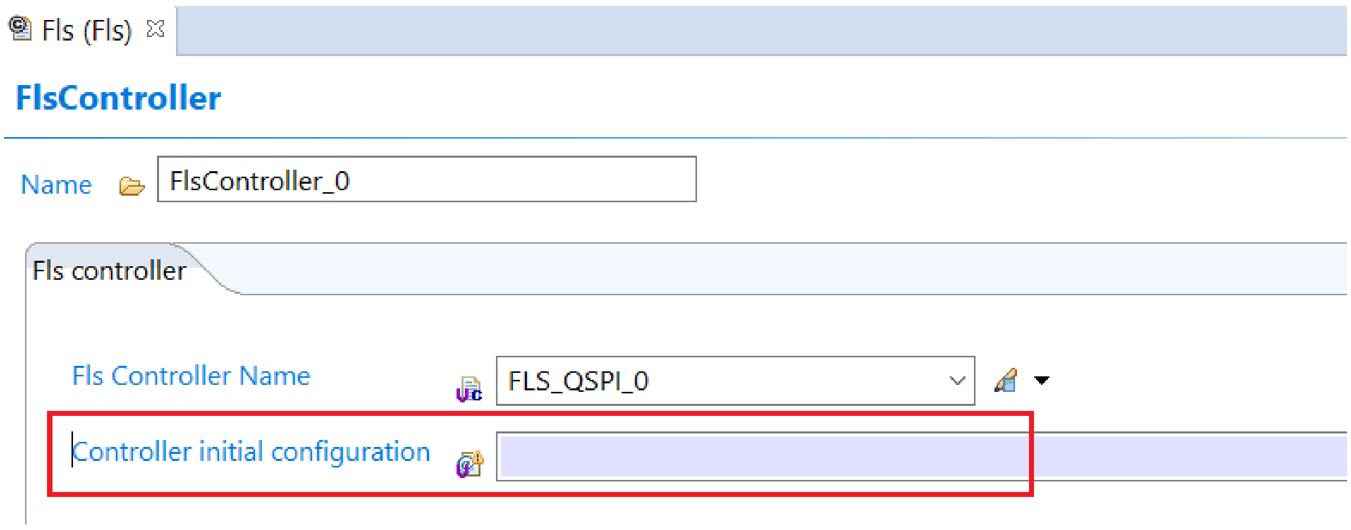
Fls controller

Fls Controller Name: FLS_QSPI_0

Controller initial configuration: /Fls/Fls/FlsConfigSet/FlsExternalDr/ControllerCfg_0_SDR_DQSLoopBack

This step can be skipped by leaving the reference node blank, the purpose is:

- Reuse the existing QuadSPI settings by the boot code
- Or in multicore context where one core performs the initialization for the others



Fls (Fls)

FlsController

Name: FlsController_0

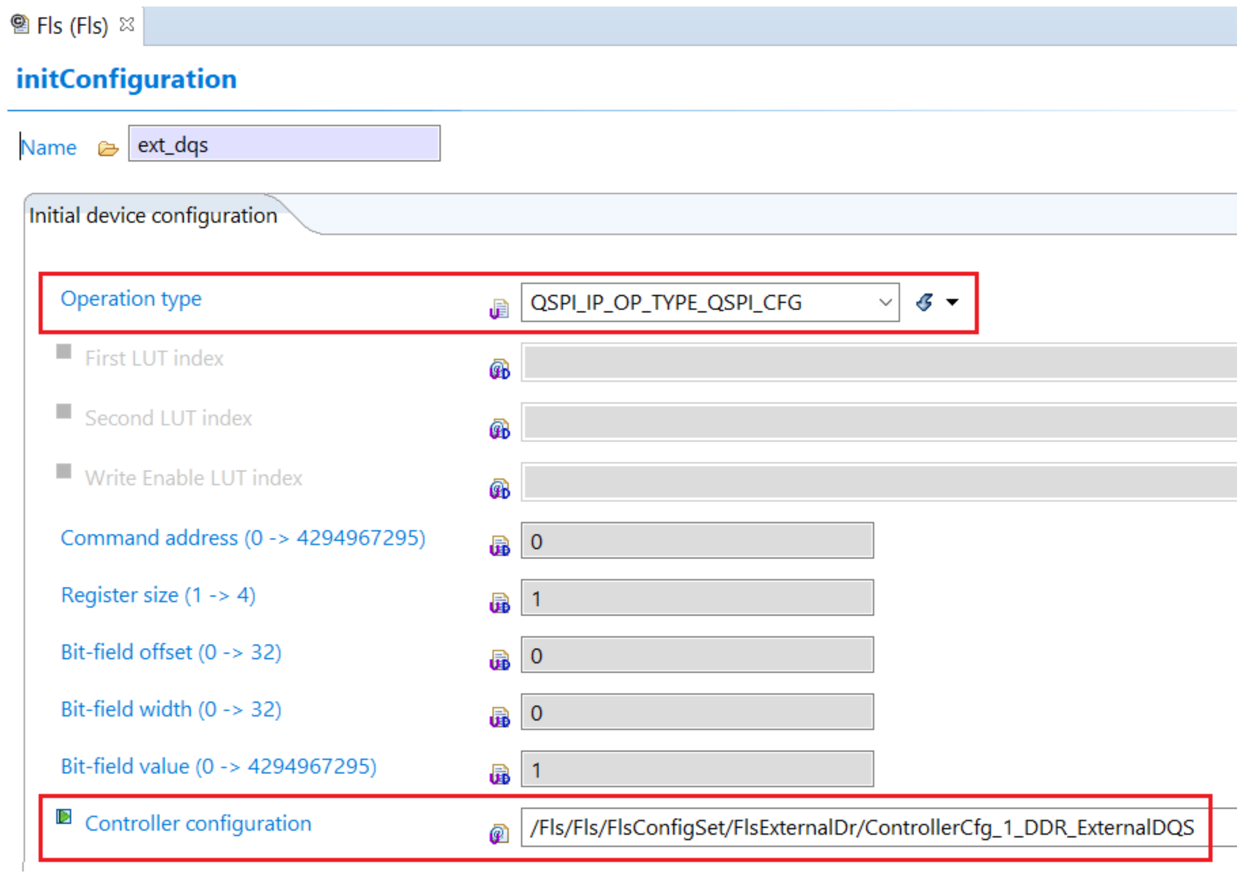
Fls controller

Fls Controller Name: FLS_QSPI_0

Controller initial configuration:

3.2.3.2.2.2 Controller configuration

The second initialization point is in the list of operations of **MemCfg**. This step is needed after we configure the device memory to another mode that is no longer compatible with the controller configuration point #1 (E.g: after activating DOPI mode)


Fls (Fls)

initConfiguration

Name: ext_dqs

Initial device configuration

Operation type: QSPI_IP_OP_TYPE_QSPI_CFG

First LUT index

Second LUT index

Write Enable LUT index

Command address (0 -> 4294967295): 0

Register size (1 -> 4): 1

Bit-field offset (0 -> 32): 0

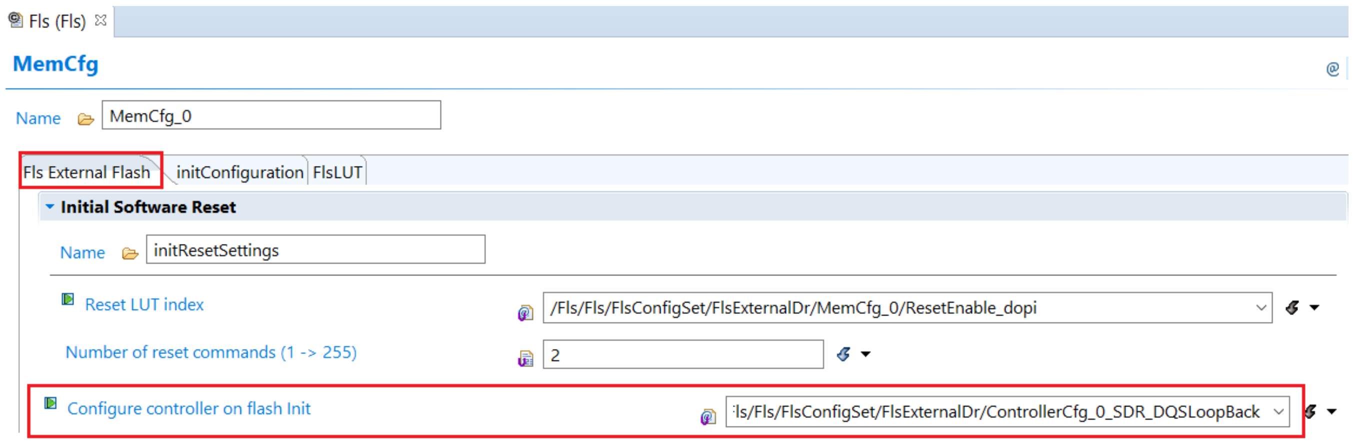
Bit-field width (0 -> 32): 0

Bit-field value (0 -> 4294967295): 1

Controller configuration: /Fls/Fls/FlsConfigSet/FlsExternalDr/ControllerCfg_1_DDR_ExternalDQS

3.2.3.2.2.3 Configure controller on flash Init

The third configuration point is at the end of **MemCfg**. This step is needed when resetting the memory device, then we have to re-configure the controller to a mode that is compatible with the new state of memory device after reset. (E.g: when executing the reset sequence in DOPI mode)


Fls (Fls)

MemCfg

Name: MemCfg_0

Fls External Flash | initConfiguration | FlsLUT

Initial Software Reset

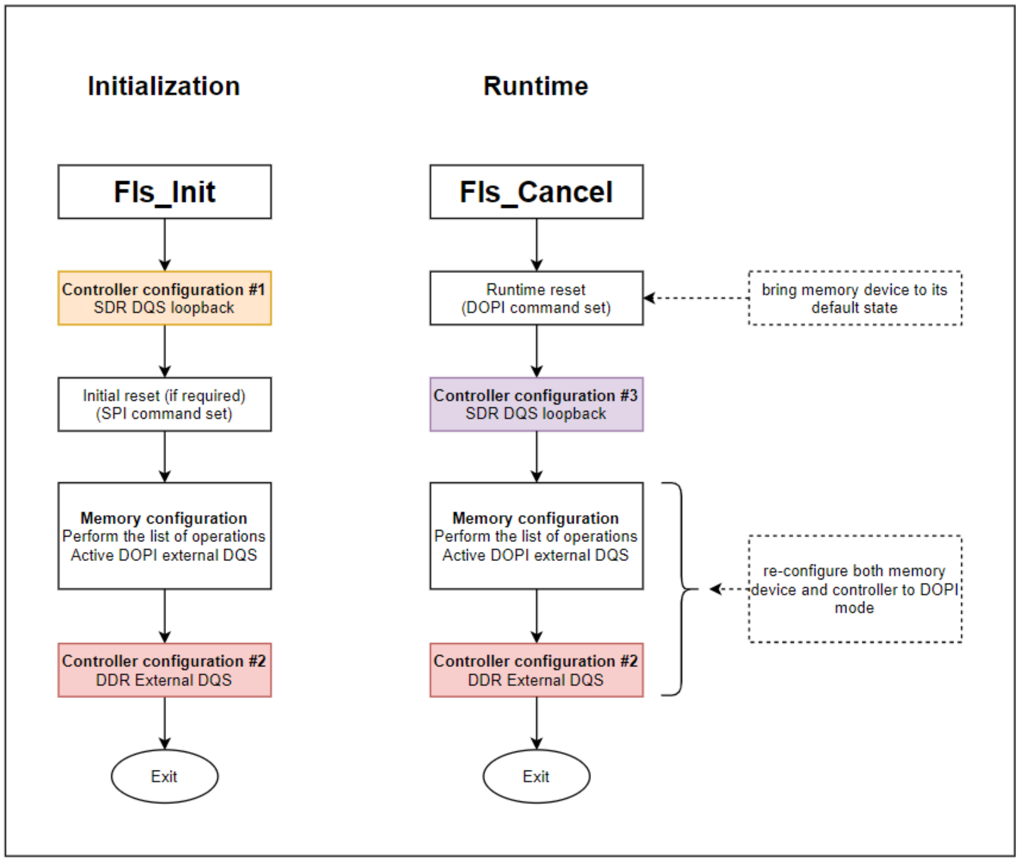
Name: initResetSettings

Reset LUT index: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/ResetEnable_dopi

Number of reset commands (1 -> 255): 2

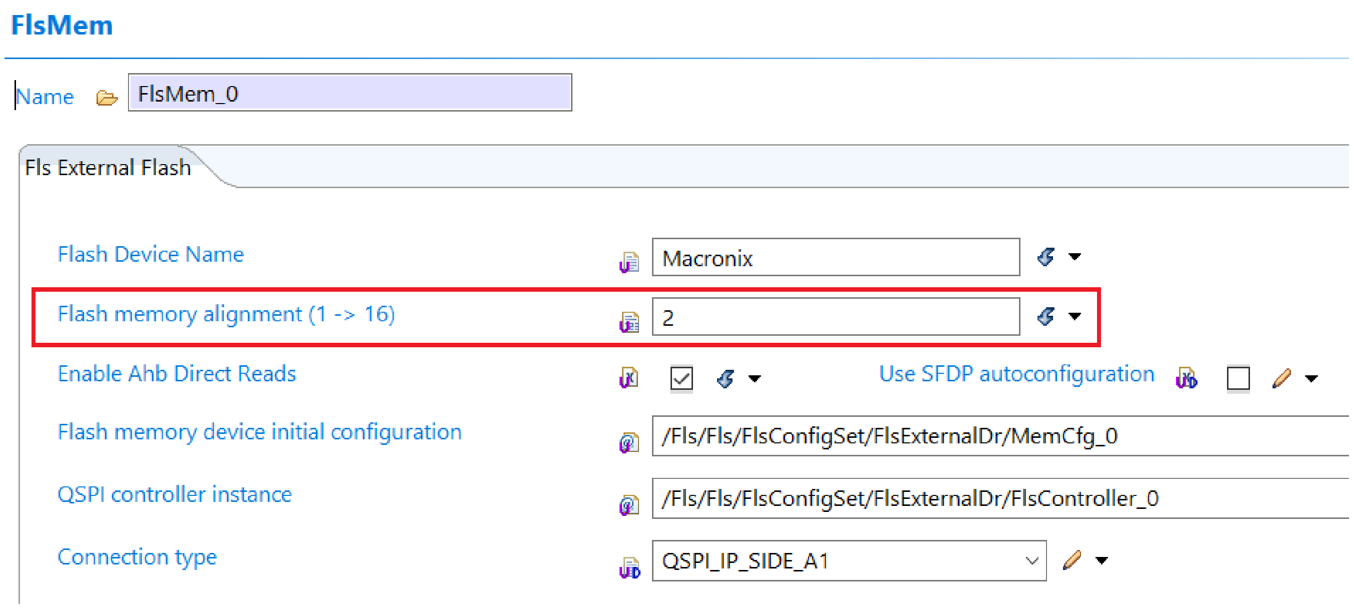
Configure controller on flash Init: ls/Fls/FlsConfigSet/FlsExternalDr/ControllerCfg_0_SDR_DQSLoopBack

Below is the complete code flow (initialization time and runtime) for both QuadSPI controller and memory device to work in Double data rate - Octal I/O mode (DOPI).


Initialization
Runtime
Fls_Init
Fls_Cancel
Controller configuration #1
SDR DQS loopback
Runtime reset
(DOPI command set)
bring memory device to its default state
Initial reset (if required)
(SPI command set)
Controller configuration #3
SDR DQS loopback
Memory configuration
Perform the list of operations
Active DOPI external DQS
Memory configuration
Perform the list of operations
Active DOPI external DQS
re-configure both memory device and controller to DOPI mode
Controller configuration #2
DDR External DQS
Controller configuration #2
DDR External DQS
Exit
Exit

3.2.3.2.3 Read/Write from unaligned addresses

Due to the nature of DDR protocol, both the starting address must be even address and data byte number must be even. Fls driver supports a feature to allow users to read/write with odd addresses and odd data length in DOPI mode, simply by setting the memory alignment value to 2 in the **FlsMem** configuration:


FlsMem

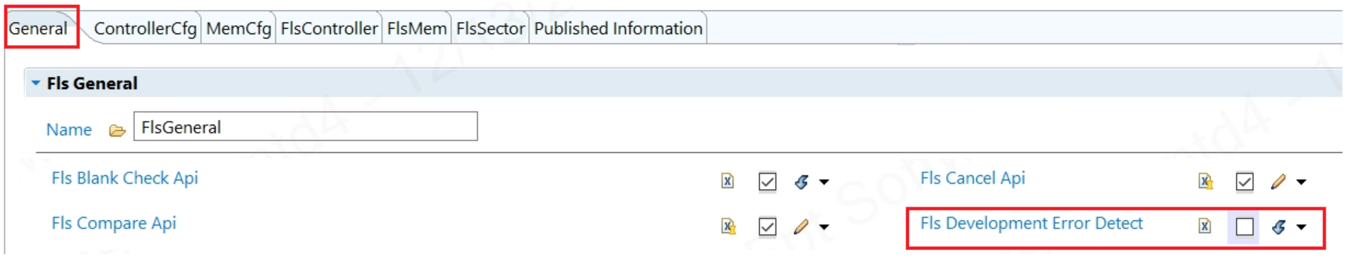
Name	FlsMem_0

Fls External Flash

Flash Device Name	Macronix
Flash memory alignment (1 -> 16)	2
Enable Ahb Direct Reads	✓
Use SFDP autoconfiguration	☐
Flash memory device initial configuration	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0
QSPI controller instance	/Fls/Fls/FlsConfigSet/FlsExternalDr/FlsController_0
Connection type	QSPI_IP_SIDE_A1

Note

- For write operation, driver will send extra data with FFh to overwrite the overlapping memory area
- Users need to disable the development error detection feature in order to bypass the flash page boundary alignment checks:



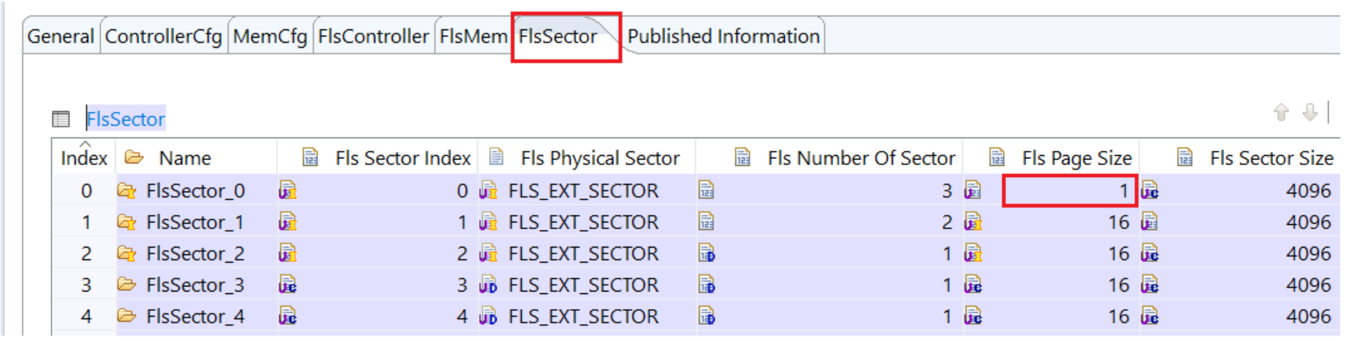
General | ControllerCfg | MemCfg | FlsController | FlsMem | FlsSector | Published Information

Fls General

Name: FlsGeneral

Fls Blank Check Api	✓	Fls Cancel Api	✓
Fls Compare Api	✓	Fls Development Error Detect	☐

- Or configure the size of flash page boundary to **1** to meet that requirement



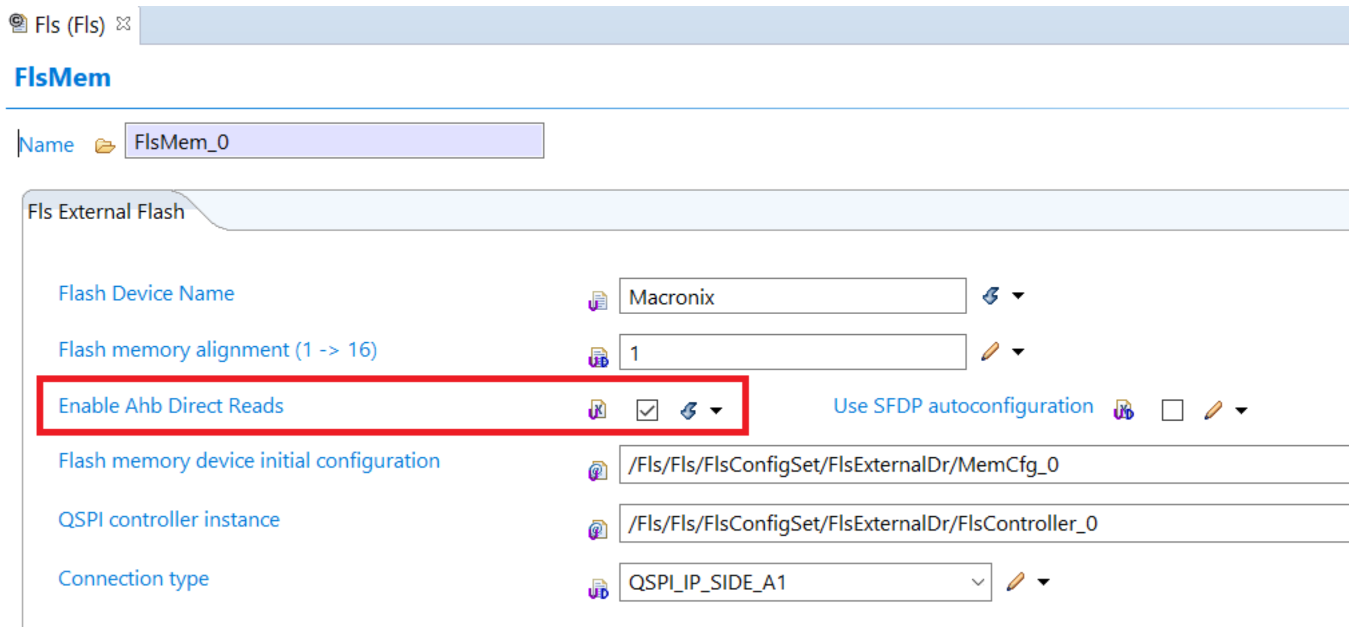
General | ControllerCfg | MemCfg | FlsController | FlsMem | FlsSector | Published Information

FlsSector

Index	Name	Fls Sector Index	Fls Physical Sector	Fls Number Of Sector	Fls Page Size	Fls Sector Size
0	FlsSector_0	0	FLS_EXT_SECTOR	3	1	4096
1	FlsSector_1	1	FLS_EXT_SECTOR	2	16	4096
2	FlsSector_2	2	FLS_EXT_SECTOR	1	16	4096
3	FlsSector_3	3	FLS_EXT_SECTOR	1	16	4096
4	FlsSector_4	4	FLS_EXT_SECTOR	1	16	4096

3.2.3.2.4 AHB read

Users can enable the option **AHBReadEnable** in **FlsMem** to use the AHB read feature, this allows application can read directly through Flash memory devices address mapping (QuadSPI's AHB region):



Fls (Fls)

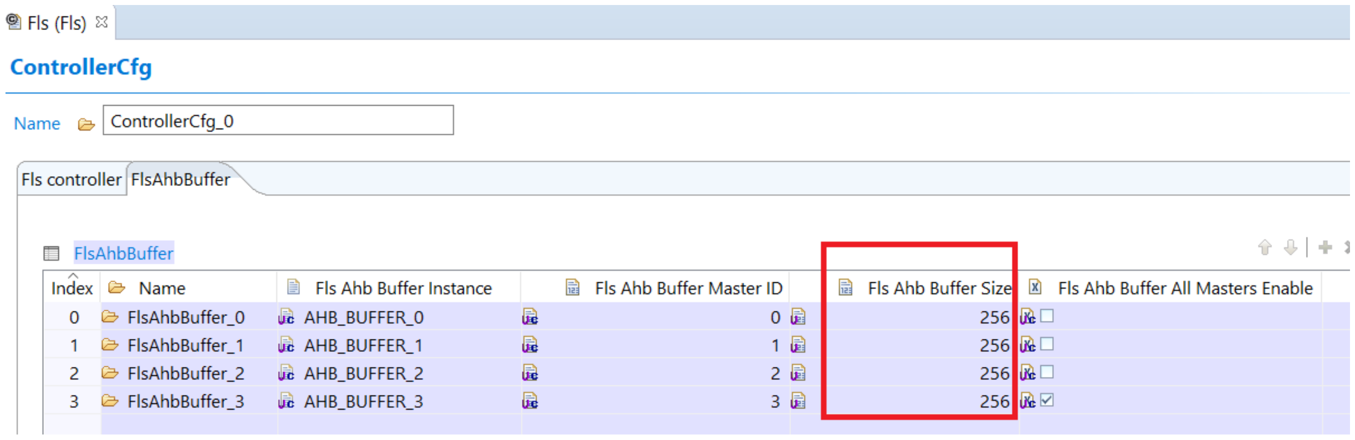
FlsMem

Name: FlsMem_0

Fls External Flash

Flash Device Name	Macronix
Flash memory alignment (1 -> 16)	1
Enable Ahb Direct Reads	✓
Use SFDP autoconfiguration	☐
Flash memory device initial configuration	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0
QSPI controller instance	/Fls/Fls/FlsConfigSet/FlsExternalDr/FlsController_0
Connection type	QSPI_IP_SIDE_A1

Besides, users need to configure the AHB buffers (master IDs and sizes):



Fls (Fls)

ControllerCfg

Name: ControllerCfg_0

Fls controller | FlsAhbBuffer

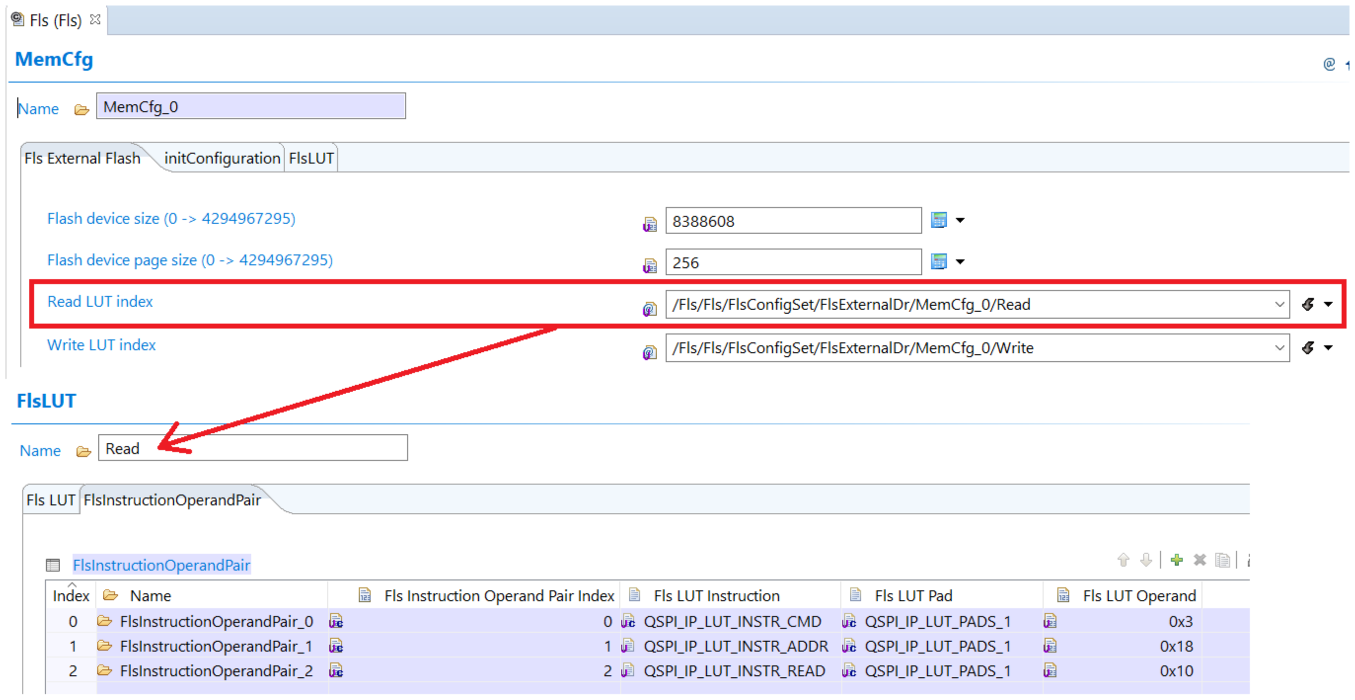
FlsAhbBuffer

Index	Name	Fls Ahb Buffer Instance	Fls Ahb Buffer Master ID	Fls Ahb Buffer Size	Fls Ahb Buffer All Masters Enable
0	FlsAhbBuffer_0	AHB_BUFFER_0	0	256	☐
1	FlsAhbBuffer_1	AHB_BUFFER_1	1	256	☐
2	FlsAhbBuffer_2	AHB_BUFFER_2	2	256	☐
3	FlsAhbBuffer_3	AHB_BUFFER_3	3	256	☑

Note

- The driver will configure AHB transfer sizes to match the buffer sizes
- **Qspi_Ip_ControllerGetStatus** can be used to wait for AHB commands complete to avoid conflict with subsequent IP commands

The LUT sequence of IP command read will be used for AHB command read:



Fls (Fls)

MemCfg

Name: MemCfg_0

Fls External Flash | initConfiguration | FlsLUT

Flash device size (0 -> 4294967295): 8388608

Flash device page size (0 -> 4294967295): 256

Read LUT index: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/Read

Write LUT index: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/Write

FlsLUT

Name: Read

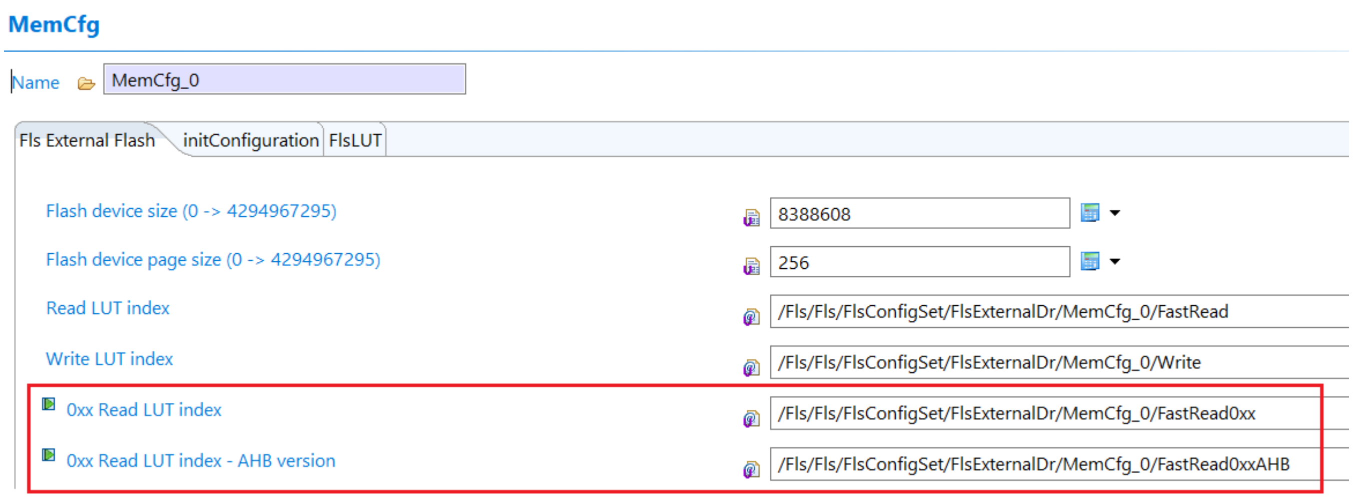
Fls LUT | FlsInstructionOperandPair

FlsInstructionOperandPair

Index	Name	Fls Instruction Operand Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0x3
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_ADDR	QSPI_IP_LUT_PADS_1	0x18
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_READ	QSPI_IP_LUT_PADS_1	0x10

3.2.3.2.5 Performance enhanced mode

The QuadSPI driver supports Continuous Read mode (0-X-X mode - no command for read instructions) which is implemented in some serial Flash memories:



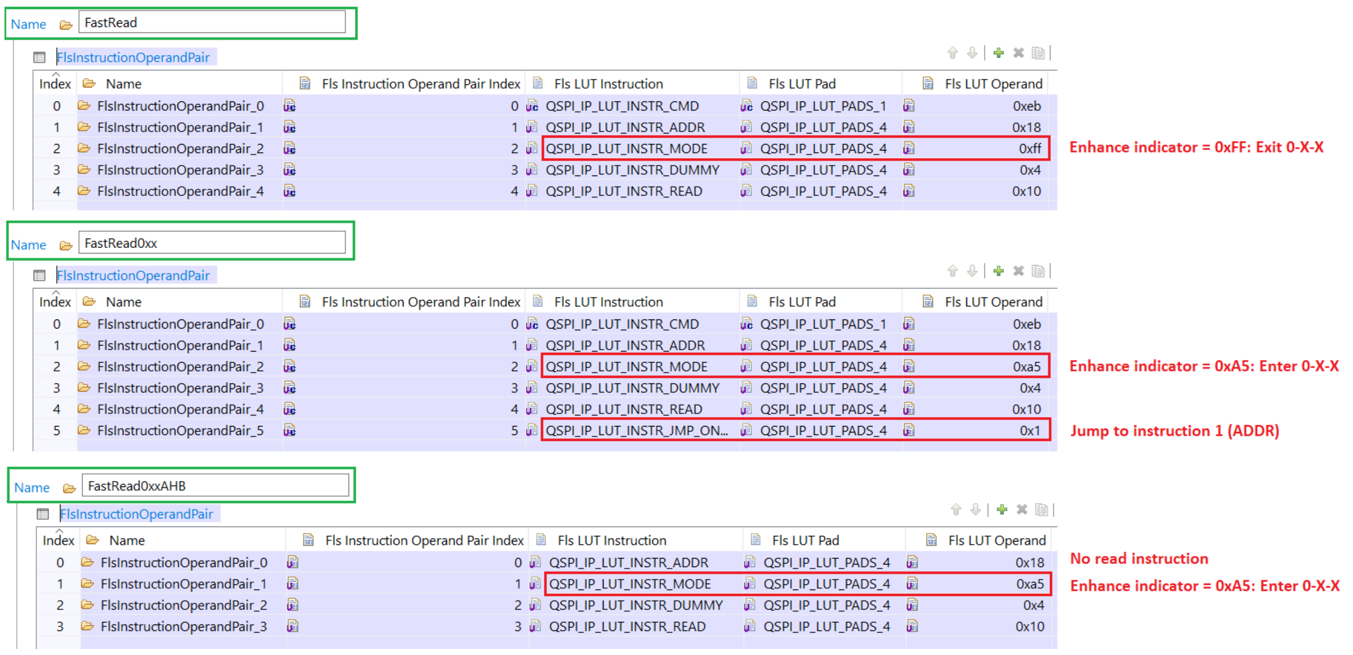
MemCfg

Name: MemCfg_0

Tabs: Fls External Flash | initConfiguration | FlsLUT

Flash device size (0 -> 4294967295)	8388608
Flash device page size (0 -> 4294967295)	256
Read LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/FastRead
Write LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/Write
0xx Read LUT index	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/FastRead0xx
0xx Read LUT index - AHB version	/Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0/FastRead0xxAHB

There are two types of command, one for IP and one for AHB operations. Below is the example:



Name: FastRead

FlsInstructionOperandPair

Index	Name	Fls Instruction Operand Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand	
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0xeb	
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_ADDR	QSPI_IP_LUT_PADS_4	0x18	
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_MODE	QSPI_IP_LUT_PADS_4	0xff	Enhance indicator = 0xFF: Exit 0-X-X
3	FlsInstructionOperandPair_3	3	QSPI_IP_LUT_INSTR_DUMMY	QSPI_IP_LUT_PADS_4	0x4	
4	FlsInstructionOperandPair_4	4	QSPI_IP_LUT_INSTR_READ	QSPI_IP_LUT_PADS_4	0x10	

Name: FastRead0xx

FlsInstructionOperandPair

Index	Name	Fls Instruction Operand Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand	
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_CMD	QSPI_IP_LUT_PADS_1	0xeb	
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_ADDR	QSPI_IP_LUT_PADS_4	0x18	
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_MODE	QSPI_IP_LUT_PADS_4	0xa5	Enhance indicator = 0xA5: Enter 0-X-X
3	FlsInstructionOperandPair_3	3	QSPI_IP_LUT_INSTR_DUMMY	QSPI_IP_LUT_PADS_4	0x4	
4	FlsInstructionOperandPair_4	4	QSPI_IP_LUT_INSTR_READ	QSPI_IP_LUT_PADS_4	0x10	
5	FlsInstructionOperandPair_5	5	QSPI_IP_LUT_INSTR_JMP_ON...	QSPI_IP_LUT_PADS_4	0x1	Jump to instruction 1 (ADDR)

Name: FastRead0xxAHB

FlsInstructionOperandPair

Index	Name	Fls Instruction Operand Pair Index	Fls LUT Instruction	Fls LUT Pad	Fls LUT Operand	
0	FlsInstructionOperandPair_0	0	QSPI_IP_LUT_INSTR_ADDR	QSPI_IP_LUT_PADS_4	0x18	No read instruction
1	FlsInstructionOperandPair_1	1	QSPI_IP_LUT_INSTR_MODE	QSPI_IP_LUT_PADS_4	0xa5	Enhance indicator = 0xA5: Enter 0-X-X
2	FlsInstructionOperandPair_2	2	QSPI_IP_LUT_INSTR_DUMMY	QSPI_IP_LUT_PADS_4	0x4	
3	FlsInstructionOperandPair_3	3	QSPI_IP_LUT_INSTR_READ	QSPI_IP_LUT_PADS_4	0x10	

How they work:

1. (Optional) Call the **Qspi__Ip__AhbReadEnable** to enable AHB operation
2. Call the **Qspi__Ip__Enter0XX** to switch to 0-X-X read command sets, driver will perform a dummy read to activate 0-X-X mode

3. Call the **Qspi_Ip_Read** to read data from flash memory without the send of the instruction code
4. (Optional) Access the QuadSPI's AHB region to read data directly, **Qspi_Ip_ControllerGetStatus** can be used to wait for AHB commands complete to avoid conflict with subsequent IP commands
5. Call the **Qspi_Ip_Exit0XX** to disable 0-X-X mode and switch back to normal read command sets

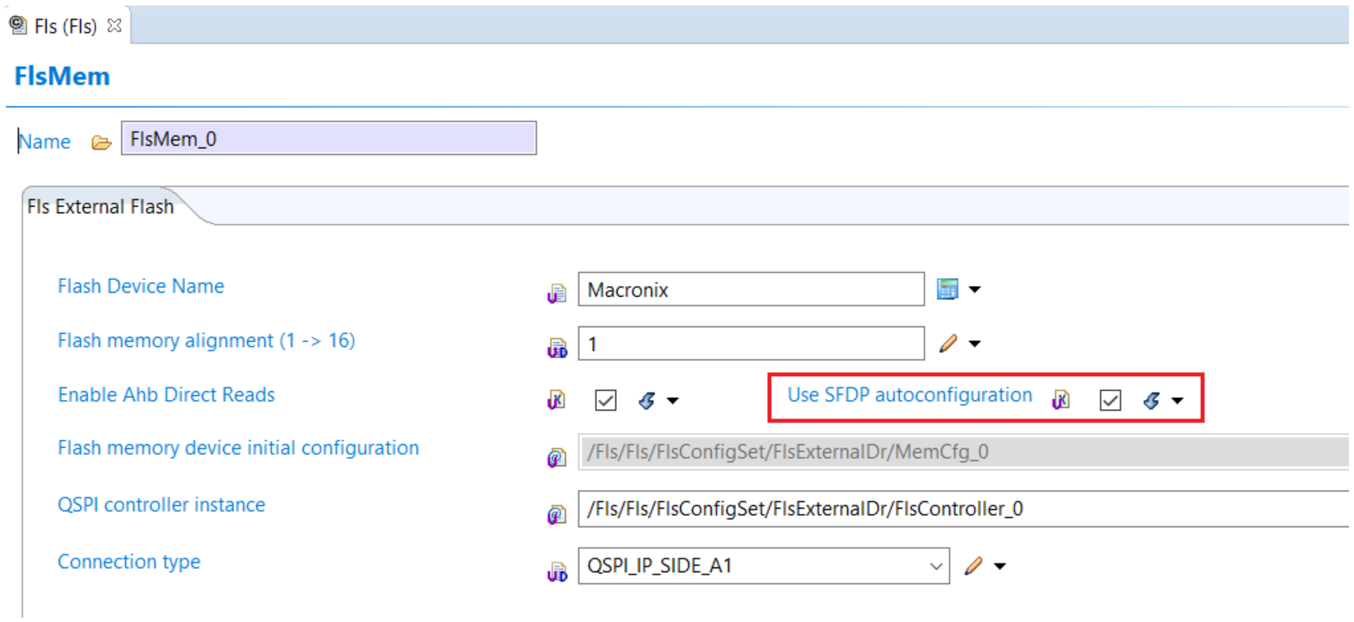
Note

Qspi_Ip_ClearIpSeqPointer() and **Qspi_Ip_ClearAHBSeqPointer()** can be useful for devices which support burst modes for enhancing performance

3.2.3.2.6 SFDP feature

Fls driver contains the SFDP software, user can enable this option to attempt auto-configuration using the information read from the SFDP table

- SFDP (Serial Flash Discoverable Parameters) is a JEDEC standard - JESD216D



Name: FlsMem_0

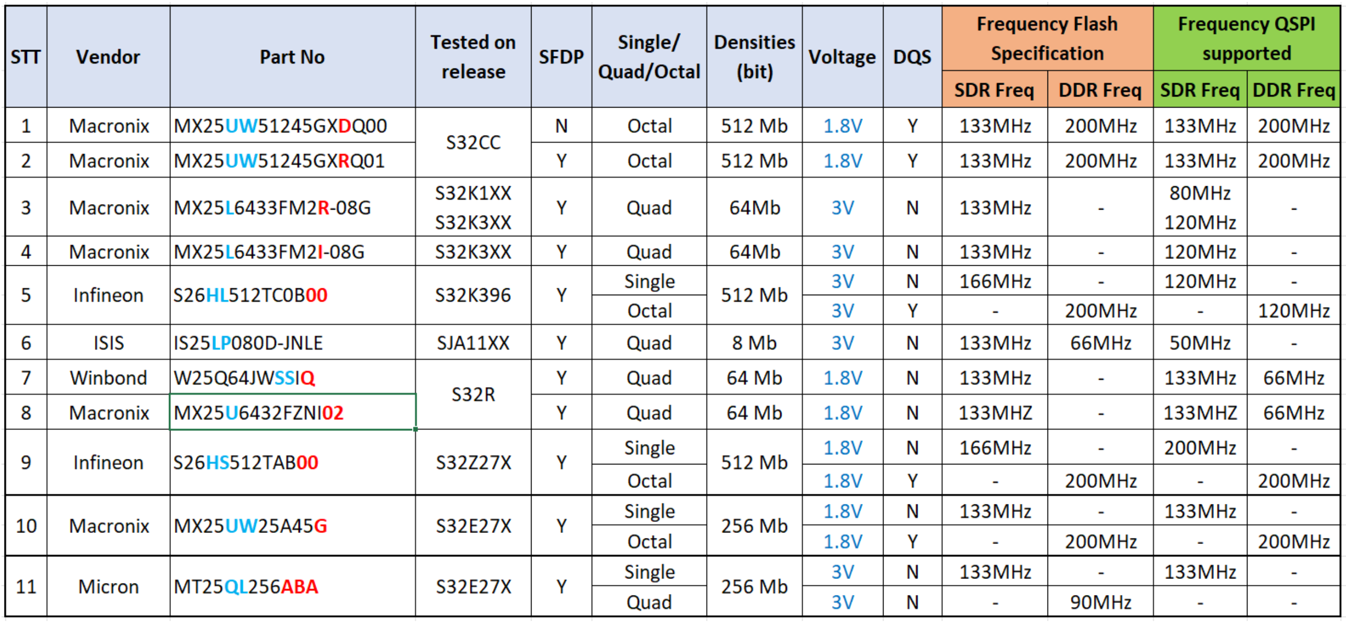
Flash Device Name: Macronix
Flash memory alignment (1 -> 16): 1
Enable Ahb Direct Reads: ✓
Use SFDP autoconfiguration: ✓
Flash memory device initial configuration: /Fls/Fls/FlsConfigSet/FlsExternalDr/MemCfg_0
QSPI controller instance: /Fls/Fls/FlsConfigSet/FlsExternalDr/FlsController_0
Connection type: QSPI_IP_SIDE_A1

Note

- The SFDP software only works for flash devices which support the SFDP feature
- Only standard JEDEC tables are interrogated, all vendor-specific tables will be skipped
- SFDP compliant devices must support 50 MHz operation for the Read SFDP command (instruction 5Ah). Some devices may support a wider frequency range, but user should run at 50 MHz or less and get valid results.
- The SFDP software does not support to read the tables directly in Octal-DDR mode (8D-8D-8D). It tries to issue 8D-8D-8D reset commands to force device to enter SPI mode before reading the SFDP tables. Therefore, user must enable the DDR mode in the QuadSPI controller settings for DDR instructions when working with devices boot up in Octal-DDR mode, or with Hyperflash devices which support the legacy SPI mode. (the Column Address setting is not required)

3.2.3.3 Supported memories

The following external device memories were tested by the Fls driver:



STT	Vendor	Part No	Tested on release	SFDP	Single/ Quad/Octal	Densities (bit)	Voltage	DQS	Frequency Flash Specification		Frequency QSPI supported	
									SDR Freq	DDR Freq	SDR Freq	DDR Freq
1	Macronix	MX25UW51245GXDQ00	S32CC	N	Octal	512 Mb	1.8V	Y	133MHz	200MHz	133MHz	200MHz
2	Macronix	MX25UW51245GXRQ01		Y	Octal	512 Mb	1.8V	Y	133MHz	200MHz	133MHz	200MHz
3	Macronix	MX25L6433FM2R-08G	S32K1XX S32K3XX	Y	Quad	64Mb	3V	N	133MHz	-	80MHz 120MHz	-
4	Macronix	MX25L6433FM2I-08G	S32K3XX	Y	Quad	64Mb	3V	N	133MHz	-	120MHz	-
5	Infineon	S26HL512TC0B00	S32K396	Y	Single	512 Mb	3V	N	166MHz	-	120MHz	-
					Octal		3V	Y	-	200MHz	-	120MHz
6	ISIS	IS25LP080D-JNLE	SJA11XX	Y	Quad	8 Mb	3V	N	133MHz	66MHz	50MHz	-
7	Winbond	W25Q64JWSSIQ	S32R	Y	Quad	64 Mb	1.8V	N	133MHz	-	133MHz	66MHz
8	Macronix	MX25U6432FZNI02		Y	Quad	64 Mb	1.8V	N	133MHZ	-	133MHZ	66MHz
9	Infineon	S26HS512TAB00	S32Z27X	Y	Single	512 Mb	1.8V	N	166MHz	-	200MHz	-
					Octal		1.8V	Y	-	200MHz	-	200MHz
10	Macronix	MX25UW25A45G	S32E27X	Y	Single	256 Mb	1.8V	N	133MHz	-	133MHz	-
					Octal		1.8V	Y	-	200MHz	-	200MHz
11	Micron	MT25QL256ABA	S32E27X	Y	Single	256 Mb	3V	N	133MHz	-	133MHz	-
					Quad		3V	N	-	90MHz	-	-

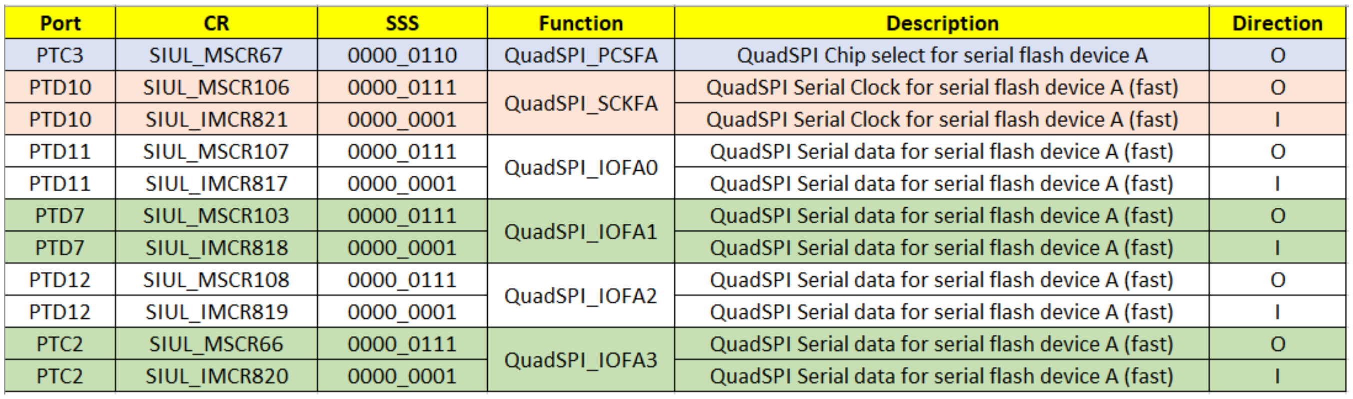
3.3 Hardware Resources

3.3.1 For external flash

Note

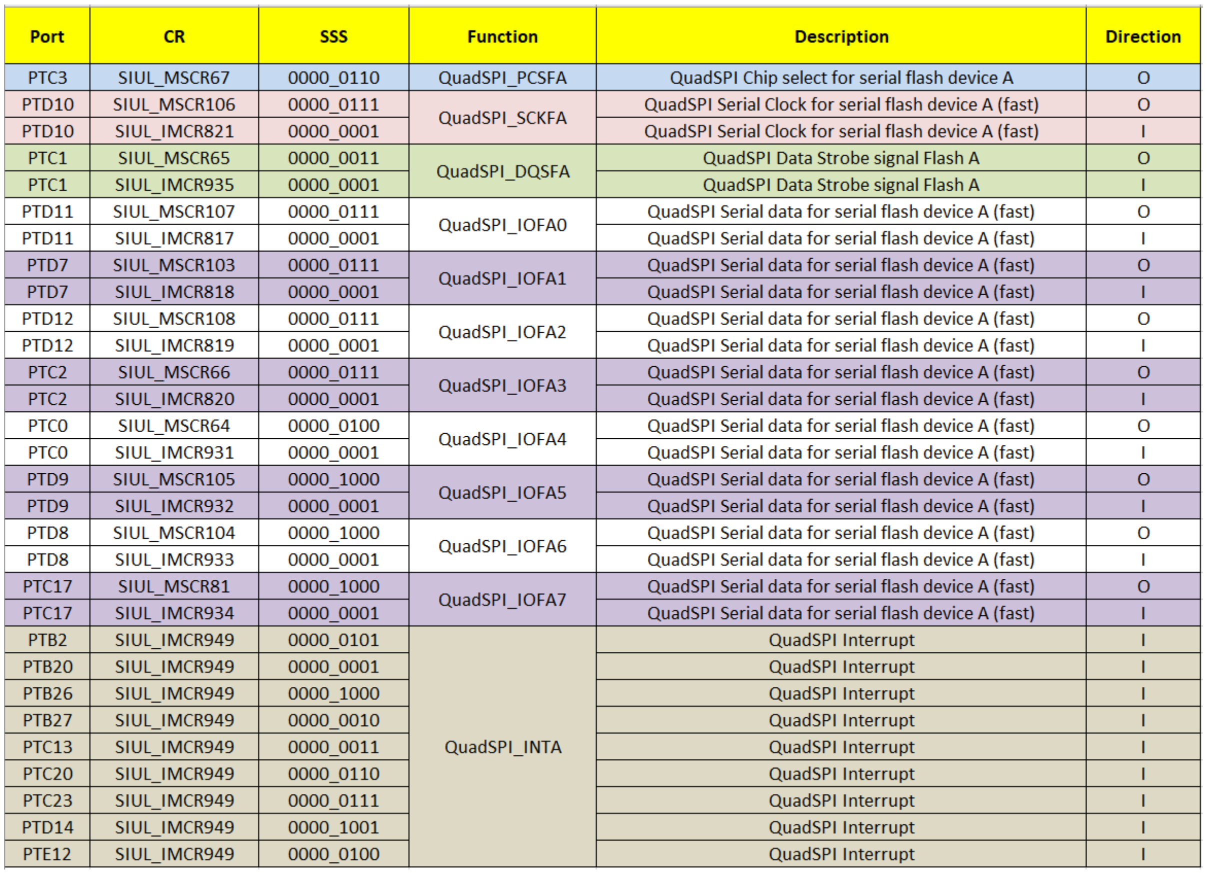
QuadSPI is not available on S32K312

- For S32K341 / S32K322 / S32K342 / S32K314 / S32K324 / S32K344
  - The Quad Serial Peripheral Interface (QuadSPI) block acts as an interface to single serial flash devices, with up to four bidirectional data lines. The QuadSPI supports 4-pin Quad A interface only in SDR mode



Port	CR	SSS	Function	Description	Direction
PTC3	SIUL_MSCR67	0000_0110	QuadSPI_PCSFA	QuadSPI Chip select for serial flash device A	O
PTD10	SIUL_MSCR106	0000_0111	QuadSPI_SCKFA	QuadSPI Serial Clock for serial flash device A (fast)	O
PTD10	SIUL_IMCR821	0000_0001		QuadSPI Serial Clock for serial flash device A (fast)	I
PTD11	SIUL_MSCR107	0000_0111	QuadSPI_IOFA0	QuadSPI Serial data for serial flash device A (fast)	O
PTD11	SIUL_IMCR817	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD7	SIUL_MSCR103	0000_0111	QuadSPI_IOFA1	QuadSPI Serial data for serial flash device A (fast)	O
PTD7	SIUL_IMCR818	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD12	SIUL_MSCR108	0000_0111	QuadSPI_IOFA2	QuadSPI Serial data for serial flash device A (fast)	O
PTD12	SIUL_IMCR819	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTC2	SIUL_MSCR66	0000_0111	QuadSPI_IOFA3	QuadSPI Serial data for serial flash device A (fast)	O
PTC2	SIUL_IMCR820	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I

- For S32K396
  - The QuadSPI supports 8-pin Quad A interface in both SDR and DDR mode
  - Support for Octal flash and Hyperflash memories



Port	CR	SSS	Function	Description	Direction
PTC3	SIUL_MSCR67	0000_0110	QuadSPI_PCSFA	QuadSPI Chip select for serial flash device A	O
PTD10	SIUL_MSCR106	0000_0111	QuadSPI_SCKFA	QuadSPI Serial Clock for serial flash device A (fast)	O
PTD10	SIUL_IMCR821	0000_0001		QuadSPI Serial Clock for serial flash device A (fast)	I
PTC1	SIUL_MSCR65	0000_0011	QuadSPI_DQSFA	QuadSPI Data Strobe signal Flash A	O
PTC1	SIUL_IMCR935	0000_0001		QuadSPI Data Strobe signal Flash A	I
PTD11	SIUL_MSCR107	0000_0111	QuadSPI_IOFA0	QuadSPI Serial data for serial flash device A (fast)	O
PTD11	SIUL_IMCR817	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD7	SIUL_MSCR103	0000_0111	QuadSPI_IOFA1	QuadSPI Serial data for serial flash device A (fast)	O
PTD7	SIUL_IMCR818	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD12	SIUL_MSCR108	0000_0111	QuadSPI_IOFA2	QuadSPI Serial data for serial flash device A (fast)	O
PTD12	SIUL_IMCR819	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTC2	SIUL_MSCR66	0000_0111	QuadSPI_IOFA3	QuadSPI Serial data for serial flash device A (fast)	O
PTC2	SIUL_IMCR820	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTC0	SIUL_MSCR64	0000_0100	QuadSPI_IOFA4	QuadSPI Serial data for serial flash device A (fast)	O
PTC0	SIUL_IMCR931	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD9	SIUL_MSCR105	0000_1000	QuadSPI_IOFA5	QuadSPI Serial data for serial flash device A (fast)	O
PTD9	SIUL_IMCR932	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTD8	SIUL_MSCR104	0000_1000	QuadSPI_IOFA6	QuadSPI Serial data for serial flash device A (fast)	O
PTD8	SIUL_IMCR933	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTC17	SIUL_MSCR81	0000_1000	QuadSPI_IOFA7	QuadSPI Serial data for serial flash device A (fast)	O
PTC17	SIUL_IMCR934	0000_0001		QuadSPI Serial data for serial flash device A (fast)	I
PTB2	SIUL_IMCR949	0000_0101	QuadSPI_INTA	QuadSPI Interrupt	I
PTB20	SIUL_IMCR949	0000_0001		QuadSPI Interrupt	I
PTB26	SIUL_IMCR949	0000_1000		QuadSPI Interrupt	I
PTB27	SIUL_IMCR949	0000_0010		QuadSPI Interrupt	I
PTC13	SIUL_IMCR949	0000_0011		QuadSPI Interrupt	I
PTC20	SIUL_IMCR949	0000_0110		QuadSPI Interrupt	I
PTC23	SIUL_IMCR949	0000_0111		QuadSPI Interrupt	I
PTD14	SIUL_IMCR949	0000_1001		QuadSPI Interrupt	I
PTE12	SIUL_IMCR949	0000_0100		QuadSPI Interrupt	I

Note

- Please refer to the examples for more details about configurations of pin mux, driver strength, pull up and slew rate settings

3.3.2 Flash Banks/Arrays, Sectors details

- List of S32K3xx derivatives and their flash configuration:

Derivatives	PFlash [KB]	DFlash [KB]	UTest [KB]	SectorSize [KB]
S32K310	512	64	8	8
S32K311	1024	64	8	8
S32K341		128	8	8
S32M274	512	64	8	8

Derivatives	PFlash [KB]	DFlash [KB]	UTest [KB]	SectorSize [KB]
S32M276	1024	64	8	8
S32K312	2048	128	8	8
S32K322		128	8	8
S32K342		128	8	8
S32K314	4096	128	8	8
S32K324		128	8	8
S32K344		128	8	8
S32K358	8192	128	8	8
S32K388		128	8	8
S32K394	4096	128	8	8
S32K396	6144	128	8	8

- For S32K310, S32M274: has 512 KBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 2 blocks (read partitions):
    - P Flash: Block code flash 0 (512K). Each sector is 8K so 512K/8K = 64 sectors.
    - D Flash: Block data flash 2 (64K). Each sector is 8K so 64K/8K = 8 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_2_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_2_S007	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S063	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K311, S32M276: has 1 MBytes of code flash (program flash), 64 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 3 blocks (read partitions):
    - P Flash: Block code flash 0 (512K). Each sector is 8K so 512K/8K = 64 sectors.
    - P Flash: Block code flash 1 (512K). Each sector is 8K so 512K/8K = 64 sectors.
    - D Flash: Block data flash 2 (64K). Each sector is 8K so 64K/8K = 8 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_2_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_2_S007	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S063	8

Sector name	Sector Size (KB)
FLS_CODE_ARRAY_0_BLOCK_1_S064	8
...	...
FLS_CODE_ARRAY_0_BLOCK_1_S127	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K341: has 1 MBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 3 blocks (read partitions):
    - P Flash: Block code flash 0 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
    - D Flash: Block data flash 2 (128K). Each sector is 8K so 128K/8K = 16 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_2_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_2_S007	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S127	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K3x2: has 2 MBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 3 blocks (read partitions):
    - P Flash: Block code flash 0 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
    - P Flash: Block code flash 1 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
    - D Flash: Block data flash 2 (128K). Each sector is 8K so 128K/8K = 16 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_2_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_2_S015	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S127	8
FLS_CODE_ARRAY_0_BLOCK_1_S128	8
...	...
FLS_CODE_ARRAY_0_BLOCK_1_S255	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K3x4: has 4 MBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM

- There are 5 blocks (read partitions):
  - P Flash: Block code flash 0 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
  - P Flash: Block code flash 1 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
  - P Flash: Block code flash 2 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
  - P Flash: Block code flash 3 (1M). Each sector is 8K so 1024K/8K = 128 sectors.
  - D Flash: Block data flash 4 (128K). Each sector is 8K so 128K/8K = 16 sectors.
  - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_4_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_4_S015	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S127	8
FLS_CODE_ARRAY_0_BLOCK_1_S128	8
...	...
FLS_CODE_ARRAY_0_BLOCK_1_S255	8
FLS_CODE_ARRAY_0_BLOCK_2_S256	8
...	...
FLS_CODE_ARRAY_0_BLOCK_2_S383	8
FLS_CODE_ARRAY_0_BLOCK_3_S384	8
...	...
FLS_CODE_ARRAY_0_BLOCK_3_S511	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K3x8: has 8 MBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 5 blocks (read partitions):
    - P Flash: Block code flash 0 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - P Flash: Block code flash 1 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - P Flash: Block code flash 2 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - P Flash: Block code flash 3 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - D Flash: Block data flash 4 (128K). Each sector is 8K so 128K/8K = 16 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_4_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_4_S015	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S255	8
FLS_CODE_ARRAY_0_BLOCK_1_S256	8
...	...

Sector name	Sector Size (KB)
FLS_CODE_ARRAY_0_BLOCK_1_S511	8
FLS_CODE_ARRAY_0_BLOCK_2_S512	8
...	...
FLS_CODE_ARRAY_0_BLOCK_2_S767	8
FLS_CODE_ARRAY_0_BLOCK_3_S768	8
...	...
FLS_CODE_ARRAY_0_BLOCK_3_S1023	8
FLS_UTEST_ARRAY_0_S000	8

- For S32K396: has 6 MBytes of code flash (program flash), 128 KBytes of data flash and 8 KBytes of Utest NVM
  - There are 5 blocks (read partitions):
    - P Flash: Block code flash 0 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - P Flash: Block code flash 1 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - P Flash: Block code flash 2 (2M). Each sector is 8K so 2048K/8K = 256 sectors.
    - D Flash: Block data flash 3 (128K). Each sector is 8K so 128K/8K = 16 sectors.
    - U Flash: Block Utest (8K). each sector is 8K so 8K/8K = 1 sectors.

Sector name	Sector Size (KB)
FLS_DATA_ARRAY_0_BLOCK_3_S000	8
...	...
FLS_DATA_ARRAY_0_BLOCK_3_S015	8
FLS_CODE_ARRAY_0_BLOCK_0_S000	8
...	...
FLS_CODE_ARRAY_0_BLOCK_0_S255	8
FLS_CODE_ARRAY_0_BLOCK_1_S256	8
...	...
FLS_CODE_ARRAY_0_BLOCK_1_S511	8
FLS_CODE_ARRAY_0_BLOCK_2_S512	8
...	...
FLS_CODE_ARRAY_0_BLOCK_2_S767	8
FLS_UTEST_ARRAY_0_S000	8

3.4 Deviations from Requirements

The driver deviates from the AUTOSAR FLS Driver software specification in some places. The table below identifies the AUTOSAR requirements that are not implemented or out of scope for the FLS Driver.

Term	Definition
N/S	Not supported
N/I	Not implemented
N/F	Not fully implemented

Below table identifies the AUTOSAR requirements that are not fully implemented, implemented differently or out of scope for the FLS driver.

Requirement	Status	Description	Notes
SWS_Fls_00145	N/S	If possible, e.g. with interrupt controlled implementations, the FLS module shall start the first round of the erase job directly within the function Fls_↩ Erase to reduce overall runtime.	Fls driver does not support interrupt
SWS_Fls_00146	N/S	If possible, e.g. with interrupt controlled implementations, the FLS module shall start the first round of the write job directly within the function Fls_↩ Write to reduce overall runtime.	Fls driver does not support interrupt
SWS_Fls_00232	N/S	The configuration parameter FlsUse↩ Interrupts shall switch between interrupt and polling controlled job processing if this is supported by the flash memory hardware.	Fls driver does not support interrupt
SWS_Fls_00233	N/S	The FLS module's implementer shall locate the interrupt service routine in Fls_Irq.c.	Fls driver does not support interrupt
SWS_Fls_00234	N/S	If interrupt controlled job processing is supported and enabled with the configuration parameter FlsUseInterrupts, the interrupt service routine shall reset the interrupt flag, check for errors reported by the underlying hardware, reload the hardware finite state machine for the next round of the pending job or call the appropriate notification routine if the job is finished or aborted.	Fls driver does not support interrupt

3.5 Driver Limitations

3.5.1 For C40 internal flash

- For Fls_Write, both TargetAddress and Length must be double words (8-byte) aligned. If not, a STATUS_↩ C40_IP_ERROR_INPUT_PARAM error code will be thrown at C40_Ip layer leading to FLS_E_WRITE↩ _FAILED at HLD.
- The UTest functions at IP layer:
  - C40_Ip_CheckUserTestStatus
  - C40_Ip_ArrayIntegrityCheck
  - C40_Ip_ArrayIntegrityCheckSuspend
  - C40_Ip_ArrayIntegrityCheckResume
  - C40_Ip_UserMarginReadCheck

They can not run from FLASH because during an array integrity sequence, the flash memory array ignore any incoming read requests. When a Flash array integrity check is in progress, the Flash memory controller terminates all Flash access requests with an error so all Utest functions must be run from RAM.

3.5.2 For external flash

- For Hyper Flash supported configuration but not working in XS32K3X8CVB-Q289 PCB 53108 RevX3 SCH RevA1. So this feature should not use.
- For QuadSPI supported configuration but not working in the NXP S32K388 VDK system. So this feature should not use.

3.5.3 Loading AccessCode to RAM

- Not Test

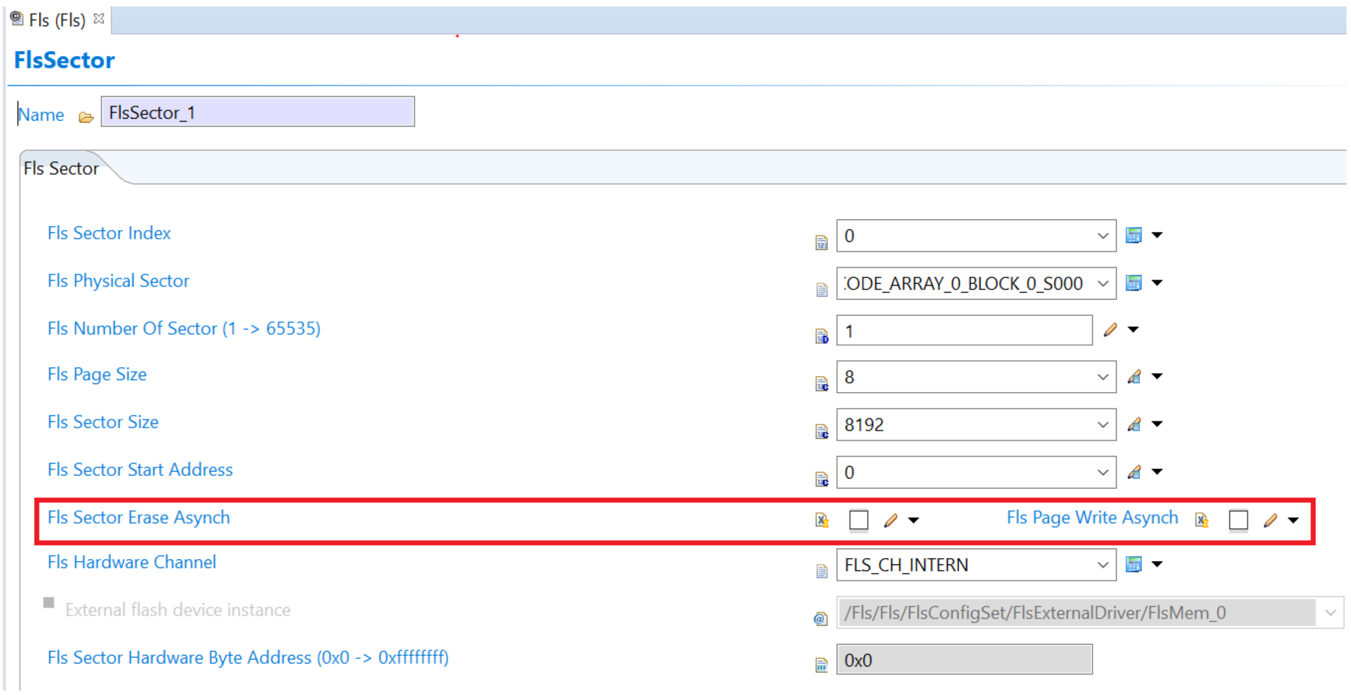
3.5.4 For Errata

- S32K3x4 and S32KK3x2
  - ERR051127 PFLASH: Flash read during array integrity may return incorrect read data
    - This will be implemented by ticket ARTD-59390
  - ERR050609 PFLASH: PFCR4[DERR_SUP] may not work as expected
    - Users need to be aware. FCCU need to be configured to workaround. Detail on Errata document.
  - ERR051061 PFLASH: Read-While-Write to the same block may return incorrect read data
    - If we use the single core to access to memory, the driver has a LoadAc feature to avoid Read-While-Write Error.
    - If we use the multicore to access to memory, the driver has the McoreSema4sLock feature to avoid Read-While-Write Error.
    - If we use DMA or another thing like that, to access memory while having another job writing, the driver can't control it to avoid Read-While-Write Error.
  - ERR051114 PFLASH: PFCBLK0_LOCKMASTER_SS register provides incorrect status of the super sector program/erase lock bit domain ID owner. There is no software workaround for this erratum. Master can find out if it owns the lock bit by toggling PFCBLK0_SSPELOCK register lock bit. If it owns lock bit then PFCBLK0_SSPELOCK register lock bit will be toggled
- S32K39x
  - ERR051358: Embedded Flash Memory: Unexpected false Address Encode Error may be generated
    - This error only appears when flash memory reads transition the 1 MB boundary of a 2 MB block in Utest mode, and it is not implemented yet in the driver code (C40_Ip.c). This will be implemented in next release (ticket ARTD-27001)

3.6 Driver usage and configuration tips

3.6.1 Introduction

For internal flash sectors, it's possible to modify the behavior of sector erase / page write using two configuration parameters (FlsSectorEraseAsynch, FlsPageWriteAsynch) in FlsSector TAB.


Fls (Fls)

FlsSector

Name: FlsSector_1

Fls Sector

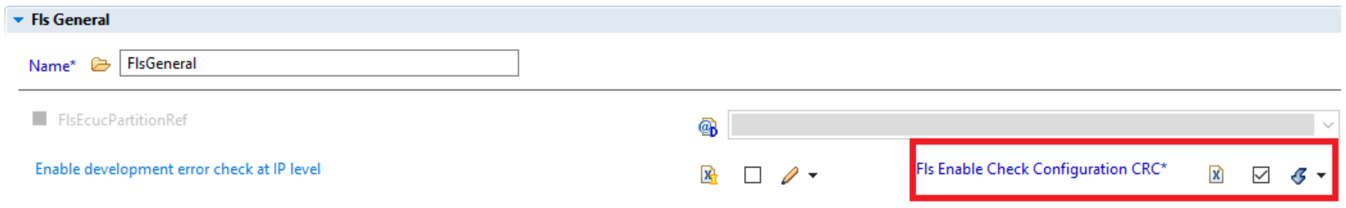
Fls Sector Index	0
Fls Physical Sector	:ODE_ARRAY_0_BLOCK_0_S000
Fls Number Of Sector (1 -> 65535)	1
Fls Page Size	8
Fls Sector Size	8192
Fls Sector Start Address	0
Fls Sector Erase Asynch	☐
Fls Page Write Asynch	☐
Fls Hardware Channel	FLS_CH_INTERN
External flash device instance	/Fls/Fls/FlsConfigSet/FlsExternalDriver/FlsMem_0
Fls Sector Hardware Byte Address (0x0 -> 0xffffffff)	0x0

If FlsSectorEraseAsynch/FlsPageWriteAsynch are enabled sector erase / page write job in the Fls_MainFunction are executed asynchronously, it means that Fls_MainFunction will not wait (not blocking) for completion of high voltage operation.

If FlsSectorEraseAsynch/FlsPageWriteAsynch are disabled sector erase / page write job are executed synchronously, which means sector erase / page write job are blocking and any high voltage operation will be completed during one Fls_Mainfunction.

3.6.2 Fls Enable Check Configuration CRC

The CRC configuration check that takes an amount of time, which may not be necessary if the image is already authenticated. So the driver will support the CRC check optional for the FLS Configuration. With the default to OFF (disabled). User can enable this function on configuration interface


Fls General

Name*: FlsGeneral

FlsEcucPartitionRef	
Enable development error check at IP level	☐
Fls Enable Check Configuration CRC*	✓

3.6.3 Avoiding RWW problem

To avoid RWW (Read While Write) problems on the internal flash, the FLS driver provides the FlsAcLoad↩ OnJobStart configuration parameter. If it is set to true the Fls driver will load the flash access code routine to RAM whenever an erase or write job is started and unload (overwrite) it after that job has been finished or canceled.

FlsAcLoadOnJobStart functionality can be used only in case of Sync Mode, in which case the flash access code is loaded to RAM and therefore the flash driver shouldn't have RWW problems; if FlsAcLoadOnJobStart is set to false the sector erased / page written must belong to flash array / partition different from flash array / partition the application is executing from.

If a platform does not support multiple read-while-write partitions, either the flash access code must be loaded to RAM(SYNC mode) or the entire code execution has to be moved to RAM while the FLS driver is performing the modify operation.

In case of Async operations it is only possible to erase / write to flash array different from flash array the application is executing from. This mode is usable only if the platform supports different Read While Write partitions or if the entire code is executed from RAM, during the flash modify operation.

Note:

1. The flash driver uses the sector erase / page write access code to clear the MCRS:DONE bit and wait for completion of high voltage operation (and therefore incompatible with Async operation).
2. The flash module might be further divided into partitions/blocks that determine locations for valid read-while-write (RWW) operations(Ex: Program flash block 0 and Data flash/FlexNvm). While the embedded flash memory is performing a 'write' (program or erase) to a given partition, it can simultaneously perform a read from any other partition.
3. FlsAcCallback should be in located in RAM if FlsAcLoadOnJobStart is true to avoid RWW problem.
4. When performing flash modifying operations which might interfere with the executing code, the application should take into account also the possible interrupts which could execute from flash during a flash modify operation. The flash access notifications can be used, in order to notify the start and finish of the flash access.
5. FlsCleanCacheAfterLoadAc allow to clean cache after loading AccessCode to RAM to ensure the synchronization between cache and RAM memory. This action might be needed in case the AccessCode function is coppied to a cacheable area.

3.7 Runtime errors

- The driver supports runtime generation of the errors listed in the table:

Error code	Function	Condition triggering the error
FLS_E_VERIFY_ERASE_FAILED	Fls_MainFunction()	Verify erasing operation failed before writing a flash block
		Verify erasing operation failed after erasing a flash block
FLS_E_VERIFY_WRITE_FAILED	Fls_MainFunction()	Verify writing operation failed after writing a flash block
FLS_E_TIMEOUT	Fls_Init()	Access timeout value to the flash controller has been exceeded
	Fls_MainFunction()	Maximum read / write / compare / erase time has been exceeded

- The driver supports Transient faults generation of the errors listed in the table:

Error Code	Function	Condition triggering the error
FLS_E_ERASE_FAILED	Fls_MainFunction()	A flash erase job fails due to a hardware error
FLS_E_WRITE_FAILED		A flash write job fails due to a hardware error
FLS_E_READ_FAILED		A flash read job fails due to a hardware error
FLS_E_COMPARE_FAILED		A flash compare job fails due to a hardware error
FLS_E_UNEXPECTED_FLASH_ID	Fls_Init()	The hardware ID of the external flash device mismatched the corresponding configuration parameter

- Development Error Description

Error Code	Value	Condition triggering the error
FLS_E_PARAM_CONFIG	1	API service called with wrong parameter
FLS_E_PARAM_ADDRESS	2	u32TargetAddress is not in range and aligned to first byte of flash sector
FLS_E_PARAM_LENGTH	3	u32TargetAddress is not in range and aligned to last byte of flash sector
FLS_E_PARAM_DATA	4	NULL_PTR == SourceAddressPtr
FLS_E_UNINIT	5	API service called without module initialization
FLS_E_BUSY	6	PI service called while driver still busy
FLS_E_PARAM_POINTER	10	NULL_PTR passed

3.8 Symbolic Names Disclaimer

All containers having symbolicNameValue set to TRUE in the AUTOSAR schema will generate defines like:

#define <Mip>Conf_<Container_ShortName>_<Container_ID>

For this reason it is forbidden to duplicate the names of such containers across the RTD configurations or to use names that may trigger other compile issues (e.g. match existing `#ifdefs` arguments).

Chapter 4

Tresos Configuration Plug-in

This chapter describes the Tresos configuration plug-in for the driver. All the parameters are described below.

- Module Fls
  - Container FlsConfigSet
    - Parameter FlsAcErase
    - Parameter FlsAcWrite
    - Parameter FlsAcErasePointer
    - Parameter FlsAcWritePointer
    - Parameter FlsCallCycle
    - Parameter FlsDefaultMode
    - Parameter FlsACCallback
    - Parameter FlsJobEndNotification
    - Parameter FlsJobErrorNotification
    - Parameter FlsStartFlashAccessNotif
    - Parameter FlsFinishedFlashAccessNotif
    - Parameter FlsMCoreTimeoutNotification
    - Parameter FlsReadFunctionCallout
    - Parameter FlsQspiInitCallout
    - Parameter FlsQspiResetCallout
    - Parameter FlsQspiErrorCheckCallout
    - Parameter FlsQspiEccCheckCallout
    - Parameter FlsMaxReadFastMode
    - Parameter FlsMaxReadNormalMode
    - Parameter FlsMaxWriteFastMode
    - Parameter FlsMaxWriteNormalMode
    - Parameter FlsProtection
    - Container FlsExternalDriver
      - Reference FlsSpiReference
      - Container ControllerCfg
      - Parameter FlsHwUnitReadMode
      - Parameter FlsSerialFlashA1Size
      - Parameter FlsSerialFlashA2Size

- Parameter FlsHwUnitSamplingModeA
- Parameter IdleSignalDriveIOFA3HighLvl
- Parameter IdleSignalDriveIOFA2HighLvl
- Parameter FlsHwUnitSamplingEdge
- Parameter FlsHwUnitSamplingDly
- Parameter FlsHwUnitTdh
- Parameter FlsHwUnitTcsh
- Parameter FlsHwUnitTcss
- Parameter FlsHwUnitColumnAddressWidth
- Parameter FlsHwUnitByteSwapping
- Parameter FlsHwUnitWordAddressable
- Container FlsAhbBuffer
- Parameter FlsAhbBufferInstance
- Parameter FlsAhbBufferMasterId
- Parameter FlsAhbBufferSize
- Parameter FlsAhbBufferAllMasters
- Container DllCfgA
- Parameter DllCfgADllMode
- Parameter DllCfgADllCraFreqEn
- Parameter DllCfgADllCraReferenceCounter
- Parameter DllCfgADllCraResolution
- Parameter DllCfgADllCraSlvFineOffset
- Parameter DllCfgADllCraSlvDlyOffset
- Parameter DllCfgADllCraSlvDlyCoarse
- Parameter DllCfgADllTapSelect
- Container SecureFlashProtection
- Parameter SfpMasterTimeout
- Container SfpMdadTG
- Parameter Valid
- Parameter SecureAttribute
- Parameter MaskType
- Parameter Mask
- Parameter DomainID
- Container SfpFrad
- Parameter Valid
- Parameter StartAddress
- Parameter EndAddress
- Parameter ExclusiveAccessLock
- Parameter ExclusiveAccessOwner
- Parameter Md0Acp
- Parameter Md1Acp
- Container MemCfg
- Parameter MemCfgSize
- Parameter MemCfgPageSize
- Reference MemCfgReadLUT
- Reference MemCfgWriteLUT
- Reference MemCfgRead0xxLUT

- Reference MemCfgRead0xxLUTAHB
- Reference ctrlAutoCfgPtr
- Container MemCfgReadIdSettings
- Parameter MemCfgReadIdSize
- Parameter FlsQspiDeviceId
- Reference MemCfgReadIdLUT
- Container MemCfgEraseSettings
- Parameter MemCfgErase1Size
- Parameter MemCfgErase2Size
- Parameter MemCfgErase3Size
- Parameter MemCfgErase4Size
- Reference MemCfgErase1LUT
- Reference MemCfgErase2LUT
- Reference MemCfgErase3LUT
- Reference MemCfgErase4LUT
- Reference ChipEraseLUT
- Container statusConfig
- Parameter regSize
- Parameter busyOffset
- Parameter busyValue
- Parameter writeEnableOffset
- Parameter blockProtectionOffset
- Parameter blockProtectionWidth
- Parameter blockProtectionValue
- Reference statusRegInitReadLut
- Reference statusRegReadLut
- Reference statusRegWriteLut
- Reference writeEnableSRLut
- Reference writeEnableLut
- Container suspendSettings
- Reference eraseSuspendLut
- Reference eraseResumeLut
- Reference programSuspendLut
- Reference programResumeLut
- Container resetSettings
- Parameter resetCmdCount
- Reference resetCmdLut
- Container initResetSettings
- Parameter resetCmdCount
- Reference resetCmdLut
- Container initConfiguration
- Parameter opType
- Parameter addr
- Parameter size
- Parameter shift
- Parameter width
- Parameter value

- Reference command1Lut
- Reference command2Lut
- Reference weLut
- Reference ctrlCfgPtr
- Container FlsLUT
- Parameter FlsLUTIndex
- Container FlsInstructionOperandPair
- Parameter FlsInstrOperPairIndex
- Parameter FlsLUTInstruction
- Parameter FlsLUTPad
- Parameter FlsLUTOperand
- Container HyperflashCfg
- Parameter MemCfgSize
- Parameter MemCfgPageSize
- Parameter outputDriverStrength
- Parameter RWDSLowOnDualError
- Parameter secureRegionUnlocked
- Parameter readLatency
- Parameter paramSectorMap
- Reference ctrlAutoCfgPtr
- Container MemCfgReadIdSettings
- Parameter MemCfgReadIdLUT
- Parameter MemCfgReadIdWordAddr
- Parameter MemCfgReadIdSize
- Parameter FlsQspiDeviceId
- Container FlsController
- Parameter ControllerName
- Reference FlsControllerCfgRef
- Container FlsMem
- Parameter FlsMemName
- Parameter MemAlignment
- Parameter AHBReadEnable
- Parameter FlsMemUseSfdp
- Parameter connectionType
- Reference FlsMemCfgRef
- Reference qspiInstance

* Container FlsSectorList
  - Container FlsSector
  - Parameter FlsSectorIndex
  - Parameter FlsPhysicalSector
  - Parameter FlsNumberOfSectors
  - Parameter FlsPageSize
  - Parameter FlsSectorSize
  - Parameter FlsSectorStartaddress
  - Parameter FlsSectorEraseAsynch
  - Parameter FlsPageWriteAsynch
  - Parameter FlsHwCh

        · Parameter FlsSectorHwAddress
        · Reference flashInstance
  - Container AutosarExt
      * Parameter FlsEnableUserModeSupport
      * Parameter FlsQspiLockLUT
      * Parameter FlsQspiHangRecovery
      * Parameter FlsSynchronizeCache
      * Parameter FlsMCoreEnable
      * Parameter FlsMCoreJobSemaphoreChannelNo
      * Parameter FlsMCoreQJobSemaphoreChannelNo
      * Parameter FlsInternalSectorsConfigured
      * Parameter FlsExternalSectorsConfigured
      * Parameter FlsDataErrorSuppression
      * Parameter FlsBlock4PipeSelect
      * Parameter FlsUsesAlterInterface
      * Parameter FlsDomainID
  - Container FlsGeneral
      * Parameter FlsEnableDevAssert
      * Parameter FlsEnableCheckCfgCrc
      * Parameter FlsUtestModeApi
      * Parameter FlsAcLoadOnJobStart
      * Parameter FlsCleanCacheAfterLoadAc
      * Parameter FlsBaseAddress
      * Parameter FlsBlankCheckApi
      * Parameter FlsCancelApi
      * Parameter FlsCompareApi
      * Parameter FlsDevErrorDetect
      * Parameter FlsDriverIndex
      * Parameter FlsGetJobResultApi
      * Parameter FlsGetStatusApi
      * Parameter FlsSetModeApi
      * Parameter FlsTotalSize
      * Parameter FlsUseInterrupts
      * Parameter FlsVersionInfoApi
      * Parameter FlsSectorSetLockApi
      * Parameter FlsECCCheck
      * Parameter FlsECCHandlingProtectionHook
      * Parameter FlsEraseVerificationEnabled
      * Parameter FlsWriteVerificationEnabled
      * Parameter FlsMaxEraseBlankCheck
      * Parameter FlsTimeoutSupervisionEnabled

    * Parameter FlsTimeoutMethod
    * Parameter FlsAsyncWriteTimeout
    * Parameter FlsAsyncEraseTimeout
    * Parameter FlsSyncWriteTimeout
    * Parameter FlsSyncEraseTimeout
    * Parameter FlsAbortTimeout
    * Parameter FlsQspiIpTimeoutOsifCounterType
    * Parameter FlsQspiSyncReadTimeout
    * Parameter FlsQspiAsyncWriteTimeout
    * Parameter FlsQspiAsyncEraseTimeout
    * Parameter FlsQspiSyncWriteTimeout
    * Parameter FlsQspiSyncEraseTimeout
    * Parameter FlsQspiDllLockTimeout
    * Parameter FlsQspiCommandCompleteTimeout
    * Parameter FlsQspiResetTimeout
    * Parameter SfpEnableGlobal
    * Parameter SfpEnableMdad
    * Parameter SfpEnableFrad
    * Parameter FlsQspiIdleTimeout
    * Parameter FlsQspiFlashInitTimeout
    * Parameter FlsQspiSoftwareResetDelay
    * Parameter FlsQspiTxBufferResetDelay
    * Parameter FlsQspiWriteEnableRetries
    * Parameter FlsMCoreArbitrationTimeout
    * Parameter FlsMCoreInitTimeout
    * Reference FlsEcucPartitionRef
- Container FlsPublishedInformation
    * Parameter FlsAcLocationErase
    * Parameter FlsAcLocationWrite
    * Parameter FlsAcSizeErase
    * Parameter FlsAcSizeWrite
    * Parameter FlsEraseTime
    * Parameter FlsErasedValue
    * Parameter FlsECCValue
    * Parameter FlsExpectedHwId
    * Parameter FlsSpecifiedEraseCycles
    * Parameter FlsWriteTime
- Container CommonPublishedInformation
    * Parameter ArReleaseMajorVersion
    * Parameter ArReleaseMinorVersion
    * Parameter ArReleaseRevisionVersion

  * Parameter ModuleId
  * Parameter SwMajorVersion
  * Parameter SwMinorVersion
  * Parameter SwPatchVersion
  * Parameter VendorApiInfix
  * Parameter VendorId

4.1 Module Fls

Configuration of the Fls (internal or external flash driver) module.

Included containers:

- FlsConfigSet
- AutosarExt
- FlsGeneral
- FlsPublishedInformation
- CommonPublishedInformation

Property	Value
type	ECUC-MODULE-DEF
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantSupport	true
supportedConfigVariants	VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

4.2 Container FlsConfigSet

Container for runtime configuration parameters of the flash driver.

Implementation Type: Fls_ConfigType.

Included subcontainers:

- FlsExternalDriver
- FlsSectorList

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.3 Parameter FlsAcErase

Address offset in RAM to which the erase flash access code shall be loaded.

Used as function pointer to access the erase flash access code.

Note: To use Fls Access Code Erase be sure Fls Access Code Erase Pointer is NULL or NULL_PTR.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	541253376
max	4294967295
min	0

4.4 Parameter FlsAcWrite

Address offset in RAM to which the write flash access code shall be loaded.

Used as function pointer to access the write flash access code.

Note: To use Fls Access Code Write be sure Fls Access Code Write Pointer is NULL or NULL_PTR.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	541253376
max	4294967295
min	0

4.5 Parameter FlsAcErasePointer

Vendor specific: Pointer in RAM to which the erase flash access code shall be loaded.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	NULL_PTR

4.6 Parameter FlsAcWritePointer

Vendor specific: Pointer in RAM to which the write flash access code shall be loaded.

Used as function pointer to access the write flash access code.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1

Property	Value
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	NULL_PTR

4.7 Parameter FlsCallCycle

Cycle time of calls of the flash driver main function

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0.2
max	1.0
min	0.0

4.8 Parameter FlsDefaultMode

This parameter is the default FLS device mode after initialization.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	MEMIF_MODE_SLOW
literals	['MEMIF_MODE_FAST', 'MEMIF_MODE_SLOW']

4.9 Parameter FlsACCallback

Vendor specific: Mapped to the Access Code Callback provided by some upper layer module, typically the Wdg module.

Note: Disable the Access Code Callback to have it set as NULL_PTR.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fls_AC_Callback

4.10 Parameter FlsJobEndNotification

Mapped to the job end notification routine provided by some upper layer module, typically the Fee module.

Note: Disable the end notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true

Property	Value
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fee_JobEndNotification

4.11 Parameter FlsJobErrorNotification

Mapped to the job error notification routine provided by some upper layer module, typically the Fee module.

Note: Disable the error notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fee_JobErrorNotification

4.12 Parameter FlsStartFlashAccessNotif

Vendor specific: Start flash access. If configured, this notification will be called before any flash memory access.

It is called before flash memory read accesses(in read, compare, verify write, verify erase jobs) and

before flash memory program operations(in write and erase jobs).

The purpose of this notification together with FlsFinishedFlashAccess, is to ensure that, if needed, no other

executed code(other tasks, cores, masters) will access the affected flash area simultaneously with the access

initiated by the driver. For more details, see Integration manual, chapter 5. Module requirements.

Note: Disable the error notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fls_StartFlashAccessNotif

4.13 Parameter FlsFinishedFlashAccessNotif

Vendor specific: Finished flash access. If configured, this notification will be called after any flash memory access.

It is called after flash memory read accesses(in read, compare, verify write, verify erase jobs).

The purpose of this notification together with FlsStartFlashAccess, is to ensure that, if needed, no other

executed code(other tasks, cores, masters) will access the affected flash area simultaneously with the access

initiated by the driver. For more details, see Integration manual, chapter 5. Module requirements.

Note: Disable the error notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fls_FinishedFlashAccessNotif

4.14 Parameter FlsMCoreTimeoutNotification

Vendor specific: Flash Multi Core Timeout Notification.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Fls_MCoreTimeoutNotif

4.15 Parameter FlsReadFunctionCallout

Vendor specific: The callout for the user to check for ECC errors for Internal Flash memories.

In this callout, the user can schedule a task that reads from flash memory

to a read source buffer and check/handle for an ECC exception.

If an exception occurs, a descriptor regarding the faulty line number

that caused the ECC and the state of the task should be updated.

Note: Inside a task, the flow is not endangered in case of an ECC exception, as the task can be forcibly terminated in that case.

(please see the chapter 'ECC Management on Flash' in IM for more information)

- Disable: Read and Compare functions will be handled by driver

- Enable: Read and Compare functions will be handled by users.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true

4.16 Parameter FlsQspiInitCallout

Vendor specific: Callout function called by the driver at the end of the QSPI Init phase.

The intended purpose of this callout is to provide to the application the

possibility of performing additional configuration to the QSPI hardware IP or

to the external memories connected(for ex: sending the lock/unlock sequences

for the external flash sectors, altering QSPI IP timing, etc.)

Note: Disable the callout in order to have it set as NULL_PTR.

Note: The callout can be configured only if the FlsExternalDriver is enabled.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FlsQspiInitCallout

4.17 Parameter FlsQspiResetCallout

Vendor specific: Callout function called by the driver at the beginning of a new job. The intended purpose of this callout is to provide to the application thepossibility of reseting the external memory to an idle and error free state.

If the callout is disabled, at the beginnig of a new job the Fls_MainFunction will check the external memory status and if not, poll and wait for it to become idle.

If the callout is enabled and the memory is not idle, the Fls_MainFunction will also call the configured function to allow the application to send extra commands to the external memory(software reset, abort any suspended operation, error flags clearing, etc.)

Note: Disable the callout in order to have it set as NULL_PTR.

Note: The callout can be configured only if the FlsExternalDriver is enabled.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FlsQspiResetCallout

4.18 Parameter FlsQspiErrorCheckCallout

Vendor specific: Callout function called by the driver at the end of each program and erase job

The intended purpose of this callout is to provide to the application the

possibility of interrogating the error status of the memory after each program and erase job.

The application should check any error or status bits available and reset the memory after interrogation

in case an error condition was detected.

If the callout is enabled, at the end of each job, the callout is called and the return

value is checked to determine if there was any error during the memory operation.

Return values: E_OK(0) E_NOT_OK(1).

If E_OK(0) is received, the job is considered successful.

If E_NOT_OK(1) is received, the job is considered unsuccessful and marked as failed.

If the callout is disabled, the job is assumed as successful from the memory status point of view.

Note: Disable the callout in order to have it set as NULL_PTR.

Note: The callout can be configured only if the FlsExternalDriver is enabled.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD

4.19 Parameter FlsQspiEccCheckCallout

Vendor specific: Callout function called by the driver at the end of each read operation

The intended purpose of this callout is to provide to the application the

possibility of interrogating the ECC status of the memory after each read operation.

The callout provide the hardware channel, start address and the size of the read operation.

The application should check there is any ECC error in the current read data

If the callout is enabled, at the end of each read operation, the callout is called and the return

value is checked to determine if there was any error during the memory operation.

Return values: E_OK(0) E_NOT_OK(1).

If E_OK(0) is received, the job is considered successful.

If E_NOT_OK(1) is received, the job is considered unsuccessful and marked as failed.

If the callout is disabled, the job is assumed as successful from the memory status point of view.

Note: Disable the callout in order to have it set as NULL_PTR.

Note: The callout can be configured only if the FlsExternalDriver is enabled.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FlsQspiEccCheckCallout

4.20 Parameter FlsMaxReadFastMode

The maximum number of bytes to read or compare in one cycle of the flash driver's job processing function in fast mode.

Note: If external sectors are configured and if FlsHwUnitWordAddressable is set,

the FlsMaxReadFastMode must be an even value(two bytes aligned).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1048576
max	4294967295
min	0

4.21 Parameter FlsMaxReadNormalMode

The maximum number of bytes to read or compare in one cycle of the flash driver's job processing function in normal mode.

Note: If external sectors are configured and if FlsHwUnitWordAddressable is set,

the FlsMaxReadNormalMode must be an even value(two bytes aligned).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1024
max	4294967295
min	0

4.22 Parameter FlsMaxWriteFastMode

The maximum number of bytes to write in one cycle of the flash driver's job processing function in fast mode.

Note: If external sectors are configured, the FlsMaxWriteFastMode must be an integer multiple of the FlsPageSize.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	256
max	4294967295
min	0

4.23 Parameter FlsMaxWriteNormalMode

The maximum number of bytes to write in one cycle of the flash driver's job processing function in normal mode.

Note: If external sectors are configured, the FlsMaxWriteFastMode must be an integer multiple of the FlsPageSize.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	8
max	4294967295
min	0

4.24 Parameter FlsProtection

Erase/write protection settings.Note:Not supported by the driver.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.25 Container FlsExternalDriver

This container is present for external Flash drivers only. Internal Flash drivers do not use the parameter listed in this container, hence its multiplicity is 0 for internal drivers.

Included subcontainers:

- ControllerCfg
- MemCfg
- HyperflashCfg
- FlsController
- FlsMem

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.26 Reference FlsSpiReference

Reference to SPI sequence. Not used in current implementation.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	true
destination	/AUTOSAR/EcucDefs/Spi/SpiDriver/SpiSequence

4.27 Container ControllerCfg

Vendor specific: Container for defining configurations for QSPI controllers.

These configurations are not tied to a particular controller.

Included subcontainers:

- FlsAhbBuffer
- DllCfgA
- SecureFlashProtection

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.28 Parameter FlsHwUnitReadMode

Vendor specific: The hardware unit read mode:

QSPI_IP_DATA_RATE_SDR (single data rate) which samples incoming data on a single edge.

QSPI_IP_DATA_RATE_DDR (double data rate) which samples incoming data on both edges.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_DATA_RATE_SDR
literals	['QSPI_IP_DATA_RATE_SDR', 'QSPI_IP_DATA_RATE_DDR']

4.29 Parameter FlsSerialFlashA1Size

Vendor specific: Size of flash device connected to side A1 of the controller. Set to 0 if no flash device is connected.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.30 Parameter FlsSerialFlashA2Size

Vendor specific: Size of flash device connected to side A2 of the controller. Set to 0 if no flash device is connected.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.31 Parameter FlsHwUnitSamplingModeA

Vendor specific: It selects DQS clock for sampling read data at Flash A QuadSPI port:

QSPI_IP_READ_MODE_INTERNAL_DQS = DQS internal (Default).

QSPI_IP_READ_MODE_LOOPBACK = Pad loopback.

QSPI_IP_READ_MODE_LOOPBACK_DQS = DQS pad loopback.

QSPI_IP_READ_MODE_EXTERNAL_DQS = External DQS.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_READ_MODE_LOOPBACK
literals	['QSPI_IP_READ_MODE_LOOPBACK', 'QSPI_IP_READ_MODE_↩ EXTERNAL_DQS']

4.32 Parameter IdleSignalDriveIOFA3HighLvl

Vendor specific: Idle Signal Drive IOFA[3] Flash A. This bit determines the logic level the IOFA[3] output of the QuadSPI module is driven to in the inactive state.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.33 Parameter IdleSignalDriveIOFA2HighLvl

Vendor specific: Idle Signal Drive IOFA[2] Flash A. This bit determines the logic level the IOFA[2] output of the QuadSPI module is driven to in the inactive state.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.34 Parameter FlsHwUnitSamplingEdge

Vendor specific: Full-speed phase selection for SDR instructions.

This field selects the edge of the sampling clock valid for full-speed commands.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SAMPLE_PHASE_NON_INVERTED
literals	['QSPI_IP_SAMPLE_PHASE_NON_INVERTED', 'QSPI_IP_SAMPLE_↩ PHASE_INVERTED']

4.35 Parameter FlsHwUnitSamplingDly

Vendor specific: Full-speed delay selection for internal/pad loop back DQS sampling.

This field selects the delay in accordance with the reference edge for the valid sample point.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SAMPLE_DELAY_SAME_DQS
literals	['QSPI_IP_SAMPLE_DELAY_SAME_DQS', 'QSPI_IP_SAMPLE_↩ DELAY_HALFCYCLE_EARLY_DQS']

4.36 Parameter FlsHwUnitTdh

Vendor specific: TDH: Serial flash data in hold time. Should be set to QSPI_IP_FLASH_DATA_ALIGN_REFCLK for QSPI_IP_DATA_RATE_SDR mode.

TDH parameter delays data sent to flash, in order to meet the input hold time requirement of flash.

QSPI_IP_FLASH_DATA_ALIGN_REFCLK = Data aligned with the posedge of Internal reference clock of Quad-SPI.

QSPI_IP_FLASH_DATA_ALIGN_2X_REFCLK = Data aligned with 2x serial flash half clock.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_FLASH_DATA_ALIGN_REFCLK
literals	['QSPI_IP_FLASH_DATA_ALIGN_REFCLK', 'QSPI_IP_FLASH_DATA↩ _ALIGN_2X_REFCLK']

4.37 Parameter FlsHwUnitTcsh

Vendor specific: TCSH: Serial flash CS hold time in terms of serial flash clock cycles.

A bigger value will release the CS signal later after the transaction ends.

The actual delay between chip select and clock is defined as:

TCSH = 1 SCK clk if N= 0/1 else, N SCK clk if N>1, where N is the setting of TCSH

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	3
max	15
min	0

4.38 Parameter FlsHwUnitTcss

Vendor specific: TCSS: Serial flash CS setup time in terms of serial flash clock cycles.

A bigger value will pull the CS signal earlier before the transaction starts.

The actual delay between chip select and clock is defined as:

TCSS = 0.5 SCK clk if N= 0/1 else, N+0.5 SCK clk if N>1, where N is the setting of TCSS.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	3
max	15
min	0

4.39 Parameter FlsHwUnitColumnAddressWidth

Vendor specific: Column Address Space. Defines the width of the column address.

Example: If the coulmn address is for example [2:0] of QSPI_SFAR/AHB address,

then CAS must be 3. If there is no column address separation in any

serial flash this value must be programmed to 0.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true

Property	Value
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	15
min	0

4.40 Parameter FlsHwUnitByteSwapping

Vendor specific: In case of Octal DDR mode, this bit controls whether a word unit composed of two bytes from posedge

and negedge of a single DQS cycle needs to be swapped.

- Disable : One word of two bytes at [nth, n+1th] address.

- Enable : One word of two bytes at [n+1th, nth] address

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.41 Parameter FlsHwUnitWordAddressable

Vendor specific: Defines whether the serial flash is a byte addressable flash or a word addressable flash.

According to this bit configuration the address is re-mapped to the flash interface.

DISABLED: Byte addressable serial flash mode.

ENABLED: Word (2 byte) addressable serial flash mode. If the

incoming address is 0x2004, the controller re-maps this address

to access the flash location 0x1002.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.42 Container FlsAhbBuffer

Container for the configuration of the AHB read buffers. Holds the configuration for each

AHB buffer configured for AHB read mode.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	4
upperMultiplicity	4
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.43 Parameter FlsAhbBufferInstance

Vendor specific: Selects the AHB buffer instance for which this configuration applies.

If an instance is not present, the corresponding AHB buffer will be configured with size 0.

The size of the AHB_BUFFER_3 instance will be configured to at least the selected size, or more, up until the maximum

value is reached. For more details about the maximum avaialable size see chip specific details.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	AHB_BUFFER_1
literals	['AHB_BUFFER_0', 'AHB_BUFFER_1', 'AHB_BUFFER_2', 'AHB_↩ BUFFER_3']

4.44 Parameter FlsAhbBufferMasterId

Vendor specific: The ID of the AHB master associated with this buffer. Any AHB access with this master port number is routed to this buffer. It must be ensured that the master IDs associated with all buffers must be different.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	15
min	0

4.45 Parameter FlsAhbBufferSize

Vendor specific: The size allocated to this AHB Buffer instance. The minimum size is 8 bytes, the maximum size is the entire AHB Buffer.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.46 Parameter FlsAhbBufferAllMasters

Vendor specific: When set, buffer3 acts as an all-master buffer. Any AHB access with a master port number not matching with the master ID of buffer0 or buffer1 or buffer2 is routed to buffer3.

When set, the Master ID parameter for this buffer is ignored.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.47 Container DllCfgA

Vendor specific: Container for DLL settings for side A

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.48 Parameter DllCfgADllMode

Vendor specific: Choose the mode of DLL feature for flash A.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_DLL_BYPASSED
literals	['QSPI_IP_DLL_BYPASSED', 'QSPI_IP_DLL_MANUAL_UPDATE', 'QSPI_IP_DLL_AUTO_UPDATE']

4.49 Parameter DllCfgADllCraFreqEn

Vendor specific: Frequency enable for flash A. These are 60-133Mhz (low freq) and 133-200Mhz (high freq)

Disable - Selects delay-chain for low frequency of operation.

Enable - Selects delay-chain for high frequency of operation.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.50 Parameter DllCfgADllCraReferenceCounter

Vendor specific: Select the "n+1" interval of DLL phase detection and reference delay updating interval (minimum recommended value = 1).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	15
min	0

4.51 Parameter DllCfgADllCraResolution

Vendor specific: Minimum resolution for DLL phase detector to remain locked/unlocked based on flash memory clock jitter.

The minimum value is 2, and should be programmed to a more suitable value, such as 6.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2
max	15
min	0

4.52 Parameter DllCfgADllCraSlvFineOffset

Vendor specific: Fine offset delay elements in incoming DQS for flash A

This field sets the number of fine offset delay elements up to 16 in incoming DQS; default should be 1 element

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	15
min	0

4.53 Parameter DllCfgADllCraSlvDlyOffset

Vendor specific: T/16 offset delay elements in incoming DQS for flash A

This field sets the number of T/16 offset delay elements in incoming DQS; default is 0.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false

Property	Value
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	7
min	0

4.54 Parameter DllCfgADllCraSlvDlyCoarse

Vendor specific: Delay elements in each delay tap for flash A

This field sets the number of delay elements in each delay tap. The field is used to overwrite DLL generated delay values and works in BYPASS Mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	15
min	0

4.55 Parameter DllCfgADllTapSelect

Vendor specific: Selects the nth tap provided by slave delay chain for flash memory A.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	7
min	0

4.56 Container SecureFlashProtection

Container for configuring the SFP block.

Included subcontainers:

- SfpMdadTG
- SfpFrad

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.57 Parameter SfpMasterTimeout

Vendor specific: Master Timeout (MTO)

Maximum timeout value to abort the ongoing write or read command. The timeout counter starts after the access from any target queue has won the arbitration and QSPI is IDLE (FSM_STAT state field is not 00).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	65535
max	4294967295
min	0

4.58 Container SfpMdadTG

Target Group n Master Domain Access Descriptor (TG0MDAD - TG1MDAD).

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	2
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: PRE-COMPILE

4.59 Parameter Valid

Indicates whether MDAD Descriptor for the target group n is valid.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A

Property	Value
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.60 Parameter SecureAttribute

Configure the SecureAttribute field for this TG.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SFP_BOTH
literals	['QSPI_IP_SFP_UNSECURE', 'QSPI_IP_SFP_SECURE', 'QSPI_IP_SFP↩ _BOTH']

4.61 Parameter MaskType

Vendor specific: Choose the mode of DLL feature for flash A.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD

Property	Value
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SFP_MASK_AND
literals	['QSPI_IP_SFP_MASK_AND', 'QSPI_IP_SFP_MASK_OR']

4.62 Parameter Mask

Defines the 6-bit mask value for the ID-Match comparision.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	63
min	0

4.63 Parameter DomainID

Specifies the reference value of the Domain-ID (MID) for MID-comparision.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	63
min	0

4.64 Container SfpFrad

Flash Region Access Descriptors.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	8
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: PRE-COMPILE

4.65 Parameter Valid

Indicates whether the FRAD Descriptor is valid.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.66 Parameter StartAddress

Flash Region Start Address (FRAD0_WORD0 - FRAD7_WORD0)

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.67 Parameter EndAddress

Flash Region End Address (FRAD0_WORD1 - FRAD7_WORD1)

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4294967295
max	4294967295
min	0

4.68 Parameter ExclusiveAccessLock

Defines the exclusive access lock field of the corresponding FRAD.

QSPI_IP_SFP_EAL_DISABLED: Write permissions available for all masters.

QSPI_IP_SFP_EAL_NONE: Lock enabled. Write permissions revoked for all domains.

QSPI_IP_SFP_EAL_OWNER: Lock enabled. Exclusive write permission for master with domain ID given in ExclusiveAccessOwner based on its Access Control Policy (Md0Acp and Md1Acp). Write disabled for other masters.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SFP_EAL_DISABLED
literals	['QSPI_IP_SFP_EAL_DISABLED', 'QSPI_IP_SFP_EAL_NONE', 'QSPI↩ _IP_SFP_EAL_OWNER']

4.69 Parameter ExclusiveAccessOwner

Indicates the domain/master ID that owns the exclusive access when ExclusiveAccessLock is QSPI_IP_SFP_EAL_OWNER.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	63
min	0

4.70 Parameter Md0Acp

Master Domain Access Control Policy for transactions coming through TG0.

Value

Policy

Secure privilege

Secure user

Non secure privilege

Non secure user

7

PRIVILEGED

R/W

R

R/W

R

6

ALL

R/W

R/W

R/W

R/W

5

SECURE_PRIVILEGED

R/W

R

R

R

4

SECURE

R/W

R/W

R

R

0

NONE

R

R

R

R

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SFP_ACP_NONE
literals	['QSPI_IP_SFP_ACP_NONE', 'QSPI_IP_SFP_ACP_SECURE', 'QSPI↩ _IP_SFP_ACP_SECURE_PRIVILEGED', 'QSPI_IP_SFP_ACP_ALL', 'QSPI_IP_SFP_ACP_PRIVILEGED']

4.71 Parameter Md1Acp

Master Domain Access Control Policy for transactions coming through TG1.

Value

Policy

Secure privilege

Secure user

Non secure privilege

Non secure user

7

PRIVILEGED

R/W

R

R/W

R

6

ALL

R/W

R/W

R/W

R/W

5

SECURE_PRIVILEGED

R/W

R

R

R

4

SECURE

R/W

R/W

R

R

0

NONE

R

R

R

R

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.72 Container MemCfg

Vendor specific: Container for defining configurations for serial flash devices.

These configurations are not tied to a particular device instance.

Included subcontainers:

- MemCfgReadIdSettings
- MemCfgEraseSettings
- statusConfig
- suspendSettings
- resetSettings
- initResetSettings
- initConfiguration
- FlsLUT

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.73 Parameter MemCfgSize

Vendor specific: The size in bytes of this flash device.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

Property	Value
defaultValue	8388608
max	4294967295
min	0

4.74 Parameter MemCfgPageSize

Vendor specific: The page size in bytes of this flash device.

Page size is the maximum amount of data that the flash device can write in a single write operation.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	256
max	4294967295
min	0

4.75 Reference MemCfgReadLUT

Vendor specific: Reference to the LUT Sequence ID which will be used for read operations

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.76 Reference MemCfgWriteLUT

Vendor specific: Reference to the LUT Sequence ID which will be used for write operations

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.77 Reference MemCfgRead0xxLUT

Vendor specific: Reference to the LUT Sequence ID which will be used for optimized read operations, if supported by the device.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.78 Reference MemCfgRead0xxLUTAHB

Vendor specific: Reference to the LUT Sequence ID which will be used for optimized read operations through AHB reads, if supported by the device.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.79 Reference ctrlAutoCfgPtr

Vendor specific: Reference to configuration which will be used for initializing the controller when the flash device is initialized.

This is needed for devices which need to change controller configuration during device initialization (e.g. switch to External DQS after activating DOPI mode).

Resetting the flash device will re-apply this configuration.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/ControllerCfg

4.80 Container MemCfgReadIdSettings

Vendor specific: Container for Read Device/Manufacturer ID command

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.81 Parameter MemCfgReadIdSize

Vendor specific: The size in bytes of the information returned by the readId command.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	3
max	10
min	0

4.82 Parameter FlsQspiDeviceId

Vendor specific: External memory ID. If the associated "FLS_E_UNEXPECTED_FLASH_ID" error is enabled, at Init,

the configured value is checked against the value read from memory.

The memory ID is read from the memory using the configured READ_ID LUT sequence.

Example for a Macronix device:

Configured value of FlsQspiDeviceId = 0x3A:81:C2, meaning Memory density: 0x3A, Memory type: 0x81, Manufacturer ID: 0xC2.

The configured READ_ID LUT sequence schedules a read id command (ex: RDID 0x9F) with read length 3 bytes.

Note: This parameter can be configured only when Read Id LUT index reference is used.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0x3A:81:C2

4.83 Reference MemCfgReadIdLUT

Vendor specific: Reference to the LUT Sequence ID which will be used for reading device/manufacturer Id.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.84 Container MemCfgEraseSettings

Vendor specific: Container for erase commands supported by the device

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.85 Parameter MemCfgErase1Size

Vendor specific: The size in bytes of the erased area: 2 ^ size; e.g. 0x0C means 4 Kbytes

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	12
max	32
min	1

4.86 Parameter MemCfgErase2Size

Vendor specific: The size in bytes of the erased area: 2 ^ size; e.g. 0x0C means 4 Kbytes

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD

Property	Value
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	12
max	32
min	1

4.87 Parameter MemCfgErase3Size

Vendor specific: The size in bytes of the erased area: 2 ^ size; e.g. 0x0C means 4 Kbytes

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	12
max	32
min	1

4.88 Parameter MemCfgErase4Size

Vendor specific: The size in bytes of the erased area: 2 ^ size; e.g. 0x0C means 4 Kbytes

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	12

Property	Value
max	32
min	1

4.89 Reference MemCfgErase1LUT

Vendor specific: Reference to the LUT Sequence ID for erase type 1.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.90 Reference MemCfgErase2LUT

Vendor specific: Reference to the LUT Sequence ID for erase type 2.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.91 Reference MemCfgErase3LUT

Vendor specific: Reference to the LUT Sequence ID for erase type 3.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.92 Reference MemCfgErase4LUT

Vendor specific: Reference to the LUT Sequence ID for erase type 4.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.93 Reference ChipEraseLUT

Vendor specific: Reference to the LUT Sequence ID for chip erase command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.94 Container statusConfig

Vendor specific: Container for settings related to the status register of the flash device

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.95 Parameter regSize

Vendor specific: The size in bytes of the status register

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A

Property	Value
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	4
min	1

4.96 Parameter busyOffset

Vendor specific: Position of "busy" bit inside status register. This bit is indicates whether the device is busy with a high voltage operation or not.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	31
min	0

4.97 Parameter busyValue

Vendor specific: Value of "busy" bit which indicates that the device is busy; can be 0 or 1

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	1
min	0

4.98 Parameter writeEnableOffset

Vendor specific: Position of "write enable" bit inside the status register

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	31
min	0

4.99 Parameter blockProtectionOffset

Vendor specific: Offset of block protection bits inside the status register

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD

Property	Value
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2
max	31
min	0

4.100 Parameter blockProtectionWidth

Vendor specific: Width of block protection bitfield inside the status register

A value of 0 disables protection setting.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4
max	32
min	0

4.101 Parameter blockProtectionValue

Vendor specific: Value of block protection bitfield inside the status register

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD

Property	Value
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	15
min	0

4.102 Reference statusRegInitReadLut

Vendor specific: Reference to the LUT Sequence ID for Read status register command.

This sequence is used during the initializaton stage.

For example if the initial state of the flash is SPI, this should be a SPI sequence.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.103 Reference statusRegReadLut

Vendor specific: Reference to the LUT Sequence ID for Read status register command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

Property	Value
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.104 Reference statusRegWriteLut

Vendor specific: Reference to the LUT Sequence ID for Write status register command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.105 Reference writeEnableSRLut

Vendor specific: Reference to the LUT Sequence ID for Status register write enable command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.106 Reference writeEnableLut

Vendor specific: Reference to the LUT Sequence ID for Write enable command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.107 Container suspendSettings

Vendor specific: Container related to write/erase suspend and resume commands, if supported by the device.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.108 Reference eraseSuspendLut

Vendor specific: Reference to the LUT Sequence ID for Erase suspend command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP

Property	Value
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.109 Reference eraseResumeLut

Vendor specific: Reference to the LUT Sequence ID for Erase resume command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.110 Reference programSuspendLut

Vendor specific: Reference to the LUT Sequence ID for Program suspend command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false

Property	Value
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.111 Reference programResumeLut

Vendor specific: Reference to the LUT Sequence ID for Program resume command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.112 Container resetSettings

Vendor specific: Container related to software reset command, for resettings the flash device.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.113 Parameter resetCmdCount

Vendor specific: Number of commands in the reset sequence

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	255
min	1

4.114 Reference resetCmdLut

Vendor specific: Reference to the LUT Sequence ID for the first command from the reset sequence.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.115 Container initResetSettings

Vendor specific: Container related to software reset command, for resettings the flash device. This reset procedure applies only at driver intialization. It might be different from the normal reset command, depending on the initial state of the flash. If not, set the same as reset command.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.116 Parameter resetCmdCount

Vendor specific: Number of commands in the reset sequence

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	255
min	1

4.117 Reference resetCmdLut

Vendor specific: Reference to the LUT Sequence ID for the first command from the reset sequence.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false

Property	Value
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.118 Container initConfiguration

Vendor specific: This container describes the list of operations which must be performed at initialization time to bring the memory in the desired operating state.

Example: activate XPI mode, activate 4-byte addressing.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	255
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.119 Parameter opType

Vendor specific: Operation type can be one of the following:

QSPI_IP_OP_TYPE_CMD	- Simple command
QSPI_IP_OP_TYPE_WRITE_REG	- Write value in external flash register
QSPI_IP_OP_TYPE_RMW_REG	- RMW command on external flash register
QSPI_IP_OP_TYPE_READ_REG	- Read external flash register until expected value is read
QSPI_IP_OP_TYPE_QSPI_CFG	- Re-configure QSPI controller

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_OP_TYPE_CMD
literals	['QSPI_IP_OP_TYPE_CMD', 'QSPI_IP_OP_TYPE_WRITE_REG', 'QSPI_IP_OP_TYPE_RMW_REG', 'QSPI_IP_OP_TYPE_READ_REG', 'QSPI_IP_OP_TYPE_QSPI_CFG']

4.120 Parameter addr

Vendor specific: Address, if used in command

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.121 Parameter size

Vendor specific: Size in bytes of configuration register, where it applies.

Property	Value
type	ECUC-INTEGER-PARAM-DEF

Property	Value
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	4
min	1

4.122 Parameter shift

Vendor specific: Offset of configuration field, where it applies.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	32
min	0

4.123 Parameter width

Vendor specific: Witdh of configuration field, where it applies.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false

Property	Value
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	32
min	0

4.124 Parameter value

Vendor specific: Value to set/expect in the bit-field.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	4294967295
min	0

4.125 Reference command1Lut

Vendor specific: Index of first command sequence in Lut; for RMW type this is the read command

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.126 Reference command2Lut

Vendor specific: Index of second command sequence in Lut, only used for RMW type, this is the write command.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.127 Reference weLut

Vendor specific: Index of write enable command, if needed before a write command. Only used for Write and RMW operations.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg/FlsLUT

4.128 Reference ctrlCfgPtr

Vendor specific: Reference to configuration which will be used for initializing the controller.

Valid only for QSPI_IP_OP_TYPE_QSPI_CFG operations

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/ControllerCfg

4.129 Container FlsLUT

Vendor specific: Container for the configuration of the Look Up Table holding all the Instruction/Operands sequences.

A sequence consists of a series of up to 8 instruction/operands pairs, which can ocupy up to 4 LUTs,

which are executed whenever a command is triggered to the external flash memory.

Included subcontainers:

- FlsInstructionOperandPair

Property	Value

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	65534
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.130 Parameter FlsLUTIndex

Vendor specific: Fls LUT Index is an invariant index, used to order the LUT entries and loop

over them in the correct, configured order. Its value should be equal with the position of the

configured LUT inside the configured LUT list (the same value as the shown index).

Rationale: The generated .epc configuration might reorder the LUT elements (alphabetically), thus the default index parameter

changes, becoming out of sync with the real intended order (the values are not generated in the intended order, they are sorted).

Range:

min = 0

max = 65534

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	65534
min	0

4.131 Container FlsInstructionOperandPair

Vendor specific: One command set which holds one memory command-operand pair.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.132 Parameter FlsInstrOperPairIndex

Vendor specific: Fls Instruction Operand Pair Index is an invariant index, used to order the Instr.Oper. entries and loop

over them in the correct, configured order. Its value should be equal with the position of the

configured pair inside the configured pair list (the same value as the shown index).

Rationale: The generated .epc configuration might reorder the instr.oper. pairs (alphabetically), thus the index parameter

changes, becoming out of sync with the real intended order (the values are not generated in the intended order, they are sorted).

Range:

min = 0

max = 65534

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	65534
min	0

4.133 Parameter FlsLUTInstruction

Vendor specific: The instruction type used to identify the command used by the QSPI IP when

sending the command to the memory.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_LUT_INSTR_CMD
literals	['QSPI_IP_LUT_INSTR_CMD', 'QSPI_IP_LUT_INSTR_ADDR', 'QSPI↩ _IP_LUT_INSTR_DUMMY', 'QSPI_IP_LUT_INSTR_MODE', 'QSPI_IP↩ _LUT_INSTR_MODE2', 'QSPI_IP_LUT_INSTR_MODE4', 'QSPI_IP_↩ LUT_INSTR_READ', 'QSPI_IP_LUT_INSTR_WRITE', 'QSPI_IP_LUT↩ _INSTR_JMP_ON_CS', 'QSPI_IP_LUT_INSTR_ADDR_DDR', 'QSPI↩ _IP_LUT_INSTR_MODE_DDR', 'QSPI_IP_LUT_INSTR_MODE2_DDR', 'QSPI_IP_LUT_INSTR_MODE4_DDR', 'QSPI_IP_LUT_INSTR_READ↩ _DDR', 'QSPI_IP_LUT_INSTR_WRITE_DDR', 'QSPI_IP_LUT_INSTR↩ _DATA_LEARN', 'QSPI_IP_LUT_INSTR_CMD_DDR', 'QSPI_IP_LUT↩ _INSTR_CADDR', 'QSPI_IP_LUT_INSTR_CADDR_DDR', 'QSPI_IP_↩ LUT_INSTR_JMP_TO_SEQ', 'QSPI_IP_LUT_INSTR_STOP']

4.134 Parameter FlsLUTPad

Vendor specific: Number of pads/pins used for the current command.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_LUT_PADS_1
literals	['QSPI_IP_LUT_PADS_1', 'QSPI_IP_LUT_PADS_2', 'QSPI_IP_LUT_↩ PADS_4', 'QSPI_IP_LUT_PADS_8']

4.135 Parameter FlsLUTOperand

Vendor specific: The operand of the instruction command sent to memory.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	255
min	0

4.136 Container HyperflashCfg

Container for defining configurations for hyper flash devices.

These configurations are not tied to a particular device instance.

Included subcontainers:

- MemCfgReadIdSettings

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.137 Parameter MemCfgSize

Vendor specific: The size in bytes of this flash device.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	8388608
max	4294967295
min	0

4.138 Parameter MemCfgPageSize

Vendor specific: The page size in bytes of this flash device.

Page size is the maximum amount of data that the flash device can write in a single write operation.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	512
max	4294967295
min	0

4.139 Parameter outputDriverStrength

Output driver level of the device:

QSPI_IP_HF_DRV_STRENGTH_000 : Typical Impedance for 1.8V: 27; Typical Impedance 3V: 20.

QSPI_IP_HF_DRV_STRENGTH_001 : Typical Impedance for 1.8V: 117; Typical Impedance 3V: 71.

QSPI_IP_HF_DRV_STRENGTH_002 : Typical Impedance for 1.8V: 68; Typical Impedance 3V: 40.

QSPI_IP_HF_DRV_STRENGTH_003 : Typical Impedance for 1.8V: 45; Typical Impedance 3V: 27.

QSPI_IP_HF_DRV_STRENGTH_004 : Typical Impedance for 1.8V: 34; Typical Impedance 3V: 20.

QSPI_IP_HF_DRV_STRENGTH_005 : Typical Impedance for 1.8V: 27; Typical Impedance 3V: 16.

QSPI_IP_HF_DRV_STRENGTH_006 : Typical Impedance for 1.8V: 24; Typical Impedance 3V: 14.

QSPI_IP_HF_DRV_STRENGTH_007 : Typical Impedance for 1.8V: 20; Typical Impedance 3V: 12.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_HF_DRV_STRENGTH_000
literals	['QSPI_IP_HF_DRV_STRENGTH_000', 'QSPI_IP_HF_DRV_↩ STRENGTH_001', 'QSPI_IP_HF_DRV_STRENGTH_002', 'QSPI_IP_HF↩ _DRV_STRENGTH_003', 'QSPI_IP_HF_DRV_STRENGTH_004', 'QSPI↩ _IP_HF_DRV_STRENGTH_005', 'QSPI_IP_HF_DRV_STRENGTH_006', 'QSPI_IP_HF_DRV_STRENGTH_007']

4.140 Parameter RWDSLowOnDualError

Specifies if RWDS will stall upon Dual Error Detect

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.141 Parameter secureRegionUnlocked

If true, the secure silicon region will be unlocked

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.142 Parameter readLatency

Read latency in cycles. Must be set considering the operation frequency:

QSPI_IP_HF_READ_LATENCY_5_CLOCKS : Read latency 5 clocks; max frequency : 52 MHz

QSPI_IP_HF_READ_LATENCY_6_CLOCKS : Read latency 6 clocks; max frequency : 62 MHz

QSPI_IP_HF_READ_LATENCY_7_CLOCKS : Read latency 7 clocks; max frequency : 72 MHz

QSPI_IP_HF_READ_LATENCY_8_CLOCKS : Read latency 8 clocks; max frequency : 83 MHz

QSPI_IP_HF_READ_LATENCY_9_CLOCKS : Read latency 9 clocks; max frequency : 93 MHz

QSPI_IP_HF_READ_LATENCY_10_CLOCKS : Read latency 10 clocks; max frequency : 104 MHz

QSPI_IP_HF_READ_LATENCY_11_CLOCKS : Read latency 11 clocks; max frequency : 114 MHz

QSPI_IP_HF_READ_LATENCY_12_CLOCKS : Read latency 12 clocks; max frequency : 125 MHz

QSPI_IP_HF_READ_LATENCY_13_CLOCKS : Read latency 13 clocks; max frequency : 135 MHz

QSPI_IP_HF_READ_LATENCY_14_CLOCKS : Read latency 14 clocks; max frequency : 145 MHz

QSPI_IP_HF_READ_LATENCY_15_CLOCKS : Read latency 15 clocks; max frequency : 156 MHz

QSPI_IP_HF_READ_LATENCY_16_CLOCKS : Read latency 16 clocks; max frequency : 166 MHz

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_HF_READ_LATENCY_16_CLOCKS
literals	['QSPI_IP_HF_READ_LATENCY_5_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_6_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_7_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_8_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_9_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_10_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_11_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_12_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_13_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_14_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_15_CLOCKS', 'QSPI_IP_HF_READ_LATENCY_16_CLOCKS']

4.143 Parameter paramSectorMap

Define the mapping of the 4-KB Parameter Sectors:

QSPI_IP_HF_PARAM_AND_PASSWORD_MAP_LOW : Parameter-Sectors and Read Password Sectors mapped into lowest addresses

QSPI_IP_HF_PARAM_AND_PASSWORD_MAP_HIGH : Parameter-Sectors and Read Password Sectors mapped into highest addresses

QSPI_IP_HF_UNIFORM_SECTORS_READ_PASSWORD_LOW : Uniform Sectors with Read Password Sector mapped into lowest addresses

QSPI_IP_HF_UNIFORM_SECTORS_READ_PASSWORD_HIGH : Uniform Sectors with Read Password Sector mapped into highest addresses

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_HF_UNIFORM_SECTORS_READ_PASSWORD_LOW
literals	['QSPI_IP_HF_PARAM_AND_PASSWORD_MAP_LOW', 'QSPI_IP_HF↩_PARAM_AND_PASSWORD_MAP_HIGH', 'QSPI_IP_HF_UNIFORM↩_SECTORS_READ_PASSWORD_LOW', 'QSPI_IP_HF_UNIFORM_↩SECTORS_READ_PASSWORD_HIGH']

4.144 Reference ctrlAutoCfgPtr

Vendor specific: Reference to configuration which will be used for initializing the controller when the flash device is initialized.

This is needed for devices which need to change controller configuration during device initialization (e.g. switch to External DQS after activating DOPI mode).

Resetting the flash device will re-apply this configuration.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true

Property	Value
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/ControllerCfg

4.145 Container MemCfgReadIdSettings

Vendor specific: Container for Read Device/Manufacturer ID command

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.146 Parameter MemCfgReadIdLUT

Vendor specific: Reference to the LUT Sequence ID which will be used for reading device/manufacturer Id.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	False
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_HF_LUT_READ
literals	['QSPI_IP_HF_LUT_READ']

4.147 Parameter MemCfgReadIdWordAddr

Vendor specific: The word address of the device ID in ASO.

This value will be converted to by address for the read ID transaction.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.148 Parameter MemCfgReadIdSize

Vendor specific: The size in bytes of the information returned by the readId command.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	3
max	10
min	0

4.149 Parameter FlsQspiDeviceId

Vendor specific: External memory ID. If the associated "FLS_E_UNEXPECTED_FLASH_ID" error is enabled, at Init,

the configured value is checked against the value read from memory.

The memory ID is read from the memory using the configured READ_ID LUT sequence.

Example for a Macronix device:

Configured value of FlsQspiDeviceId = 0x3A:81:C2, meaning Memory density: 0x3A, Memory type: 0x81, Manufacturer ID: 0xC2.

The configured READ_ID LUT sequence schedules a read id command (ex: RDID 0x9F) with read length 3 bytes.

Note: This parameter can be configured only when Read Id LUT index reference is used.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0x3A:81:C2

4.150 Container FlsController

Container for selecting the start configuration of QSPI controllers.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.151 Parameter ControllerName

Vendor specific: The name of the configured harwdare unit name. The configured parameters will apply to this hardware unit name only.

The name of the hardware unit name represents the physical hardware unit available on chip.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FLS_QSPI_0
literals	['FLS_QSPI_0']

4.152 Reference FlsControllerCfgRef

Vendor specific: Reference to configuration which will be used for initializing the controller.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/ControllerCfg

4.153 Container FlsMem

Container for selecting the start configuration and connection information of serial flash devices.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

4.154 Parameter FlsMemName

Vendor specific: The name of the configured flash device. The configured parameters will apply to this device only.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Device_0

4.155 Parameter MemAlignment

Vendor specific: The address alignment required by the external flash (1, 2 or 4 bytes, ...), needed in the OCTA DTR Mode (DOPI) or hyperbus devices.

For read operation:

- The driver will decrease the address if it is not aligned, and increasing the size to compensate.

- After the actual read, the driver ignores the first few bytes before starting the copy/comparison to the user data.

For write operation: send extra data with FFh to overwrite the overlapping memory area

? If there is a need to program from odd starting address, keep the even input address and the input data shall start with FFh.

? If there is a need to program with odd ending address, simply provide extra data with FFh in the last falling edge of clock.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	16
min	1

4.156 Parameter AHBReadEnable

Vendor specific: When set, Qspi_Ip_AhbReadEnable() will be called from Fls_Init() to allow reads via AHB.

The application can read directly through Flash memory devices address mapping.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.157 Parameter FlsMemUseSfdp

Vendor specific: Select this option to attempt auto-configuration using the information read from the SFDP table

This only works for flash devices which support the SFDP feature.

SFDP (Serial Flash Discoverable Parameters) is a JEDEC standard - JESD216D.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.158 Parameter connectionType

Vendor specific: Connection type of the flash device to the controller:

QSPI_IP_SIDE_A1 - Serial flash connected on side A1

QSPI_IP_SIDE_A2 - Serial flash connected on side A2

QSPI_IP_SIDE_B1 - Serial flash connected on side B1

QSPI_IP_SIDE_B2 - Serial flash connected on side B2

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	QSPI_IP_SIDE_A1
literals	['QSPI_IP_SIDE_A1', 'QSPI_IP_SIDE_A2', 'QSPI_IP_SIDE_B1', 'QSPI↩ _IP_SIDE_B2']

4.159 Reference FlsMemCfgRef

Vendor specific: Reference to configuration which will be used for initializing the flash memory device.

Property	Value
type	ECUC-CHOICE-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destinations	['/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/MemCfg', '/TS↩ _T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/HyperflashCfg']

4.160 Reference qspiInstance

Vendor specific: QSPI controller instance to which this flash device is connected.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/FlsController

4.161 Container FlsSectorList

List of flashable sectors and pages.

Included subcontainers:

- FlsSector

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.162 Container FlsSector

Configuration description of a flashable sector

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.163 Parameter FlsSectorIndex

Vendor specific: Fls Sector Index is an invariant index, used to order flash sectors and loop

over them in the correct, configured order. Its value should be equal with the position of the

configured sector inside the configured sector list (the same value as the shown index).

Rationale: The generated .epc configuration might reorder the flash sectors(alphabetically), thus the index parameter

changes, becoming out of sync with the real intended order (for example: Fls Sector Start Addresses).

Range:

min = 0

max = 65534

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	65534
min	0

4.164 Parameter FlsPhysicalSector

Vendor specific: Physical flash device sector.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FLS_DATA_ARRAY_0_BLOCK_4_S000

Property	Value
literals	['FLS_DATA_ARRAY_0_BLOCK_4_S000', 'FLS_DATA_ARRAY_0_BLOCK_4_S001', 'FLS_DATA_ARRAY_0_BLOCK_4_S002', 'FLS_DATA_ARRAY_0_BLOCK_4_S003', 'FLS_DATA_ARRAY_0_BLOCK_4_S004', 'FLS_DATA_ARRAY_0_BLOCK_4_S005', 'FLS_DATA_ARRAY_0_BLOCK_4_S006', 'FLS_DATA_ARRAY_0_BLOCK_4_S007', 'FLS_DATA_ARRAY_0_BLOCK_4_S008', 'FLS_DATA_ARRAY_0_BLOCK_4_S009', 'FLS_DATA_ARRAY_0_BLOCK_4_S010', 'FLS_DATA_ARRAY_0_BLOCK_4_S011', 'FLS_DATA_ARRAY_0_BLOCK_4_S012', 'FLS_DATA_ARRAY_0_BLOCK_4_S013', 'FLS_DATA_ARRAY_0_BLOCK_4_S014', 'FLS_DATA_ARRAY_0_BLOCK_4_S015', 'FLS_CODE_ARRAY_0_BLOCK_0_S000', 'FLS_CODE_ARRAY_0_BLOCK_0_S001', 'FLS_CODE_ARRAY_0_BLOCK_0_S002', 'FLS_CODE_ARRAY_0_BLOCK_0_S003', 'FLS_CODE_ARRAY_0_BLOCK_0_S004', 'FLS_CODE_ARRAY_0_BLOCK_0_S005', 'FLS_CODE_ARRAY_0_BLOCK_0_S006', 'FLS_CODE_ARRAY_0_BLOCK_0_S007', 'FLS_CODE_ARRAY_0_BLOCK_0_S008', 'FLS_CODE_ARRAY_0_BLOCK_0_S009', 'FLS_CODE_ARRAY_0_BLOCK_0_S010', 'FLS_CODE_ARRAY_0_BLOCK_0_S011', 'FLS_CODE_ARRAY_0_BLOCK_0_S012', 'FLS_CODE_ARRAY_0_BLOCK_0_S013', 'FLS_CODE_ARRAY_0_BLOCK_0_S014', 'FLS_CODE_ARRAY_0_BLOCK_0_S015', 'FLS_CODE_ARRAY_0_BLOCK_0_S016', 'FLS_CODE_ARRAY_0_BLOCK_0_S017', 'FLS_CODE_ARRAY_0_BLOCK_0_S018', 'FLS_CODE_ARRAY_0_BLOCK_0_S019', 'FLS_CODE_ARRAY_0_BLOCK_0_S020', 'FLS_CODE_ARRAY_0_BLOCK_0_S021', 'FLS_CODE_ARRAY_0_BLOCK_0_S022', 'FLS_CODE_ARRAY_0_BLOCK_0_S023', 'FLS_CODE_ARRAY_0_BLOCK_0_S024', 'FLS_CODE_ARRAY_0_BLOCK_0_S025', 'FLS_CODE_ARRAY_0_BLOCK_0_S026', 'FLS_CODE_ARRAY_0_BLOCK_0_S027', 'FLS_CODE_ARRAY_0_BLOCK_0_S028', 'FLS_CODE_ARRAY_0_BLOCK_0_S029', 'FLS_CODE_ARRAY_0_BLOCK_0_S030', 'FLS_CODE_ARRAY_0_BLOCK_0_S031', 'FLS_CODE_ARRAY_0_BLOCK_0_S032', 'FLS_CODE_ARRAY_0_BLOCK_0_S033', 'FLS_CODE_ARRAY_0_BLOCK_0_S034', 'FLS_CODE_ARRAY_0_BLOCK_0_S035', 'FLS_CODE_ARRAY_0_BLOCK_0_S036', 'FLS_CODE_ARRAY_0_BLOCK_0_S037', 'FLS_CODE_ARRAY_0_BLOCK_0_S038', 'FLS_CODE_ARRAY_0_BLOCK_0_S039', 'FLS_CODE_ARRAY_0_BLOCK_0_S040', 'FLS_CODE_ARRAY_0_BLOCK_0_S041', 'FLS_CODE_ARRAY_0_BLOCK_0_S042', 'FLS_CODE_ARRAY_0_BLOCK_0_S043', 'FLS_CODE_ARRAY_0_BLOCK_0_S044', 'FLS_CODE_ARRAY_0_BLOCK_0_S045', 'FLS_CODE_ARRAY_0_BLOCK_0_S046', 'FLS_CODE_ARRAY_0_BLOCK_0_S047', 'FLS_CODE_ARRAY_0_BLOCK_0_S048', 'FLS_CODE_ARRAY_0_BLOCK_0_S049', 'FLS_CODE_ARRAY_0_BLOCK_0_S050', 'FLS_CODE_ARRAY_0_BLOCK_0_S051', 'FLS_CODE_ARRAY_0_BLOCK_0_S052', 'FLS_CODE_ARRAY_0_BLOCK_0_S053', 'FLS_CODE_ARRAY_0_BLOCK_0_S054', 'FLS_CODE_ARRAY_0_BLOCK_0_S055', 'FLS_CODE_ARRAY_0_BLOCK_0_S056', 'FLS_CODE_ARRAY_0_BLOCK_0_S057', 'FLS_CODE_ARRAY_0_BLOCK_0_S058', 'FLS_CODE_ARRAY_0_BLOCK_0_S059', 'FLS_CODE_ARRAY_0_BLOCK_0_S060', 'FLS_CODE_ARRAY_0_BLOCK_0_S061', 'FLS_CODE_ARRAY_0_BLOCK_0_S062', 'FLS_CODE_ARRAY_0_BLOCK_0_S063', 'FLS_CODE_ARRAY_0_BLOCK_0_S064', 'FLS_CODE_ARRAY_0_BLOCK_0_S065', 'FLS_CODE_ARRAY_0_BLOCK_0_S066', 'FLS_CODE_ARRAY_0_BLOCK_0_S067', 'FLS_CODE_ARRAY_0_BLOCK_0_S068', 'FLS_CODE_ARRAY_0_BLOCK_0_S069', 'FLS_CODE_ARRAY_0_BLOCK_0_S070', 'FLS_CODE_ARRAY_0_BLOCK_0_S071', 'FLS_CODE_ARRAY_0_BLOCK_0_S072', 'FLS_CODE_ARRAY_0_BLOCK_0_S073', 'FLS_CODE_ARRAY_0_BLOCK_0_S074', 'FLS_CODE_ARRAY_0_BLOCK_0_S075', 'FLS_CODE_ARRAY_0_BLOCK

Property	Value

4.165 Parameter FlsNumberOfSectors

Number of continuous sectors with the above characteristics.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	65535
min	1

4.166 Parameter FlsPageSize

Size of one page of this sector. Implementation Type: Fls_LengthType.

For internal flash, page size is 8 byte

For external flash, page size is chip specific.

For example: In Macronix devices, the ECC algorithm uses a Hamming code that can correct a single bit error per 16-Byte page.

It is recommended that data be programmed in multiples of 16 bytes using the Page Program command instead of programming a byte or a word at a time using the Program command.

Each group of 16 bytes must fall within the same 16-Byte boundary.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1

Property	Value
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	8
max	4294967295
min	0

4.167 Parameter FlsSectorSize

Size of this sector. Implementation Type: Fls_LengthType.

Note: Size of the sector should be a multiple of the page size.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	8192
max	4294967295
min	0

4.168 Parameter FlsSectorStartaddress

Start address of this sector.

Implementation Type: Fls_AddressType.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.169 Parameter FlsSectorEraseAsynch

Vendor specific: Enable asynchronous execution of the erase job in the Fls_MainFunction function which doesn't wait (block)

for completion of the sector erase operation. The flash driver doesn't use the erase access code to the erase flash sector

in asynchronous mode so it can be used only on flash sectors which belong to flash array different from flash array the

application is executing from.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.170 Parameter FlsPageWriteAsynch

Vendor specific: Enable asynchronous execution of the write job in the Fls_MainFunction function which doesn't wait (block) for completion of the page write operation(s). The flash driver doesn't use the write access code to the write flash page(s)

in asynchronous mode so it can be used only on flash sectors which belong to flash array different from flash array the

application is executing from.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.171 Parameter FlsHwCh

Vendor specific: The hardware channel type of the current sector: internal flash or external QSPI flash sector.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FLS_CH_QSPI
literals	['FLS_CH_QSPI', 'FLS_CH_INTERN']

4.172 Parameter FlsSectorHwAddress

Vendor specific: Hardware address of this sector, as needed by the external flash device (usually starting from 0).

Applicable only to external sectors. This value is used to access the hardware sector on the attached device

and will be sent as parameter of flash comands, so it should be completed to meet the requirements of the

external flash memory type and configured operating mode.

Internally, this address is added to the MCU base addresses of each channel, configured in SF{A/B}{1/2}AD registers, in order

to select the corresponding external device hw channel.

Example: FlsSectorHwAddress = 0x100

Sector hardware channel = FLS_CH_EXTERN_QSPI_0_A2

FlsSerialFlashA1TopAddr = 0x24000000

The address used by the driver internally will be 0x24000100, thus selecting external

flash device A2 and accessing internal location 0x100 of the memory.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.173 Reference flashInstance

Vendor specific: External flash device instance to which this sector belongs.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false

Property	Value
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/TS_T40D34M30I0R0/Fls/FlsConfigSet/FlsExternalDriver/FlsMem

4.174 Container AutosarExt

Vendor specific: This container contains the global Non-Autosar configuration parameters of the Fls driver.

This container is a MultipleConfigurationContainer, i.e. this container and

its sub-containers exist once per configuration set.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.175 Parameter FlsEnableUserModeSupport

Vendor specific: When this parameter is enabled, the FLS module will adapt to run from User Mode, with the following measures:

configuring REG_PROT for Fls IPs so that the registers under protection can be accessed from user mode by setting UAA bit in REG_PROT_GCR to 1

for more information and availability on this platform, please see chapter User Mode Support in IM

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.176 Parameter FlsQspiLockLUT

Vendor specific: Enable the Lock/Unlock of the LUT for the external QuadSPI memory.

If Enabled, the LUT is unlocked at the beginning of the Init phase and locked at the end of it.

If Disabled, the LUT has to be unlocked if the Init phase is supposed to populate it.

Note: not used in the driver code.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.177 Parameter FlsQspiHangRecovery

Vendor specific: Enable the hang recovery feature for the external QuadSPI controller.

If Enabled, the driver will perform the software reset sequence in case of being stuck in BUSY state.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF

Property	Value
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.178 Parameter FlsSynchronizeCache

Vendor specific:

Synchronize the memory by invalidating the cache after each flash hardware operation.

The FLS driver needs to maintain the memory coherency by means of three methods:

1. Disable data cache, or

2. Configure the flash region upon which the driver operates, as non-cacheable, or

3. Enable the FlsSynchronizeCache feature.

Depending on the application configuration, one option may be more beneficial than other.

Enabled: The FLS driver will call Mcl cache API functions in order to invalidate the cache

after each high voltage operation(write,erase) and before each read operation, in order

to ensure that the cache and the modified flash memory are in sync.

If enabled, the driver will attempt to invalidate only the modified lines from the cache.

If the size of the region to be invalidated is greater than half of the cache size, then

the entire cache is invalidated.

Note: If enabled, the MclLmemEnableCacheApi parameter has to be enabled and the MCL plugin included as a dependency.

Disabled: The upper layers have to ensure that the flash region upon which the driver operates is not cached.

This can be obtained by either disabling the data cache or by configuring the memory region as non-cacheable.

Note: This feature is applicable only if supported on the current platform.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.179 Parameter FlsMCoreEnable

Vendor specific:

Enable the multicore synchronization feature.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.180 Parameter FlsMCoreJobSemaphoreChannelNo

Vendor specific:

The channel number of the multicore semaphore used for requesting an internal job access.

The channel number should be passed to the MCL gate APIs.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.181 Parameter FlsMCoreQJobSemaphoreChannelNo

Vendor specific:

The channel number of the multicore semaphore used for requesting an external job access.

The channel number should be passed to the MCL gate APIs.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.182 Parameter FlsInternalSectorsConfigured

Vendor specific:

Boolean parameter which must be enabled if internal flash sectors are configured.

Enabled: At least one internal flash sector is configured in any variant.

Disabled: No internal flash sector is configured in any variant, only external flash sectors are present.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.183 Parameter FlsExternalSectorsConfigured

Vendor specific:

Boolean parameter which must be enabled if external flash sectors are configured.

Enabled: At least one external flash sector is configured in any variant.

Disabled: No external flash sector is configured in any variant, only internal flash sectors are present.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.184 Parameter FlsDataErrorSuppression

Vendor specific: See the Embedded Flash Memory configuration information or system memory map for which flash memory blocks are affected by this field.

Disable - Reports ECC events on data flash memory accesses.

Enable - Single-bit and multi-bit ECC events on data flash memory accesses are suppressed.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.185 Parameter FlsBlock4PipeSelect

Vendor specific: Select the pipe to be used for accessing the internal flash block 4.

PFLASH has four independent command pipes to issue four parallel read commands to different flash memory blocks.

The access to block 4 can be through any of the command pipes:

FLS_COMMAND_PIPE_0 - Block 4 access is always through pipe 0.

FLS_COMMAND_PIPE_1 - Block 4 access is always through pipe 1.

FLS_COMMAND_PIPE_2 - Block 4 access is always through pipe 2.

FLS_COMMAND_PIPE_3 - Block 4 access is always through pipe 3.

FLS_ANY_COMMAND_PIPES - Block 4 access can be through any of the command pipes, based on which command pipe is available for block 4 access.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1

Property	Value
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	FLS_COMMAND_PIPE_0
literals	['FLS_COMMAND_PIPE_0', 'FLS_COMMAND_PIPE_1', 'FLS_↩ COMMAND_PIPE_2', 'FLS_COMMAND_PIPE_3', 'FLS_ANY_↩ COMMAND_PIPES']

4.186 Parameter FlsUsesAlterInterface

Vendor specific: When enabled: A second interface is made available for program and erase operations

The alternate interface includes an alternate MCR register, alternate MCRS register,

alternate PEADR register, and alternate sector and super sector PELOCK registers.

Program and Erase procedures on the alternate interface follow exactly the same flow as the main interface

Note:

+) Both the Alternate Interface and the Main Interface have the same priority which allows

both operations to initiate in parallel.

+) Alternate inteface may not be available for the application cores, it only allocated to the HSE core.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.187 Parameter FlsDomainID

Vendor specific: The domain ID assigned by the XRDC.

Note: Users have to fill using core.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.188 Container FlsGeneral

Container for general parameters of the flash driver. These parameters are always pre-compile.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.189 Parameter FlsEnableDevAssert

Vendor specific:

true: Development error checking at IP level is enabled.

false: Development error checking at IP level is disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.190 Parameter FlsEnableCheckCfgCrc

Vendor specific:

true: Enable calculates CRC for Fls Configuration

false: Disable calculates CRC for Fls Configuration.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.191 Parameter FlsUtestModeApi

Compile switch to enable and disable the Fls Utest Mode function.

true : API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.192 Parameter FlsAcLoadOnJobStart

The flash driver shall load the flash access code to RAM whenever an erase or write job is started and unload (overwrite) it after that job has been finished or canceled.

true: Flash access code loaded on job start / unloaded on job end or error.

false: Flash access code not loaded to / unloaded from RAM at all.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.193 Parameter FlsCleanCacheAfterLoadAc

Vendor specific: Pre-processor switch to allow to clean cache after loading AccessCode to RAM to ensure the synchronization between cache and RAM memory.

This action might be needed in case the AccessCode function is coppied to a cacheable area.

true: cleans cache after loading AccessCode function to RAM to write cache data to the actual RAM memory

false: does not clean cache after loading AccessCode function to RAM

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.194 Parameter FlsBaseAddress

The flash memory start address (see also FLS118).

FLS169: This parameter defines the lower boundary for read / write / erase and compare jobs.Note:Not needed / supported by the driver.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.195 Parameter FlsBlankCheckApi

Compile switch to enable and disable the Fls_BlankCheck function.

true: API supported / function provided.

false: API not supported / function not provided

Property	**Value**
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.196 Parameter FlsCancelApi

Compile switch to enable and disable the Fls_Cancel function.

true: API supported / function provided.

false: API not supported / function not provided

Property	**Value**
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.197 Parameter FlsCompareApi

Compile switch to enable and disable the Fls_Compare function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.198 Parameter FlsDevErrorDetect

Pre-processor switch to enable and disable development error detection.

true: Development error detection enabled.

false: Development error detection disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.199 Parameter FlsDriverIndex

Index of the driver, used by FEE.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	true
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	254
min	0

4.200 Parameter FlsGetJobResultApi

Compile switch to enable and disable the Fls_GetJobResult function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.201 Parameter FlsGetStatusApi

Compile switch to enable and disable the Fls_GetStatus function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.202 Parameter FlsSetModeApi

Compile switch to enable and disable the Fls_SetMode function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.203 Parameter FlsTotalSize

The total amount of flash memory in bytes (see also FLS118). FLS170: This parameter in conjunction with FLS_BASE_ADDRESS defines the upper boundary for read / write / erase and compare jobs.

Note:Not needed / supported by the driver.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.204 Parameter FlsUseInterrupts

Not supported by the driver.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.205 Parameter FlsVersionInfoApi

Pre-processor switch to enable / disable the API to read out the modules version information.

true: Version info API enabled.

false: Version info API disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.206 Parameter FlsSectorSetLockApi

Pre-processor switch to enable / disable the Sector Set Lock Api.

true: Sector Set Lock Api enabled.

false: Sector Set Lock Api disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.207 Parameter FlsECCCheck

Vendor specific: Pre-processor switch to enable / disable the API to report data storage (ECC) errors to the flash driver.

This is the first ECC handling approach which modifies the program counter to skip the instruction causing the fault.

Please read the chapter Exception Handler in case of ECC error in IM for more information.

true : The ECC check by HardfaultHandler API is enabled.

false: The ECC check by HardfaultHandler API is disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.208 Parameter FlsECCHandlingProtectionHook

Vendor specific: Pre-processor switch to enable / disable the API to report data storage (ECC) errors to the flash driver.

This is the second ECC handling approach which is compatible with Autosar Os.

Please read the chapter Exception Handler in case of ECC error in IM for more information.

true : The ECC check by AutosarOs API is enabled.

false: The ECC check by AutosarOs API is disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.209 Parameter FlsEraseVerificationEnabled

Pre-processor switch to enable / disable the erase blank check. After a flash block has been erased, the erase blank check compares the contents of the addressed memory area against the value of an erased flash cell to check that the block has been completely erased.

true: Memory region is checked to be erased.

false: Memory region is not checked to be erased.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.210 Parameter FlsWriteVerificationEnabled

Pre-processor switch to enable / disable the write verify check. After writing a flash block, the write verify check compares the contents of the reprogrammed memory area against the contents of the provided application buffer to check that the block has been completely reprogrammed.

true: Written data is compared directly after write.

false: Written date is not compared directly after write.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.211 Parameter FlsMaxEraseBlankCheck

Vendor specific: The maximum number of bytes to blank check in one cycle of the flash driver's job processing function. Affects only the flash blocks that have enabled asynchronous execution of the erase job (FlsSectorEraseAsynch=true).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	256
max	65536
min	8

4.212 Parameter FlsTimeoutSupervisionEnabled

Compile switch to enable timeout supervision.

true: timeout supervision for read/erase/write/compare jobs enabled.

false: timeout supervision for read/erase/write/compare jobs disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.213 Parameter FlsTimeoutMethod

Vendor specific: Counter type used in timeout detection for FLS service request.

Based on selected counter type the timeout value will be interpreted as follows:

OSIF_COUNTER_DUMMY - Counts the number of iterations of the waiting loop. The actual timeout depends on many factors: operation type, compiler optimizations, interrupts or other tasks in the system, etc.

OSIF_COUNTER_SYSTEM - Microseconds.

OSIF_COUNTER_CUSTOM - Defined by user implementation of timing services

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	OSIF_COUNTER_DUMMY
literals	['OSIF_COUNTER_DUMMY', 'OSIF_COUNTER_SYSTEM', 'OSIF_↩ COUNTER_CUSTOM']

4.214 Parameter FlsAsyncWriteTimeout

Vendor specific: Fls Async Write Timeout is the timeout value for write operation in asynchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647

Property	Value
max	2147483647
min	0

4.215 Parameter FlsAsyncEraseTimeout

Vendor specific: Fls Async Erase Timeout is the timeout value for erase operation in asynchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.216 Parameter FlsSyncWriteTimeout

Vendor specific: Fls Sync Write Timeout is the timeout value for write operation in synchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.217 Parameter FlsSyncEraseTimeout

Vendor specific: Fls Sync Erase Timeout is the timeout value for erase operation in synchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.218 Parameter FlsAbortTimeout

Vendor specific: Fls Abort Timeout is the timeout value for aborting an ongoing operation.

The timeout is used also in Fls_Cancel API and Abort Erase suspend, if enabled and if the flash hardware channel does not support an immediate abort feature.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	32767
max	2147483647
min	0

4.219 Parameter FlsQspiIpTimeoutOsifCounterType

Vendor specific: Counter type used in timeout detection for QSPI operations.

Based on selected counter type the timeout value will be interpreted as follows:

OSIF_COUNTER_DUMMY - Counts the number of iterations of the waiting loop. The actual timeout depends on many factors: operation type, compiler optimizations, interrupts or other tasks in the system, etc.

OSIF_COUNTER_SYSTEM - Microseconds.

OSIF_COUNTER_CUSTOM - Defined by user implementation of timing services

Note: Qspi always uses timeout

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	OSIF_COUNTER_DUMMY
literals	['OSIF_COUNTER_DUMMY', 'OSIF_COUNTER_SYSTEM', 'OSIF_↩ COUNTER_CUSTOM']

4.220 Parameter FlsQspiSyncReadTimeout

Vendor specific: Fls Qspi Sync Read Timeout is the timeout value for read operation.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE

Property	Value
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.221 Parameter FlsQspiAsyncWriteTimeout

Vendor specific: Fls Qspi Async Write Timeout is the timeout value for QSPI write operation in asynchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.222 Parameter FlsQspiAsyncEraseTimeout

Vendor specific: Fls Qspi Async Erase Timeout is the timeout value for QSPI erase operation in asynchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647

Property	Value
max	2147483647
min	0

4.223 Parameter FlsQspiSyncWriteTimeout

Vendor specific: Fls Qspi Sync Write Timeout is the timeout value for QSPI write operation in synchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.224 Parameter FlsQspiSyncEraseTimeout

Vendor specific: Fls Qspi Sync Erase Timeout is the timeout value for QSPI erase operation in synchronous mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.225 Parameter FlsQspiDllLockTimeout

Vendor specific: Fls Qspi DLL Lock Timeout is the timeout value for waiting DLL lock bit.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2147483647
max	2147483647
min	0

4.226 Parameter FlsQspiCommandCompleteTimeout

Vendor specific: Fls Qspi Command Complete Timeout is the timeout value for waiting for a QSPI command to be completed.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	2147483647
min	0

4.227 Parameter FlsQspiResetTimeout

Vendor specific: Fls Qspi Reset Timeout is the timeout for waiting for the external device to become available after a software reset.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	2147483647
min	0

4.228 Parameter SfpEnableGlobal

Vendor specific: Master Global Configuration (MGC) :: Global Valid [GVLD]

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.229 Parameter SfpEnableMdad

Vendor specific: Global Valid MDAD [GVLDMDAD]

Checked: MDAD checks are enabled.

Unchecked: MDAD checks are disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.230 Parameter SfpEnableFrad

Vendor specific: Global Valid FRAD [GVLDFRAD]

Checked: FRAD checks are enabled.

Unchecked: FRAD checks are disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.231 Parameter FlsQspiIdleTimeout

Vendor specific: How much time [us] to wait for the QSPI to become idle.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	100
max	2147483647
min	0

4.232 Parameter FlsQspiFlashInitTimeout

Vendor specific: Fls Flash Init Timeout is the timeout for completing the initializtion operation sequence for the external flash at startup.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1
max	2147483647
min	0

4.233 Parameter FlsQspiSoftwareResetDelay

Vendor specific: Fls Qspi Reset Delay is the waiting time after changing the value of the QSPI software reset bits in MCR register.

Note: The default value is calculated in the number of CPU cycles for the worst case scenario (with maximum possible CPU frequency and minimum possible flash clock frequency).

See the note of MCR register of QSPI chapter in Reference manual for more information.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	21
max	2147483647
min	0

4.234 Parameter FlsQspiTxBufferResetDelay

Vendor specific: Fls Qspi TX Buffer Reset Delay is the waiting time after changing the value of the QSPI TX FIFO/buffer reset bits in MCR register.

Note: The default value is calculated in the number of CPU cycles for the worst case scenario (with maximum possible CPU frequency and minimum possible flash clock frequency).

See the note of MCR register of QSPI chapter in Reference manual for more information.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	2147483647
min	0

4.235 Parameter FlsQspiWriteEnableRetries

Vendor specific: Number of attempts when sending the Write Enable command to the external flash.

The driver will read back the status register after each attempt and check the Busy bit.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	3
max	100
min	0

4.236 Parameter FlsMCoreArbitrationTimeout

Vendor specific: Fls MultiCore Arbitration Timeout Time is the timeout value after which, if the Job Semaphore is not

acquired, the job is aborted.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	32767
max	2147483647
min	0

4.237 Parameter FlsMCoreInitTimeout

Vendor specific: Fls Multi Core Initialization Timeout is the timeout value for aborting the drive initialization.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	32767
max	2147483647
min	0

4.238 Reference FlsEcucPartitionRef

Maps the Flash driver to zero or one ECUC partition to make the driver API available in this partition.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/EcuC/EcucPartitionCollection/EcucPartition

4.239 Container FlsPublishedInformation

Additional published parameters not covered by CommonPublishedInformation container.

Note that these parameters do not have any configuration class setting, since they are published information.

Included subcontainers:

- None

Property	**Value**
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.240 Parameter FlsAcLocationErase

Position in RAM, to which the erase flash access code has to be loaded.

Only relevant if the erase flash access code is not position independent. If this information is not provided it is assumed that the erase flash access code is position independent and that therefore the RAM position can be freely configured.

Property	**Value**
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	4294967295
min	0

4.241 Parameter FlsAcLocationWrite

Vendor specific: Position in RAM, to which the write flash access code has to be loaded.

Only relevant if the write flash access code is not position independent. If this information is not provided it is assumed that the write flash access code is position independent and that therefore the RAM position can be freely configured.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	4294967295
min	0

4.242 Parameter FlsAcSizeErase

Number of bytes in RAM needed for the erase flash access code.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	4294967295
min	0

4.243 Parameter FlsAcSizeWrite

Number of bytes in RAM needed for the write flash access code.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC

Property	Value
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	4294967295
min	0

4.244 Parameter FlsEraseTime

Maximum time to erase one complete flash sector [sec].

Note:This value can be found on DS as the maximum erase time occurs after the specified number of program/erase cycles .

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	5.0
max	5.0
min	0.0

4.245 Parameter FlsErasedValue

The contents of an erased flash memory cell.

Property	Value
type	ECUC-INTEGER-PARAM-DEF

Property	Value
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	4294967295
max	4294967295
min	0

4.246 Parameter FlsECCValue

Vendor specific: The contents of an ECC flash memory line.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1427461397
max	4294967295
min	0

4.247 Parameter FlsExpectedHwId

Unique identifier of the hardware device that is expected by this driver (the device for which this driver has been implemented).

Only relevant for external flash drivers.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0

4.248 Parameter FlsSpecifiedEraseCycles

Number of erase cycles specified for the flash device (usually given in the device data sheet).

FLS198: If the number of specified erase cycles depends on the operating environment (temperature, voltage, ...) during reprogramming of the flash device, the minimum number for which a data retention of at least 15 years over the temperature range from -40C .. +125C can be guaranteed shall be given.

Note:If there are different numbers of specified erase cycles for different flash sectors of the device this parameter has to be extended to a parameter list (similar to the sector list above).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1000
max	4294967295
min	0

4.249 Parameter FlsWriteTime

Maximum time to program one complete flash page [sec].

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	5.0E-4
max	5.0E-4
min	0.0

4.250 Container CommonPublishedInformation

Common container, aggregated by all modules. It contains published information about vendor and versions.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.251 Parameter ArReleaseMajorVersion

Vendor specific: Major version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1

Property	Value
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	4
max	4
min	4

4.252 Parameter ArReleaseMinorVersion

Vendor specific: Minor version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	7
max	7
min	7

4.253 Parameter ArReleaseRevisionVersion

Vendor specific: Patch version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1

Property	Value
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	0
min	0

4.254 Parameter ModuleId

Vendor specific: Module ID of this module.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	92
max	92
min	92

4.255 Parameter SwMajorVersion

Vendor specific: Major version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	3
max	3
min	3

4.256 Parameter SwMinorVersion

Vendor specific: Minor version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	0
min	0

4.257 Parameter SwPatchVersion

Vendor specific: Patch level version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	0
min	0

4.258 Parameter VendorApiInfix

Vendor specific: In driver modules which can be instantiated several times on a single ECU, BSW00347 requires that the name of APIs is extended by the VendorId and a vendor specific name.

This parameter is used to specify the vendor specific name. In total, the implementation specific name is generated as follows:

<ModuleName>_<VendorId>_<VendorApiInfix>.

E.g. assuming that the VendorId of the implementor is 123 and the implementer chose a VendorApiInfix of "v11r456" a api name Can_Write defined in the SWS will translate to Can_123_v11r456Write.

This parameter is mandatory for all modules with upper multiplicity > 1. It shall not be used for modules with upper multiplicity =1.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	

4.259 Parameter VendorId

Vendor specific: Vendor ID of the dedicated implementation of this module according to the AUTOSAR vendor list.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	43
max	43
min	43

This chapter describes the Tresos configuration plug-in for the *driver* Driver. The most of the parameters are described below.

Chapter 5

Module Index

5.1 Software Specification

Here is a list of all modules:

Chapter 6

Module Documentation

6.1 C40 IP Driver

6.1.1 Detailed Description

Data Structures

- struct C40_Ip_MisrType

  MISR structure. Implements : C40_Ip_MisrType_Class. More...
- struct Fls_ExceptionDetailsType

  Detailed information on the exception. More...
- struct C40_ConfigType

  C40 Configuration Structure. More...

Macros

- #define C40_SECTOR_SIZE

  Each sector has a size of 8k.
- #define C40_CODE_BASE_ADDRESS

  Code sectors base address.
- #define C40_DATA_BASE_ADDRESS

  Data sectors base address.
- #define C40_DATA_END_ADDRESS

  Data sectors end address.
- #define C40_UTEST_BASE_ADDRESS

  UTest sector base address.
- #define C40_WRITE_DOUBLE_WORD

  Program allignment.
- #define C40_DATA_SIZE_BYTES_U32

  Main interface program data registers (DATA0 - DATA31)
- #define C40_USER_TEST_PASSWORD

For UTE bit, the password 0xF9F9_9999 must be written to the UT0 register, and this must be a 32bit write.
- #define FLASH_USER_TEST_WAIT

  Time out for wait done.
- #define FLS_UNHANDLED

  Return value for Fls_DsiHandler and Fls_MciHandler.
- #define FLS_HANDLED_RETRY

  Return value for Fls_DsiHandler and Fls_MciHandler.
- #define FLS_HANDLED_SKIP

  Return value for Fls_DsiHandler and Fls_MciHandler.
- #define FLS_HANDLED_STOP

  Return value for Fls_DsiHandler and Fls_MciHandler.
- #define FLS_SIZE_1BYTE

  the number of bytes uses to compare (1 byte).
- #define FLS_SIZE_2BYTE

  the number of bytes uses to compare (2 bytes).
- #define FLS_SIZE_4BYTE

  the number of bytes uses to compare (4 bytes).

Types Reference

- typedef uint8 Fls_CompHandlerReturnType

  return value of ecc checking function
- typedef const uint8 ∗ Fls_InstructionAddressType

  the instruction that generated the ECC
- typedef uint32 Fls_DataAddressType

  data address that caused the ECC error
- typedef void(∗ C40_StartFlashAccessNotifPtrType) (void)

  Fls Start Flash Access Notification Pointer Type.
- typedef void(∗ C40_FinishedFlashAccessNotifPtrType) (void)

  Fls Finished Flash Access Notification Pointer Type.

Enum Reference

- enum C40_Ip_StatusType

  Enumeration of checking status errors or not.
- enum C40_Ip_FlashBlocksNumberType

  Enumeration of Blocks of memory flash .
- enum C40_Ip_FlashBreakPointsType

  Enumeration breakpoints .
- enum C40_Ip_ArrayIntegritySequenceType

  Enumeration of Array Integrity Sequence(proprietary sequence or sequential) .
- enum C40_Ip_MarginOptionType

  Declarations of margin levels.
- enum C40_Ip_UtestStateType

  Declarations for flash suspend operation and resume operation and user test check state.

Function Reference

- C40_Ip_StatusType C40_Ip_Init (const C40_ConfigType *InitConfig)

  Initializes the C40 module.
- C40_Ip_StatusType C40_Ip_Abort (void)

  Abort a program or erase operation.
- C40_Ip_StatusType C40_Ip_Read (uint32 LogicalAddress, uint32 Length, uint8 *DestAddressPtr)

  This function fills data to DestAddressPtr.
- C40_Ip_StatusType C40_Ip_Compare (uint32 LogicalAddress, uint32 Length, const uint8 *SourceAddress←Ptr)

  Checks that there is the desired data at the specified address.
- C40_Ip_StatusType C40_Ip_GetLock (C40_Ip_VirtualSectorsType VirtualSector)

  Returns the locking status of the selected sector.
- C40_Ip_StatusType C40_Ip_ClearLock (C40_Ip_VirtualSectorsType VirtualSector, uint8 DomainIdValue)

  Unlocks the selected sector for the requesting core if possible.
- C40_Ip_VirtualSectorsType C40_Ip_GetSectorNumberFromAddress (uint32 TargetAddress)

  Get sector number from specified address.
- C40_Ip_FlashBlocksNumberType C40_Ip_GetBlockNumberFromAddress (uint32 TargetAddress)

  Get block number from target address.
- C40_Ip_StatusType C40_Ip_CheckUserTestStatus (const C40_Ip_MisrType *MisrExpectedValues, C40_Ip_UtestStateType *TestResult)

  Check the operation in user test mode.
- C40_Ip_StatusType C40_Ip_ArrayIntegrityCheck (uint32 SelectBlock, C40_Ip_ArrayIntegritySequenceType AddressSequence, C40_Ip_FlashBreakPointsType BreakPoints, const C40_Ip_MisrType *MisrSeedValues, uint8 DomainIdValue)

  Check the array integrity of the flash memory.
- C40_Ip_StatusType C40_Ip_ArrayIntegrityCheckSuspend (void)

  Suspend an on-going array integrity check.
- C40_Ip_StatusType C40_Ip_ArrayIntegrityCheckResume (void)

  Resume the previous suspend operation.
- C40_Ip_StatusType C40_Ip_UserMarginReadCheck (uint32 SelectBlock, C40_Ip_FlashBreakPointsType BreakPoints, C40_Ip_MarginOptionType MarginLevel, const C40_Ip_MisrType *MisrSeedValues, uint8 DomainIdValue)

  Check the user margin read of the flash memory.
- uint32 C40_Ip_GetFailedAddress (void)

  Get the failing address in memory.
- void C40_Ip_SetAsyncMode (const boolean Async)

  Set synch/Asynch at IP layer base on the bAsynch of HLD.
- void C40_Ip_DataErrorSuppression (void)

  Setup the ECC error handling on data flash block.
- uint32 C40_Ip_GetLockProtect (C40_Ip_VirtualSectorsType VirtualSector)

  Read lock bit status of flash sectors.
- void C40_Ip_SetLockProtect (C40_Ip_VirtualSectorsType VirtualSector)

  Locks the selected sector for the requesting core.
- void C40_Ip_ClearLockProtect (C40_Ip_VirtualSectorsType VirtualSector)

  Unlocks the selected sector for the requesting core.
- void C40_Ip_CheckLockDomainID_CheckRegister (C40_Ip_VirtualSectorsType VirtualSector, uint32 *CheckRegister, uint32 *TempLockMasterRegister)

  Read and check the lock domain ID for flash sectors.

6.1.2 Data Structure Documentation

6.1.2.1 struct C40_Ip_MisrType

MISR structure. Implements : C40_Ip_MisrType_Class.

Definition at line 271 of file C40_Ip_Types.h.

Data Fields

Type	Name	Description
uint32	arrMISRValue[10U]	The value of MISR, size of arrMISRValue is (FLASH_UM_COUNT +1)

6.1.2.2 struct Fls_ExceptionDetailsType

Detailed information on the exception.

The following information will be checked by the driver:

- if there is a pending read, compare,
- data_pt matches address currently accessed by pending flash read or flash compare job,
- if the exception syndrome register indicates DSI or MCI reason,

Definition at line 285 of file C40_Ip_Types.h.

Data Fields

Type	Name	Description
Fls_InstructionAddressType	instruction_pt	pointer to the instruction that generated the ECC
Fls_DataAddressType	data_pt	data address that caused the ECC error
uint32	syndrome_u32	details on the type of exception

6.1.2.3 struct C40_ConfigType

C40 Configuration Structure.

Implements : C40_ConfigType_Class

Definition at line 311 of file C40_Ip_Types.h.

Data Fields

Type	Name	Description
C40_StartFlashAccessNotifPtrType	startFlashAccessNotifPtr	Pointer to start flash access callout
C40_FinishedFlashAccessNotifPtrType	finishedFlashAccessNotifPtr	Pointer to finish flash access callout

6.1.3 Macro Definition Documentation

6.1.3.1 C40_SECTOR_SIZE

```
#define C40_SECTOR_SIZE
```

Each sector has a size of 8k.

Definition at line 68 of file C40_Ip_Types.h.

6.1.3.2 C40_CODE_BASE_ADDRESS

```
#define C40_CODE_BASE_ADDRESS
```

Code sectors base address.

Definition at line 72 of file C40_Ip_Types.h.

6.1.3.3 C40_DATA_BASE_ADDRESS

```
#define C40_DATA_BASE_ADDRESS
```

Data sectors base address.

Definition at line 76 of file C40_Ip_Types.h.

6.1.3.4 C40_DATA_END_ADDRESS

```
#define C40_DATA_END_ADDRESS
```

Data sectors end address.

Definition at line 80 of file C40_Ip_Types.h.

6.1.3.5 C40_UTEST_BASE_ADDRESS

```
#define C40_UTEST_BASE_ADDRESS
```

UTest sector base address.

Definition at line 84 of file C40_Ip_Types.h.

6.1.3.6 C40_WRITE_DOUBLE_WORD

```
#define C40_WRITE_DOUBLE_WORD
```

Program allignment.

Definition at line 88 of file C40_Ip_Types.h.

6.1.3.7 C40_DATA_SIZE_BYTES_U32

```
#define C40_DATA_SIZE_BYTES_U32
```

Main interface program data registers (DATA0 - DATA31)

Definition at line 92 of file C40_Ip_Types.h.

6.1.3.8 C40_USER_TEST_PASSWORD

```
#define C40_USER_TEST_PASSWORD
```

For UTE bit, the password 0xF9F9_9999 must be written to the UT0 register, and this must be a 32bit write.

Definition at line 98 of file C40_Ip_Types.h.

6.1.3.9 FLASH_USER_TEST_WAIT

```
#define FLASH_USER_TEST_WAIT
```

Time out for wait done.

Definition at line 102 of file C40_Ip_Types.h.

6.1.3.10 FLS_UNHANDLED

```
#define FLS_UNHANDLED
```

Return value for Fls_DsiHandler and Fls_MciHandler.

module doesn't feel responsible (e.g. address does not belong to its current job, there is no current pending read/compare job, the syndrome is different).

Definition at line 110 of file C40_Ip_Types.h.

6.1.3.11 FLS_HANDLED_RETRY

```
#define FLS_HANDLED_RETRY
```

Return value for Fls_DsiHandler and Fls_MciHandler.

module feels responsible, but wants to repeat the causing instruction. Maybe: it still uses information in MCM or ECSM module, but they are outdated (e.g. due to an erroneous DMA transfer in the meantime)

Definition at line 118 of file C40_Ip_Types.h.

6.1.3.12 FLS_HANDLED_SKIP

```
#define FLS_HANDLED_SKIP
```

Return value for Fls_DsiHandler and Fls_MciHandler.

module feels responsible, the current job is marked as failed, processing may continue, skipping the causing instruction.

Definition at line 125 of file C40_Ip_Types.h.

6.1.3.13 FLS_HANDLED_STOP

```
#define FLS_HANDLED_STOP
```

Return value for Fls_DsiHandler and Fls_MciHandler.

module feels responsible, but the only reaction is to stop the system (e.g.: try to shut-down in a quite safe way)

Definition at line 132 of file C40_Ip_Types.h.

6.1.3.14 FLS_SIZE_1BYTE

```
#define FLS_SIZE_1BYTE
```

the number of bytes uses to compare (1 byte).

Definition at line 139 of file C40_Ip_Types.h.

6.1.3.15 FLS_SIZE_2BYTE

```
#define FLS_SIZE_2BYTE
```

the number of bytes uses to compare (2 bytes).

Definition at line 145 of file C40_Ip_Types.h.

6.1.3.16 FLS_SIZE_4BYTE

```
#define FLS_SIZE_4BYTE
```

the number of bytes uses to compare (4 bytes).

Definition at line 151 of file C40_Ip_Types.h.

6.1.4 Types Reference

6.1.4.1 Fls_CompHandlerReturnType

```
typedef uint8 Fls_CompHandlerReturnType
```

return value of ecc checking function

Definition at line 256 of file C40_Ip_Types.h.

6.1.4.2 Fls_InstructionAddressType

```
typedef const uint8* Fls_InstructionAddressType
```

the instruction that generated the ECC

Definition at line 261 of file C40_Ip_Types.h.

6.1.4.3 Fls_DataAddressType

```
typedef uint32 Fls_DataAddressType
```

data address that caused the ECC error

Definition at line 266 of file C40_Ip_Types.h.

6.1.4.4 C40_StartFlashAccessNotifPtrType

```
typedef void(* C40_StartFlashAccessNotifPtrType) (void)
```

Fls Start Flash Access Notification Pointer Type.

Pointer type of Fls_StartFlashAccessNotif function

Definition at line 297 of file C40_Ip_Types.h.

6.1.4.5 C40_FinishedFlashAccessNotifPtrType

```
typedef void(* C40_FinishedFlashAccessNotifPtrType) (void)
```

Fls Finished Flash Access Notification Pointer Type.

Pointer type of Fls_FinishedFlashAccessNotif function

Definition at line 304 of file C40_Ip_Types.h.

6.1.5 Enum Reference

6.1.5.1 C40_Ip_StatusType

```
enum C40_Ip_StatusType
```

Enumeration of checking status errors or not.

Enumerator

STATUS_C40_IP_SUCCESS	Successful job
STATUS_C40_IP_BUSY	IP is performing an operation
STATUS_C40_IP_ERROR	Error - general code
STATUS_C40_IP_ERROR_TIMEOUT	Error - exceeded timeout
STATUS_C40_IP_ERROR_INPUT_PARAM	Error - wrong input parameter
STATUS_C40_IP_ERROR_BLANK_CHECK	Error - selected memory area is not erased
STATUS_C40_IP_ERROR_PROGRAM_VERIFY	Error - selected memory area doesn't contain desired value

Definition at line 161 of file C40_Ip_Types.h.

6.1.5.2 C40_Ip_FlashBlocksNumberType

```
enum C40_Ip_FlashBlocksNumberType
```

Enumeration of Blocks of memory flash .

Enumerator

FLS_CODE_BLOCK↵_0	code block number 0
FLS_CODE_BLOCK↵_1	code block number 1
FLS_CODE_BLOCK↵_2	code block number 2
FLS_CODE_BLOCK↵_3	code block number 3
FLS_DATA_BLOCK	data block
FLS_BLOCK_UTEST	block Utest
FLS_BLOCK_INVALID	invalid block

Definition at line 179 of file C40_Ip_Types.h.

6.1.5.3 C40_Ip_FlashBreakPointsType

```
enum C40_Ip_FlashBreakPointsType
```

Enumeration breakpoints .

Enumerator

FLS_BREAKPOINTS_ON_DBD	Break on Double bit detection
FLS_BREAKPOINTS_ON_DBD_SBC	Break on both Double bit detection and Single bit correction
FLS_NO_BREAKPOINTS	No break at all

Definition at line 193 of file C40_Ip_Types.h.

6.1.5.4 C40_Ip_ArrayIntegritySequenceType

```
enum C40_Ip_ArrayIntegritySequenceType
```

Enumeration of Array Integrity Sequence(proprietary sequence or sequential) .

Enumerator

FLS_PROPRIETARY_SEQENCE	Array integrity sequence is proprietary sequence
FLS_SEQUENTIAL	Array integrity sequence is sequential

Definition at line 203 of file C40_Ip_Types.h.

6.1.5.5 C40_Ip_MarginOptionType

```
enum C40_Ip_MarginOptionType
```

Declarations of margin levels.

This is used to selects the margin level that is being checked. Implements : C40_Ip_MarginOptionType_Class

Enumerator

C40_MARGIN_LEVEL_PROGRAM	a programmed level
C40_MARGIN_LEVEL_ERASE	a erased level

Definition at line 215 of file C40_Ip_Types.h.

6.1.5.6 C40_Ip_UtestStateType

```
enum C40_Ip_UtestStateType
```

Declarations for flash suspend operation and resume operation and user test check state.

This is used to indicators for suspending state, resuming state and operation is broken by single bit correction or double bit detection. Implements : C40_Ip_UtestStateType

Enumerator

C40_IP_OK	Successful operation
C40_IP_SUS_NOTHING	No program/erase operation
C40_IP_PGM_WRITE	A program sequence in interlock write stage.

Enumerator

C40_IP_ERS_WRITE	An erase sequence in interlock write stage.
C40_IP_ERS_SUS_PGM_WRITE	An erase-suspend program sequence in interlock write stage.
C40_IP_PGM_SUS	The program operation is in suspend state
C40_IP_ERS_SUS	The erase operation is in suspend state
C40_IP_ERS_SUS_PGM_SUS	The erase-suspended program operation is in suspend state
C40_IP_USER_TEST_SUS	The UTest check operation is in suspend state C40_IP
C40_IP_RES_NOTHING	No suspended program/erase operation
C40_IP_RES_PGM	The program operation is resumed
C40_IP_RES_ERS	The erase operation is resumed
C40_IP_RES_ERS_PGM	The erase-suspended program operation is resumed
C40_IP_RES_USER_TEST	The UTest check operation is resumed C40_IP
C40_IP_USER_TEST_BREAK_SBC	The UTest check operation is broken by Single bit correction
C40_IP_USER_TEST_BREAK_DBD	The UTest check operation is broken by Double bit detection

Definition at line 227 of file C40_Ip_Types.h.

6.1.6 Function Reference

6.1.6.1 C40_Ip_Init()

```
C40_Ip_StatusType C40_Ip_Init (
            const C40_ConfigType * InitConfig )
```

Initializes the C40 module.

This function will initialize c40 module and clear all error flags.

Parameters

in	*InitConfig*	Pointer to the driver configuration structure.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	Initialization is success
STATUS_C40_IP_ERROR_TIMEOUT	Errors Timeout because wait for the Done bit long time

6.1.6.2 C40_Ip_Abort()

```
C40_Ip_StatusType C40_Ip_Abort (
            void  )
```

Abort a program or erase operation.

This function will abort a program or erase operation in user mode and clear all PGM, APGM, ERS, AERS, EHV, AEHV bits in MCR,AMCRS registers

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	: The operation is successful.
STATUS_C40_IP_ERROR_TIMEOUT	the operation error because wait for the Done bit long time

6.1.6.3 C40_Ip_Read()

```
C40_Ip_StatusType C40_Ip_Read (
            uint32 LogicalAddress,
            uint32 Length,
            uint8 * DestAddressPtr )
```

This function fills data to DestAddressPtr.

This function fills data to DestAddressPtr with data from the specified address

Parameters

in	*LogicalAddress*	The start address of the area to be read.
in	*Length*	Read size
in	*DestAddressPtr*	Pointer to the destination of the read.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	Read performed successfully.
STATUS_C40_IP_ERROR_INPUT_PARAM	Input parameters are invalid.
STATUS_C40_IP_ERROR	There was an error while reading.

Precondition

The module has to be initialized and not busy.

6.1.6.4 C40_Ip_Compare()

```
C40_Ip_StatusType C40_Ip_Compare (
            uint32 LogicalAddress,
            uint32 Length,
            const uint8 * SourceAddressPtr )
```

Checks that there is the desired data at the specified address.

Checks that there is the desired data at the specified address. If the compare is intented to be a blank check, the SourceAddressPtr should be NULL.

Parameters

in	*LogicalAddress*	The start address of the area to be checked.
in	*Length*	Check size
in	*SourceAddressPtr*	Pointer to the data expected to be read.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	Read performed successfully.
STATUS_C40_IP_ERROR_INPUT_PARAM	Input parameters are invalid.
STATUS_C40_IP_ERROR	There was an error while reading.
STATUS_C40_IP_ERROR_PROGRAM_VERIFY	The expected data was not found completely at the specified address

Precondition

The module has to be initialized and not busy.

6.1.6.5 C40_Ip_GetLock()

```
C40_Ip_StatusType C40_Ip_GetLock (
            C40_Ip_VirtualSectorsType VirtualSector )
```

Returns the locking status of the selected sector.

Returns the locking status of the selected sector. This function shall cover all the address spaces available.

Parameters

in	*VirtualSector*	Sector to be checked for locking.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SECTOR_UNPROTECTED	Sector was not locked
STATUS_C40_IP_SECTOR_PROTECTED	Sector was locked
STATUS_C40_IP_ERROR	The requested sector is invalid

Precondition

The module has to be initialized and not busy.

6.1.6.6 C40_Ip_ClearLock()

```
C40_Ip_StatusType C40_Ip_ClearLock (
            C40_Ip_VirtualSectorsType VirtualSector,
            uint8 DomainIdValue )
```

Unlocks the selected sector for the requesting core if possible.

Unlocks the selected sector for the requesting core if possible. This function shall cover all the address spaces available.

Parameters

in	*VirtualSector*	Sector to be unlocked.
in	*DomainIdValue*	ID for the core that requests sector lock

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	Sector was unlocked successfully
STATUS_C40_IP_ERROR	The requested sector was unlocked by another core or the sector input is out of range

Precondition

The module has to be initialized and not busy.

6.1.6.7 C40_Ip_GetSectorNumberFromAddress()

```
C40_Ip_VirtualSectorsType C40_Ip_GetSectorNumberFromAddress (
            uint32 TargetAddress )
```

Get sector number from specified address.

Get sector number from specified address.

Parameters

in	*TargetAddress*	target address

Returns

C40_Ip_VirtualSectorsType

Return values

Address	of sector

Precondition

The module has to be initialized and not busy.

6.1.6.8 C40_Ip_GetBlockNumberFromAddress()

```
C40_Ip_FlashBlocksNumberType C40_Ip_GetBlockNumberFromAddress (
            uint32 TargetAddress )
```

Get block number from target address.

Get block number from target address

Parameters

in	*TargetAddress*	target address

Returns

C40_Ip_GetBlockNumberFromAddress

Return values

The	block number which contains the target address.

6.1.6.9 C40_Ip_CheckUserTestStatus()

```
C40_Ip_StatusType C40_Ip_CheckUserTestStatus (
            const C40_Ip_MisrType * MisrExpectedValues,
            C40_Ip_UtestStateType * TestResult )
```

Check the operation in user test mode.

This function will check the status array integrity check in user test mode.

Parameters

in	*MisrExpectedValues*	The MISR values calculated by the user to do comparison with MISR values generated by hardware.
out	*TestResult*	The value return the state of flash.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	The operation is successful
STATUS_C40_IP_ERROR	Operation failure status
STATUS_C40_IP_BUSY	In progress status
STATUS_C40_IP_ERROR_INPUT_PARAM	input parameters is invalid

Precondition

The module has to be initialized

6.1.6.10 C40_Ip_ArrayIntegrityCheck()

```
C40_Ip_StatusType C40_Ip_ArrayIntegrityCheck (
            uint32 SelectBlock,
            C40_Ip_ArrayIntegritySequenceType AddressSequence,
            C40_Ip_FlashBreakPointsType BreakPoints,
            const C40_Ip_MisrType * MisrSeedValues,
            uint8 DomainIdValue )
```

Check the array integrity of the flash memory.

This function will check the array integrity of the flash via main interface. The user specified address sequence is used for array integrity reads and the operation is done on the specified blocks. The MISR values calculated by the hardware is compared to the values passed by the user, if they are not the same, then an error code is returned. User should call C40_Ip_CheckUserTestStatus to check the on-going status of this function. And once finish, it will do comparison between MISR values provided by user which is currently stored in 'pMisrExpectedValues' and MISR values generated by hardware and return an appropriate code according to this compared result.

Parameters

in	*SelectBlock*	Select the block base address for checking.
in	*AddressSequence*	Determine the address sequence to be used during array integrity checks.
in	*BreakPoints*	Specify an option to allow stopping the operation on errors.
in	*MisrSeedValues*	Value to be written in the MISR registers prior to the check
in	*DomainIdValue*	ID for the core that requests program sequence.

Returns

C40_Ip_StatusTypes

Return values

STATUS_C40_IP_SUCCESS	The operation is successful.
STATUS_C40_IP_BUSY	New operation cannot be performed while previous high voltage operation in progress.
STATUS_C40_IP_ERROR_INPUT_PARAM	Input parameters are invalid.
STATUS_C40_IP_ERROR	It's impossible to enable an operation
STATUS_C40_IP_ERROR_TIMEOUT	Errors Timeout because wait for the Done bit long time

Precondition

The module has to be initialized

6.1.6.11 C40_Ip_ArrayIntegrityCheckSuspend()

```
C40_Ip_StatusType C40_Ip_ArrayIntegrityCheckSuspend (
            void  )
```

Suspend an on-going array integrity check.

This function will check if there is an on-going array integrity check of the flash and suspend it via main interface.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_Ip_SUCCESS	array integrity check suspending was successful.
STATUS_C40_IP_ERROR	there is no suspended array integrity check or not successfully resumed.

Precondition

The module has to be initialized

6.1.6.12 C40_Ip_ArrayIntegrityCheckResume()

```
C40_Ip_StatusType C40_Ip_ArrayIntegrityCheckResume (
            void  )
```

Resume the previous suspend operation.

This function will check if there is an on-going array integrity check of the flash being suspended and resume it via main interface.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	array integrity check resuming was successful.
STATUS_C40_IP_ERROR	there is no suspended array integrity check or not successfully resumed.

Precondition

The module has to be initialized

6.1.6.13 C40_Ip_UserMarginReadCheck()

```
C40_Ip_StatusType C40_Ip_UserMarginReadCheck (
            uint32 SelectBlock,
            C40_Ip_FlashBreakPointsType BreakPoints,
            C40_Ip_MarginOptionType MarginLevel,
            const C40_Ip_MisrType * MisrSeedValues,
            uint8 DomainIdValue )
```

Check the user margin read of the flash memory.

This function will check the user margin reads of the flash via main interface. The user specified margin level is used for reads and the operation is done on the specified blocks. The MISR values calculated by the hardware are compared to the values passed by the user, if they are not the same, then an error code is returned. User should call C40_Ip_CheckUserTestStatus to check the on-going status of this function. And once finish, it will do comparison between MISR values provided by user which are currently stored in 'pMisrExpectedValues,' and MISR values generated by hardware and return an appropriate code according to this compared result.

Parameters

in	*SelectBlock*	Select the block base address for checking.
in	*BreakPoints*	An option to allow stopping the operation on errors.
in	*MarginLevel*	The margin level to be used during margin read checks.
in	*MisrSeedValues*	Value to be written in the MISR registers prior to the check
in	*DomainIdValue*	ID for the core that requests program sequence.

Returns

C40_Ip_StatusType

Return values

STATUS_C40_IP_SUCCESS	The operation is successful.
STATUS_C40_IP_BUSY	New operation cannot be performed while previous high voltage operation in progress.
STATUS_C40_IP_ERROR_INPUT_PARAM	Input parameters are invalid.
STATUS_C40_IP_ERROR	It's impossible to enable an operation
STATUS_C40_IP_ERROR_TIMEOUT	Errors Timeout because wait for the Done bit long time

Precondition

The module has to be initialized

6.1.6.14 C40_Ip_GetFailedAddress()

```
uint32 C40_Ip_GetFailedAddress (
            void  )
```

Get the failing address in memory.

This function will get the failing address in the event of ECC event error, Single Bit Correction, as well as providing the address of a failure that may have occurred in a program/erase operation.

Returns

uint32

Return values

Return	the address is failed in the event or single bit correction.

Precondition

The module has to be initialized

6.1.6.15 C40_Ip_SetAsyncMode()

```
void C40_Ip_SetAsyncMode (
            const boolean Async )
```

Set synch/Asynch at IP layer base on the bAsynch of HLD.

This function will change C40_Ip_Async value at IP layer. Its param base on the bAsynch of HLD. Thanks for this param, writting and erasing will operate at synch or Asynch mode.

Precondition

The module has to be initialized

6.1.6.16 C40_Ip_DataErrorSuppression()

```
void C40_Ip_DataErrorSuppression (
            void  )
```

Setup the ECC error handling on data flash block.

Parameters

none	

Returns

none

6.1.6.17 C40_Ip_GetLockProtect()

```
uint32 C40_Ip_GetLockProtect (
            C40_Ip_VirtualSectorsType VirtualSector )
```

Read lock bit status of flash sectors.

Parameters

in	*VirtualSector*	Sector to be checked

Returns

uint32 Lock bit status value

6.1.6.18 C40_Ip_SetLockProtect()

```
void C40_Ip_SetLockProtect (
            C40_Ip_VirtualSectorsType VirtualSector )
```

Locks the selected sector for the requesting core.

Parameters

in	*VirtualSector*	Sector to be locked

Returns

none

6.1.6.19 C40_Ip_ClearLockProtect()

```
void C40_Ip_ClearLockProtect (
            C40_Ip_VirtualSectorsType VirtualSector )
```

Unlocks the selected sector for the requesting core.

Parameters

in	*VirtualSector*	Sector to be unlocked

Return values

none	

6.1.6.20 C40_Ip_CheckLockDomainID_CheckRegister()

```
void C40_Ip_CheckLockDomainID_CheckRegister (
            C40_Ip_VirtualSectorsType VirtualSector,
            uint32 * CheckRegister,
            uint32 * TempLockMasterRegister )
```

Read and check the lock domain ID for flash sectors.

Parameters

in	*VirtualSector*	Sector to be checked
in,out	*CheckRegister*	Lock status value of the sector
in,out	*TempLockMasterRegister*	The address of the register that contain domain ID of the master currently acquiring the lock bit.

Returns

none

6.2 FLS Driver

6.2.1 Detailed Description

Data Structures

- struct Fls_Flash_InternalSectorInfoType

Define pointer type of erase access code function. More...
- struct Fls_QspiCfgConfigType

  Fls Qspi CfgConfig Type. More...
- struct Fls_ConfigType

  Fls Config Type. More...

Macros

- #define FLS_DEVICE_INSTANCE_INVALID
- #define FLS_API_VENDOR_ID

  Version Check parameters.
- #define FLS_MODULE_ID

  AUTOSAR module identification.
- #define FLS_INSTANCE_ID

  AUTOSAR module instance identification.
- #define FLS_E_PARAM_CONFIG

  Development error codes (passed to DET).
- #define FLS_E_PARAM_ADDRESS

  API service called with wrong address parameter.
- #define FLS_E_PARAM_LENGTH

  API service called with wrong length parameter.
- #define FLS_E_PARAM_DATA

  API service called with wrong data parameter.
- #define FLS_E_UNINIT

  API service called without module initialization.
- #define FLS_E_BUSY

  API service called while driver still busy.
- #define FLS_E_PARAM_POINTER

  API service called with NULL pointer.
- #define FLS_E_VERIFY_ERASE_FAILED

  Runtime error codes (passed to DET).
- #define FLS_E_VERIFY_WRITE_FAILED

  Write verification (compare) failed.
- #define FLS_E_TIMEOUT

  Timeout exceeded.
- #define FLS_E_ERASE_FAILED

  Transient Faults codes (passed to DET).
- #define FLS_E_WRITE_FAILED

  Flash write failed (HW)
- #define FLS_E_READ_FAILED

  Flash read failed (HW)
- #define FLS_E_COMPARE_FAILED

  Flash compare failed (HW)
- #define FLS_INIT_ID

  All service IDs (passed to DET).
- #define FLS_ERASE_ID

service ID of function: Fls_Erase. (passed to DET)
- #define FLS_WRITE_ID

  service ID of function: Fls_Write. (passed to DET)
- #define FLS_CANCEL_ID

  service ID of function: Fls_Cancel. (passed to DET)
- #define FLS_GETJOBRESULT_ID

  service ID of function: Fls_GetJobResult. (passed to DET)
- #define FLS_MAINFUNCTION_ID

  service ID of function: Fls_MainFunction. (passed to DET)
- #define FLS_READ_ID

  service ID of function: Fls_Read. (passed to DET)
- #define FLS_COMPARE_ID

  service ID of function: Fls_Compare. (passed to DET)
- #define FLS_SETMODE_ID

  service ID of function: Fls_SetMode. (passed to DET)
- #define FLS_GETVERSIONINFO_ID

  service ID of function: Fls_GetVersionInfo. (passed to DET)
- #define FLS_BLANK_CHECK_ID

  service ID of function: Fls_BlankCheck. (passed to DET)
- #define FLS_SECTOR_ERASE_ASYNCH

  All sector flags.
- #define FLS_PAGE_WRITE_ASYNCH

  fls page write asynch
- #define FLS_START_SEC_CODE

  Start of Fls section CODE.
- #define FLS_STOP_SEC_CODE

  Stop of Fls section CODE.
- #define FLS_IPW_CFG_INVALID

Types Reference

- typedef uint32 Fls_SectorIndexType

  Logical sector index.
- typedef uint32 Fls_AddressType

  Fls Address Type.
- typedef uint32 Fls_LengthType

  Fls Length Type.
- typedef uint32 Fls_SectorCountType

  Fls Sector Count Type.
- typedef uint8 Fls_BlockNumberOfSectorType

  Fls BLock Count Type.
- typedef C40_ConfigType Fls_InternalConfigType

  Fls Internal Flash Type.
- typedef void(∗ Fls_JobEndNotificationPtrType) (void)

  Fls Job End Notification Pointer Type.
- typedef void(∗ Fls_JobErrorNotificationPtrType) (void)

Fls Job Error Notification Pointer Type.

- typedef void(∗ Fls_ACCallbackPtrType) (void)

  Pointer type of Fls_AC_Callback function.
- typedef void(∗ Fls_MCoreTimeoutNotifPtrType) (Fls_MCoreTimeoutJobType eMCoreTimeoutJob)

  Fls Multi Core Notification Pointer Type.

Enum Reference

- enum Fls_HwChType

  Flash sector channel type.
- enum Fls_JobType

  Type of job currently executed by Fls_MainFunction.
- enum Fls_LLDReturnType

  Result of low-level flash operation.
- enum Fls_LLDJobType

  Type of job currently executed by Fls_LLDMainFunction.
- enum Fls_CrcDataSizeType

  Size of data to be processeed by CRC.
- enum Fls_MCoreReqReturnType

  Fls Multi Core Request Return Type.
- enum Fls_MCoreHwJobStatusType

  Fls Multi Core hardware job status.
- enum Fls_MCoreTimeoutJobType

  Fls Multi Core timeout notification jobs.

Function Reference

- void Fls_Init (const Fls_ConfigType ∗ConfigPtr)

  The function initializes Fls module.
- Std_ReturnType Fls_Write (Fls_AddressType TargetAddress, const uint8 ∗SourceAddressPtr, Fls_LengthType Length)

  Write one or more complete flash pages to the flash device.
- Std_ReturnType Fls_Erase (Fls_AddressType TargetAddress, Fls_LengthType Length)

  Erase one or more complete flash sectors.
- Std_ReturnType Fls_Read (Fls_AddressType SourceAddress, uint8 ∗TargetAddressPtr, Fls_LengthType Length)

  Reads from flash memory.

Variables

- Fls_AddressType Fls_u32JobAddrIt

  Logical address of data block currently processed by Fls_MainFunction.
- Fls_AddressType Fls_u32JobAddrEnd

  Last logical address to be processed by a job.
- volatile Fls_SectorIndexType Fls_u32JobSectorIt

  Index of flash sector currently processed by a job.
- Fls_SectorIndexType Fls_u32JobSectorEnd

  Index of last flash sector by current job.
- volatile MemIf_JobResultType Fls_eLLDJobResult

  Result of last flash hardware job.
- Fls_LLDJobType Fls_eLLDJob

  Type of current flash hardware job - used for asynchronous operating mode.
- const Fls_ConfigType ∗ Fls_pConfigPtr

  Pointer to current flash module configuration set.

6.2.2 Data Structure Documentation

6.2.2.1 struct Fls_Flash_InternalSectorInfoType

Define pointer type of erase access code function.

FLASH physical sector description

Definition at line 413 of file Fls_Types.h.

Data Fields

Type	Name	Description
uint32	pSectorStartAddressPtr	FLASH physical sector start address.
uint32	u32SectorId	Corresponding number in sector location to calc cfgCRC.

6.2.2.2 struct Fls_QspiCfgConfigType

Fls Qspi CfgConfig Type.

Fls Qspi CfgConfig Type

Definition at line 431 of file Fls_Types.h.

Data Fields

- const uint8(∗ u8SectFlashUnit)[ ]

  External flash unit assigned to each sector. Size: u32SectorCount.
- const uint8 u8FlashUnitsCount

  Number of serial flash instances.
- const Qspi_Ip_MemoryConnectionType(∗ paFlashConnectionCfg)[ ]

  Connection for each external memory device to available controllers. Size: u8FlashUnitsCount.
- const uint8(∗ u8FlashConfig)[ ]

  Configuration index used for each flash unit. Size: u8FlashUnitsCount.
- const boolean(∗ paAHBReadCfg)[ ]

  AHB direct reads configurations. Size: u8FlashUnitsCount.
- const uint8 u8FlashConfigCount

  Number of serial flash configurations.
- const Qspi_Ip_MemoryConfigType(∗ paFlashCfg)[ ]

  External memory devices configurations. Size: u8FlashConfigCount.
- const uint8 u8QspiUnitsCount

  Number of QSPI hardware instances.
- const uint8(∗ u8QspiInstance)[ ]

  Hardware instances for each QSPI unit. Size: u8QspiUnitsCount.
- const uint8(∗ u8QspiConfig)[ ]

  Configuration for each QSPI unit. Size: u8QspiUnitsCount.
- const uint8 u8QspiConfigCount

  Number of QSPI configurations.
- const Qspi_Ip_ControllerConfigType(∗ paQspiUnitCfg)[ ]

  QSPI configurations. Size: u8QspiConfigCount.

6.2.2.2.1 Field Documentation

6.2.2.2.1.1 u8SectFlashUnit `const uint8(* u8SectFlashUnit)[]`

External flash unit assigned to each sector. Size: u32SectorCount.

Definition at line 436 of file Fls_Types.h.

6.2.2.2.1.2 u8FlashUnitsCount `const uint8 u8FlashUnitsCount`

Number of serial flash instances.

Definition at line 440 of file Fls_Types.h.

6.2.2.2.1.3 paFlashConnectionCfg `const Qspi_Ip_MemoryConnectionType(* paFlashConnectionCfg)[]`

Connection for each external memory device to available controllers. Size: u8FlashUnitsCount.

Definition at line 444 of file Fls_Types.h.

6.2.2.2.1.4 u8FlashConfig `const uint8(* u8FlashConfig)[]`

Configuration index used for each flash unit. Size: u8FlashUnitsCount.

Definition at line 448 of file Fls_Types.h.

6.2.2.2.1.5 paAHBReadCfg `const boolean(* paAHBReadCfg)[]`

AHB direct reads configurations. Size: u8FlashUnitsCount.

Definition at line 452 of file Fls_Types.h.

6.2.2.2.1.6 u8FlashConfigCount `const uint8 u8FlashConfigCount`

Number of serial flash configurations.

Definition at line 457 of file Fls_Types.h.

6.2.2.2.1.7 paFlashCfg `const Qspi_Ip_MemoryConfigType(* paFlashCfg)[]`

External memory devices configurations. Size: u8FlashConfigCount.

Definition at line 461 of file Fls_Types.h.

6.2.2.2.1.8 u8QspiUnitsCount `const uint8 u8QspiUnitsCount`

Number of QSPI hardware instances.

Definition at line 466 of file Fls_Types.h.

6.2.2.2.1.9 u8QspiInstance `const uint8(* u8QspiInstance)[]`

Hardware instances for each QSPI unit. Size: u8QspiUnitsCount.

Definition at line 470 of file Fls_Types.h.

6.2.2.2.1.10 u8QspiConfig `const uint8(* u8QspiConfig)[]`

Configuration for each QSPI unit. Size: u8QspiUnitsCount.

Definition at line 474 of file Fls_Types.h.

6.2.2.2.1.11 u8QspiConfigCount `const uint8 u8QspiConfigCount`

Number of QSPI configurations.

Definition at line 478 of file Fls_Types.h.

6.2.2.2.1.12 paQspiUnitCfg `const Qspi_Ip_ControllerConfigType(* paQspiUnitCfg)[]`

QSPI configurations. Size: u8QspiConfigCount.

Definition at line 482 of file Fls_Types.h.

6.2.2.3 struct Fls_ConfigType

Fls Config Type.

Fls module initialization data structure

Definition at line 516 of file Fls_Types.h.

Data Fields

- Fls_ACCallbackPtrType acCallBackPtr

  pointer to ac callback function
- Fls_JobEndNotificationPtrType jobEndNotificationPtr

  pointer to job end notification function
- Fls_JobErrorNotificationPtrType jobErrorNotificationPtr

  pointer to job error notification function
- MemIf_ModeType eDefaultMode

  default FLS device mode after initialization (MEMIF_MODE_FAST, MEMIF_MODE_SLOW)
- Fls_LengthType u32MaxReadFastMode

  max number of bytes to read in one cycle of Fls_MainFunction (fast mode)
- Fls_LengthType u32MaxReadNormalMode

  max number of bytes to read in one cycle of Fls_MainFunction (normal mode)
- Fls_LengthType u32MaxWriteFastMode

  max number of bytes to write in one cycle of Fls_MainFunction (fast mode)
- Fls_LengthType u32MaxWriteNormalMode

  max number of bytes to write in one cycle of Fls_MainFunction (normal mode)
- Fls_SectorCountType u32SectorCount

  number of configured logical sectors
- const Fls_AddressType(∗ paSectorEndAddr)[ ]

  pointer to array containing last logical address of each configured sector
- const Fls_LengthType(∗ paSectorSize)[ ]

  pointer to array containing sector size of each configured sector
- const Fls_Flash_InternalSectorInfoType ∗const (∗ pSectorList)[ ]

  pointer to array containing physical sector ID of each configured sector
- const uint8(∗ paSectorFlags)[ ]

  pointer to array containing flags set of each configured sector
- const Fls_LengthType(∗ paSectorPageSize)[ ]

  pointer to array containing page size information of each configured sector
- const Fls_HwChType(∗ paHwCh)[ ]

  Pointer to array containing the hardware channel(internal, external_qspi, external_emmc) of each configured sector.
- const uint32(∗ paSectorHwAddress)[ ]

  Pointer to array containing the configured hardware start address of each external sector.
- const Fls_QspiCfgConfigType ∗ pFlsQspiCfgConfig

  Pointer to configuration structure of QSPI.
- const Fls_InternalConfigType ∗ pFlsInternalCfgConfig

  Pointer to configuration structure internal flash.

6.2.2.3.1 Field Documentation

6.2.2.3.1.1 acCallBackPtr `Fls_ACCallbackPtrType acCallBackPtr`

pointer to ac callback function

Definition at line 531 of file Fls_Types.h.

6.2.2.3.1.2 jobEndNotificationPtr `Fls_JobEndNotificationPtrType jobEndNotificationPtr`

pointer to job end notification function

Definition at line 535 of file Fls_Types.h.

6.2.2.3.1.3 jobErrorNotificationPtr `Fls_JobErrorNotificationPtrType jobErrorNotificationPtr`

pointer to job error notification function

Definition at line 539 of file Fls_Types.h.

6.2.2.3.1.4 eDefaultMode `MemIf_ModeType eDefaultMode`

default FLS device mode after initialization (MEMIF_MODE_FAST, MEMIF_MODE_SLOW)

Definition at line 555 of file Fls_Types.h.

6.2.2.3.1.5 u32MaxReadFastMode `Fls_LengthType u32MaxReadFastMode`

max number of bytes to read in one cycle of Fls_MainFunction (fast mode)

Definition at line 559 of file Fls_Types.h.

6.2.2.3.1.6 u32MaxReadNormalMode `Fls_LengthType u32MaxReadNormalMode`

max number of bytes to read in one cycle of Fls_MainFunction (normal mode)

Definition at line 563 of file Fls_Types.h.

6.2.2.3.1.7 u32MaxWriteFastMode `Fls_LengthType u32MaxWriteFastMode`

max number of bytes to write in one cycle of Fls_MainFunction (fast mode)

Definition at line 567 of file Fls_Types.h.

6.2.2.3.1.8 u32MaxWriteNormalMode `Fls_LengthType u32MaxWriteNormalMode`

max number of bytes to write in one cycle of Fls_MainFunction (normal mode)

Definition at line 571 of file Fls_Types.h.

6.2.2.3.1.9 u32SectorCount `Fls_SectorCountType u32SectorCount`

number of configured logical sectors

Definition at line 575 of file Fls_Types.h.

6.2.2.3.1.10 paSectorEndAddr `const Fls_AddressType(* paSectorEndAddr)[ ]`

pointer to array containing last logical address of each configured sector

Definition at line 579 of file Fls_Types.h.

6.2.2.3.1.11 paSectorSize `const Fls_LengthType(* paSectorSize)[ ]`

pointer to array containing sector size of each configured sector

Definition at line 583 of file Fls_Types.h.

6.2.2.3.1.12 pSectorList `const Fls_Flash_InternalSectorInfoType* const(* pSectorList)[ ]`

pointer to array containing physical sector ID of each configured sector

Definition at line 587 of file Fls_Types.h.

6.2.2.3.1.13 paSectorFlags `const uint8(* paSectorFlags)[ ]`

pointer to array containing flags set of each configured sector

Definition at line 591 of file Fls_Types.h.

6.2.2.3.1.14 paSectorPageSize `const Fls_LengthType(* paSectorPageSize)[]`

pointer to array containing page size information of each configured sector

Definition at line 595 of file Fls_Types.h.

6.2.2.3.1.15 paHwCh `const Fls_HwChType(* paHwCh)[]`

Pointer to array containing the hardware channel(internal, external_qspi, external_emmc) of each configured sector.

Definition at line 599 of file Fls_Types.h.

6.2.2.3.1.16 paSectorHwAddress `const uint32(* paSectorHwAddress)[]`

Pointer to array containing the configured hardware start address of each external sector.

Definition at line 603 of file Fls_Types.h.

6.2.2.3.1.17 pFlsQspiCfgConfig `const Fls_QspiCfgConfigType* pFlsQspiCfgConfig`

Pointer to configuration structure of QSPI.

Definition at line 606 of file Fls_Types.h.

6.2.2.3.1.18 pFlsInternalCfgConfig `const Fls_InternalConfigType* pFlsInternalCfgConfig`

Pointer to configuration structure internal flash.

Definition at line 610 of file Fls_Types.h.

6.2.3 Macro Definition Documentation

6.2.3.1 FLS_DEVICE_INSTANCE_INVALID

```
#define FLS_DEVICE_INSTANCE_INVALID
```

Invalid device instance

Definition at line 147 of file Fls.h.

6.2.3.2 FLS_API_VENDOR_ID

```
#define FLS_API_VENDOR_ID
```

Version Check parameters.

Definition at line 57 of file Fls_Api.h.

6.2.3.3 FLS_MODULE_ID

```
#define FLS_MODULE_ID
```

AUTOSAR module identification.

Definition at line 103 of file Fls_Api.h.

6.2.3.4 FLS_INSTANCE_ID

```
#define FLS_INSTANCE_ID
```

AUTOSAR module instance identification.

Definition at line 107 of file Fls_Api.h.

6.2.3.5 FLS_E_PARAM_CONFIG

```
#define FLS_E_PARAM_CONFIG
```

Development error codes (passed to DET).

API service called with wrong config parameter

Definition at line 115 of file Fls_Api.h.

6.2.3.6 FLS_E_PARAM_ADDRESS

```
#define FLS_E_PARAM_ADDRESS
```

API service called with wrong address parameter.

Definition at line 119 of file Fls_Api.h.

6.2.3.7 FLS_E_PARAM_LENGTH

```
#define FLS_E_PARAM_LENGTH
```

API service called with wrong length parameter.

Definition at line 123 of file Fls_Api.h.

6.2.3.8 FLS_E_PARAM_DATA

```
#define FLS_E_PARAM_DATA
```

API service called with wrong data parameter.

Definition at line 127 of file Fls_Api.h.

6.2.3.9 FLS_E_UNINIT

```
#define FLS_E_UNINIT
```

API service called without module initialization.

Definition at line 131 of file Fls_Api.h.

6.2.3.10 FLS_E_BUSY

```
#define FLS_E_BUSY
```

API service called while driver still busy.

Definition at line 135 of file Fls_Api.h.

6.2.3.11 FLS_E_PARAM_POINTER

```
#define FLS_E_PARAM_POINTER
```

API service called with NULL pointer.

Definition at line 139 of file Fls_Api.h.

6.2.3.12 FLS_E_VERIFY_ERASE_FAILED

```
#define FLS_E_VERIFY_ERASE_FAILED
```

Runtime error codes (passed to DET).

Erase verification (blank check) failed

Definition at line 147 of file Fls_Api.h.

6.2.3.13 FLS_E_VERIFY_WRITE_FAILED

```
#define FLS_E_VERIFY_WRITE_FAILED
```

Write verification (compare) failed.

Definition at line 151 of file Fls_Api.h.

6.2.3.14 FLS_E_TIMEOUT

```
#define FLS_E_TIMEOUT
```

Timeout exceeded.

Definition at line 155 of file Fls_Api.h.

6.2.3.15 FLS_E_ERASE_FAILED

```
#define FLS_E_ERASE_FAILED
```

Transient Faults codes (passed to DET).

Flash erase failed (HW)

Definition at line 163 of file Fls_Api.h.

6.2.3.16 FLS_E_WRITE_FAILED

```
#define FLS_E_WRITE_FAILED
```

Flash write failed (HW)

Definition at line 167 of file Fls_Api.h.

6.2.3.17 FLS_E_READ_FAILED

```
#define FLS_E_READ_FAILED
```

Flash read failed (HW)

Definition at line 171 of file Fls_Api.h.

6.2.3.18 FLS_E_COMPARE_FAILED

```
#define FLS_E_COMPARE_FAILED
```

Flash compare failed (HW)

Definition at line 175 of file Fls_Api.h.

6.2.3.19 FLS_INIT_ID

```
#define FLS_INIT_ID
```

All service IDs (passed to DET).

service ID of function: Fls_Init. (passed to DET)

Definition at line 187 of file Fls_Api.h.

6.2.3.20 FLS_ERASE_ID

```
#define FLS_ERASE_ID
```

service ID of function: Fls_Erase. (passed to DET)

Definition at line 191 of file Fls_Api.h.

6.2.3.21 FLS_WRITE_ID

```
#define FLS_WRITE_ID
```

service ID of function: Fls_Write. (passed to DET)

Definition at line 195 of file Fls_Api.h.

6.2.3.22 FLS_CANCEL_ID

```
#define FLS_CANCEL_ID
```

service ID of function: Fls_Cancel. (passed to DET)

Definition at line 199 of file Fls_Api.h.

6.2.3.23 FLS_GETJOBRESULT_ID

```
#define FLS_GETJOBRESULT_ID
```

service ID of function: Fls_GetJobResult. (passed to DET)

Definition at line 203 of file Fls_Api.h.

6.2.3.24 FLS_MAINFUNCTION_ID

```
#define FLS_MAINFUNCTION_ID
```

service ID of function: Fls_MainFunction. (passed to DET)

Definition at line 207 of file Fls_Api.h.

6.2.3.25 FLS_READ_ID

```
#define FLS_READ_ID
```

service ID of function: Fls_Read. (passed to DET)

Definition at line 211 of file Fls_Api.h.

6.2.3.26 FLS_COMPARE_ID

```
#define FLS_COMPARE_ID
```

service ID of function: Fls_Compare. (passed to DET)

Definition at line 215 of file Fls_Api.h.

6.2.3.27 FLS_SETMODE_ID

```
#define FLS_SETMODE_ID
```

service ID of function: Fls_SetMode. (passed to DET)

Definition at line 219 of file Fls_Api.h.

6.2.3.28 FLS_GETVERSIONINFO_ID

```
#define FLS_GETVERSIONINFO_ID
```

service ID of function: Fls_GetVersionInfo. (passed to DET)

Definition at line 223 of file Fls_Api.h.

6.2.3.29 FLS_BLANK_CHECK_ID

```
#define FLS_BLANK_CHECK_ID
```

service ID of function: Fls_BlankCheck. (passed to DET)

Definition at line 227 of file Fls_Api.h.

6.2.3.30 FLS_SECTOR_ERASE_ASYNCH

```
#define FLS_SECTOR_ERASE_ASYNCH
```

All sector flags.

fls sector erase asynch

Definition at line 236 of file Fls_Api.h.

6.2.3.31 FLS_PAGE_WRITE_ASYNCH

```
#define FLS_PAGE_WRITE_ASYNCH
```

fls page write asynch

Definition at line 240 of file Fls_Api.h.

6.2.3.32 FLS_START_SEC_CODE

```
#define FLS_START_SEC_CODE
```

Start of Fls section CODE.

Definition at line 252 of file Fls_Api.h.

6.2.3.33 FLS_STOP_SEC_CODE

```
#define FLS_STOP_SEC_CODE
```

Stop of Fls section CODE.

Definition at line 549 of file Fls_Api.h.

6.2.3.34 FLS_IPW_CFG_INVALID

```
#define FLS_IPW_CFG_INVALID
```

Invalid configuration, specifies unused device

Definition at line 106 of file Fls_IPW.h.

6.2.4 Types Reference

6.2.4.1 Fls_SectorIndexType

```
typedef uint32 Fls_SectorIndexType
```

Logical sector index.

Definition at line 253 of file Fls_Types.h.

6.2.4.2 Fls_AddressType

```
typedef uint32 Fls_AddressType
```

Fls Address Type.

Address offset from the configured flash base address to access a certain flash memory area.

Definition at line 269 of file Fls_Types.h.

6.2.4.3 Fls_LengthType

```
typedef uint32 Fls_LengthType
```

Fls Length Type.

Number of bytes to read,write,erase,compare

Definition at line 275 of file Fls_Types.h.

6.2.4.4 Fls_SectorCountType

```
typedef uint32 Fls_SectorCountType
```

Fls Sector Count Type.

Number of configured sectors

Definition at line 281 of file Fls_Types.h.

6.2.4.5 Fls_BlockNumberOfSectorType

```
typedef uint8 Fls_BlockNumberOfSectorType
```

Fls BLock Count Type.

Block number of sectors type

Definition at line 287 of file Fls_Types.h.

6.2.4.6 Fls_InternalConfigType

```
typedef C40_ConfigType Fls_InternalConfigType
```

Fls Internal Flash Type.

Configuration structure of internal flash.

Definition at line 293 of file Fls_Types.h.

6.2.4.7 Fls_JobEndNotificationPtrType

```
typedef void(* Fls_JobEndNotificationPtrType) (void)
```

Fls Job End Notification Pointer Type.

Pointer type of Fls_JobEndNotification function

Definition at line 371 of file Fls_Types.h.

6.2.4.8 Fls_JobErrorNotificationPtrType

```
typedef void(* Fls_JobErrorNotificationPtrType) (void)
```

Fls Job Error Notification Pointer Type.

Pointer type of Fls_JobErrorNotification function

Definition at line 377 of file Fls_Types.h.

6.2.4.9 Fls_ACCallbackPtrType

```
typedef void(* Fls_ACCallbackPtrType) (void)
```

Pointer type of Fls_AC_Callback function.

Definition at line 383 of file Fls_Types.h.

6.2.4.10 Fls_MCoreTimeoutNotifPtrType

```
typedef void(* Fls_MCoreTimeoutNotifPtrType) (Fls_MCoreTimeoutJobType eMCoreTimeoutJob)
```

Fls Multi Core Notification Pointer Type.

Pointer type of Fls_MCoreTimeoutNotifPtrType function

Definition at line 423 of file Fls_Types.h.

6.2.5 Enum Reference

6.2.5.1 Fls_HwChType

```
enum Fls_HwChType
```

Flash sector channel type.

Definition at line 159 of file Fls_Types.h.

6.2.5.2 Fls_JobType

```
enum Fls_JobType
```

Type of job currently executed by Fls_MainFunction.

Enumerator

FLS_JOB_ERASE	erase one or more complete flash sectors
FLS_JOB_WRITE	write one or more complete flash pages
FLS_JOB_READ	read one or more bytes from flash memory
FLS_JOB_COMPARE	compare data buffer with content of flash memory
FLS_JOB_BLANK_CHECK	check content of erased flash memory area

Definition at line 168 of file Fls_Types.h.

6.2.5.3 Fls_LLDReturnType

```
enum Fls_LLDReturnType
```

Result of low-level flash operation.

Enumerator

FLASH_E_OK	operation succeeded
FLASH_E_FAILED	operation failed due to hardware error
FLASH_E_BLOCK_INCONSISTENT	data buffer doesn't match with content of flash memory
FLASH_E_PENDING	operation is pending
FLASH_E_PARTITION_ERR	FlexNVM partition ratio error.

Definition at line 195 of file Fls_Types.h.

6.2.5.4 Fls_LLDJobType

```
enum Fls_LLDJobType
```

Type of job currently executed by Fls_LLDMainFunction.

Enumerator

FLASH_JOB_NONE	no job executed by Fls_LLDMainFunction
FLASH_JOB_ERASE	erase one flash sector
FLASH_JOB_ERASE_TEMP	complete erase and start an interleaved erase flash sector
FLASH_JOB_WRITE	write one or more complete flash pages
FLASH_JOB_ERASE_BLANK_CHECK	erase blank check of flash sector

Definition at line 207 of file Fls_Types.h.

6.2.5.5 Fls_CrcDataSizeType

```
enum Fls_CrcDataSizeType
```

Size of data to be processeed by CRC.

Enumerator

FLS_CRC_8_BITS	crc 8 bits
FLS_CRC_16_BITS	crc 16 bits

Definition at line 237 of file Fls_Types.h.

6.2.5.6 Fls_MCoreReqReturnType

```
enum Fls_MCoreReqReturnType
```

Fls Multi Core Request Return Type.

The return value for the function requesting multi core access.

Enumerator

FLS_MCORE_ERROR	return error
FLS_MCORE_TIMEOUT	return timeout
FLS_MCORE_PENDING	return pending
FLS_MCORE_GRANTED	return granted
FLS_MCORE_CANCELLED	return cancelled

Definition at line 300 of file Fls_Types.h.

6.2.5.7 Fls_MCoreHwJobStatusType

```
enum Fls_MCoreHwJobStatusType
```

Fls Multi Core hardware job status.

The status of a multicore core flash job, in hardware. Used to determine if a flash job subject to multicore arbitration was started/suspended/aborted in hardware, in the flash controller. This can be used for example, to clear a semaphore granted for erase directly, if the job was not actually started in hardware, instead of attempting to suspend it.

Enumerator

FLS_MCORE_HW_JOB_IDLE	idle status
FLS_MCORE_HW_JOB_MAINF_STARTED	mainf started status
FLS_MCORE_HW_JOB_STARTED	started status
FLS_MCORE_HW_JOB_CANCELLED	cancelled status

Definition at line 333 of file Fls_Types.h.

6.2.5.8 Fls_MCoreTimeoutJobType

```
enum Fls_MCoreTimeoutJobType
```

Fls Multi Core timeout notification jobs.

The timeout notification specifies the job during which timeout occurred.

Enumerator

FLS_MCORE_TIMEOUT_ERASE	timeout job erase
FLS_MCORE_TIMEOUT_WRITE	timeout job write
FLS_MCORE_TIMEOUT_READ	timeout job read
FLS_MCORE_TIMEOUT_COMPARE	timeout job compare
FLS_MCORE_TIMEOUT_BLANK_CHECK	timeout job blank check

Definition at line 358 of file Fls_Types.h.

6.2.6 Function Reference

6.2.6.1 Fls_Init()

```
void Fls_Init (
            const Fls_ConfigType * ConfigPtr )
```

The function initializes Fls module.

The function sets the internal module variables according to given configuration set.

Parameters

in	*ConfigPtr*	Pointer to flash driver configuration set.

Precondition

`ConfigPtr` must not be `NULL_PTR` and the module status must not be `MEMIF_BUSY`.

6.2.6.2 Fls_Write()

```
Std_ReturnType Fls_Write (
            Fls_AddressType TargetAddress,
            const uint8 * SourceAddressPtr,
            Fls_LengthType Length )
```

Write one or more complete flash pages to the flash device.

Starts a write job asynchronously. The actual job is performed by `Fls_MainFunction`.

Parameters

in	*TargetAddress*	Target address in flash memory. This address offset will be added to the flash memory base address.
in	*SourceAddressPtr*	Pointer to source data buffer.
in	*Length*	Number of bytes to write.

Returns

Std_ReturnType

Return values

E_OK	Write command has been accepted.
E_NOT_OK	Write command has not been accepted.

Precondition

The module has to be initialized and not busy.

Postcondition

`Fls_Write` changes module status and some internal variables (`Fls_u32JobSectorIt`, `Fls_u32Job↩ AddrIt`, `Fls_u32JobAddrEnd`, `Fls_pJobDataSrcPtr`, `Fls_eJob`, `Fls_eJobResult`).

6.2.6.3 Fls_Erase()

```
Std_ReturnType Fls_Erase (
            Fls_AddressType TargetAddress,
            Fls_LengthType Length )
```

Erase one or more complete flash sectors.

Starts an erase job asynchronously. The actual job is performed by the `Fls_MainFunction`.

Parameters

in	*TargetAddress*	Target address in flash memory.
in	*Length*	Number of bytes to erase.

Returns

Std_ReturnType

Return values

E_OK	Erase command has been accepted.
E_NOT_OK	Erase command has not been accepted.

Precondition

The module has to be initialized and not busy.

Postcondition

`Fls_Erase` changes module status and some internal variables (`Fls_u32JobSectorIt`, `Fls_u32Job←SectorEnd`, `Fls_Job`, `Fls_eJobResult`).

6.2.6.4 Fls_Read()

```
Std_ReturnType Fls_Read (
            Fls_AddressType SourceAddress,
            uint8 * TargetAddressPtr,
            Fls_LengthType Length )
```

Reads from flash memory.

Starts a read job asynchronously. The actual job is performed by `Fls_MainFunction`.

Parameters

in	*SourceAddress*	Source address in flash memory. This address offset will be added to the flash memory base address.
in	*Length*	Number of bytes to read.
out	*TargetAddressPtr*	Pointer to target data buffer.

Returns

Std_ReturnType

Return values

E_OK	Read command has been accepted
E_NOT_OK	Read command has not been accepted

Precondition

The module has to be initialized and not busy.

Postcondition

`Fls_Read` changes module status and some internal variables (`Fls_u32JobSectorIt`, `Fls_u32JobAddr`↩ `It`, `Fls_u32JobAddrEnd`, `Fls_pJobDataDestPtr`, `Fls_eJob`, `Fls_eJobResult`).

6.2.7 Variable Documentation

6.2.7.1 Fls_u32JobAddrIt

```
Fls_AddressType Fls_u32JobAddrIt  [extern]
```

Logical address of data block currently processed by Fls_MainFunction.

6.2.7.2 Fls_u32JobAddrEnd

```
Fls_AddressType Fls_u32JobAddrEnd  [extern]
```

Last logical address to be processed by a job.

6.2.7.3 Fls_u32JobSectorIt

```
volatile Fls_SectorIndexType Fls_u32JobSectorIt  [extern]
```

Index of flash sector currently processed by a job.

Used by all types of job

6.2.7.4 Fls_u32JobSectorEnd

```
Fls_SectorIndexType Fls_u32JobSectorEnd  [extern]
```

Index of last flash sector by current job.

Used to check status of all external flash chips before start jobs or is the last sector in Erease job

6.2.7.5 Fls_eLLDJobResult

```
volatile MemIf_JobResultType Fls_eLLDJobResult  [extern]
```

Result of last flash hardware job.

6.2.7.6 Fls_eLLDJob

```
Fls_LLDJobType Fls_eLLDJob  [extern]
```

Type of current flash hardware job - used for asynchronous operating mode.

6.2.7.7 Fls_pConfigPtr

```
const Fls_ConfigType* Fls_pConfigPtr  [extern]
```

Pointer to current flash module configuration set.

6.3 QSPI IPV Driver

6.3.1 Detailed Description

Data Structures

- struct Qspi_Ip_HyperFlashConfigType
  Hyperflash configuration structure. More...
- struct Qspi_Ip_DllSettingsType
  DLL configuration structure. More...
- struct Qspi_Ip_ControllerAhbConfigType
  AHB configuration structure. More...
- struct Qspi_Ip_ControllerConfigType
  Driver configuration structure. More...
- struct Qspi_Ip_StatusConfigType
  Status register configuration structure. More...
- struct Qspi_Ip_EraseVarConfigType
  Describes one type of erase. More...
- struct Qspi_Ip_EraseConfigType
  Erase capabilities configuration structure. More...
- struct Qspi_Ip_ReadIdConfigType
  Read Id capabilities configuration structure. More...

- struct Qspi_Ip_SuspendConfigType

  Suspend capabilities configuration structure. More...
- struct Qspi_Ip_ResetConfigType

  Soft Reset capabilities configuration structure. More...
- struct Qspi_Ip_LutConfigType

  List of LUT sequences. More...
- struct Qspi_Ip_InitOperationType

  Initialization operation. More...
- struct Qspi_Ip_InitConfigType

  Initialization sequence. More...
- struct Qspi_Ip_MemoryConfigType

  Driver configuration structure. More...
- struct Qspi_Ip_MemoryConnectionType

  Flash-controller conections configuration structure. More...

Macros

- #define QSPI_IP_MAX_READ_SIZE
- #define QSPI_IP_MAX_WRITE_SIZE
- #define QSPI_IP_ERASE_TYPES
- #define QSPI_IP_AHB_BUFFERS

  Number of AHB buffers in the device.
- #define QSPI_IP_LUT_INVALID
- #define QSPI_IP_LUT_SEQ_END
- #define QSPI_IP_PACK_LUT_REG(ops0, ops1)

Types Reference

- typedef uint16 Qspi_Ip_InstrOpType

  Operation in a LUT sequence.
- typedef Qspi_Ip_StatusType(∗ Qspi_Ip_InitCalloutPtrType) (uint32 instance)

  Init callout pointer type.
- typedef Qspi_Ip_StatusType(∗ Qspi_Ip_ResetCalloutPtrType) (uint32 instance)

  Reset callout pointer type.
- typedef Qspi_Ip_StatusType(∗ Qspi_Ip_ErrorCheckCalloutPtrType) (uint32 instance)

  Error Check callout pointer type.
- typedef Qspi_Ip_StatusType(∗ Qspi_Ip_EccCheckCalloutPtrType) (uint32 instance, uint32 startAddress, uint32 dataLength)

  Ecc Check callout pointer type.

Enum Reference

- enum Qspi_Ip_HyperflashParamSectorMapType

  Parameter sector map.
- enum Qspi_Ip_HyperflashDrvStrengthType

  Drive strength.
- enum Qspi_Ip_HyperflashReadLatencyType

  Read latency.
- enum Qspi_Ip_HyperflashAsoEntryCommandsType
- enum Qspi_Ip_HyperflashSectorProtectionType

  Sector protection type.
- enum Qspi_Ip_StatusType

  qspi return codes
- enum Qspi_Ip_ConnectionType

  flash connection to the QSPI module
- enum Qspi_Ip_OpType

  flash operation type
- enum Qspi_Ip_LutCommandsType

  Lut commands.
- enum Qspi_Ip_LutPadsType

  Lut pad options.
- enum Qspi_Ip_ReadModeType

  Read mode.
- enum Qspi_Ip_DataRateType

  Clock phase used for sampling Rx data.
- enum Qspi_Ip_SampleDelayType

  Delay used for sampling Rx data.
- enum Qspi_Ip_SamplePhaseType

  Clock phase used for sampling Rx data.
- enum Qspi_Ip_FlashDataAlignType

  Alignment of outgoing data with serial clock.
- enum Qspi_Ip_DllModeType

  DLL configuration modes.
- enum Qspi_Ip_LastCommandType

  Last command that was executed by the device flash.
- enum Qspi_Ip_FlashMemoryType

  Parameter memory type.

Function Reference

- Qspi_Ip_StatusType Qspi_Ip_Init (uint32 instance, const Qspi_Ip_MemoryConfigType ∗pConfig, const Qspi_Ip_MemoryConnectionType ∗pConnect)

  Initializes the serial flash memory driver.
- Qspi_Ip_StatusType Qspi_Ip_Deinit (uint32 instance)

  De-initializes the serial flash memory driver.
- Qspi_Ip_StatusType Qspi_Ip_EraseBlock (uint32 instance, uint32 address, uint32 size)

Erase a sector in the serial flash.
- Qspi_Ip_StatusType Qspi_Ip_EraseChip (uint32 instance)

  Erase the entire serial flash.
- Qspi_Ip_StatusType Qspi_Ip_GetMemoryStatus (uint32 instance)

  Check the status of the flash device.
- Qspi_Ip_StatusType Qspi_Ip_SetProtection (uint32 instance, uint8 value)

  Sets the protection bits to the requested value.
- Qspi_Ip_StatusType Qspi_Ip_GetProtection (uint32 instance, uint8 ∗value)

  Returns the current value of the protection bits.
- Qspi_Ip_StatusType Qspi_Ip_Reset (uint32 instance)

  Resets the flash device.
- Qspi_Ip_StatusType Qspi_Ip_Enter0XX (uint32 instance)

  Enters 0-X-X (no command) mode. This mode assumes only reads are performed.
- Qspi_Ip_StatusType Qspi_Ip_Exit0XX (uint32 instance)

  Exits 0-X-X (no command) mode. This allows operations other than reads to be performed.
- Qspi_Ip_StatusType Qspi_Ip_ProgramSuspend (uint32 instance)

  Suspends a program operation.
- Qspi_Ip_StatusType Qspi_Ip_ProgramResume (uint32 instance)

  Resumes a program operation.
- Qspi_Ip_StatusType Qspi_Ip_EraseSuspend (uint32 instance)

  Suspends an erase operation.
- Qspi_Ip_StatusType Qspi_Ip_EraseResume (uint32 instance)

  Resumes an erase operation.
- Qspi_Ip_StatusType Qspi_Ip_Read (uint32 instance, uint32 address, uint8 ∗data, uint32 size)

  Read data from serial flash.
- Qspi_Ip_StatusType Qspi_Ip_ReadId (uint32 instance, uint8 ∗data)

  Read manufacturer ID/device ID from serial flash.
- Qspi_Ip_StatusType Qspi_Ip_ProgramVerify (uint32 instance, uint32 address, const uint8 ∗data, uint32 size)

  Verifies the correctness of the programmed data.
- Qspi_Ip_StatusType Qspi_Ip_EraseVerify (uint32 instance, uint32 address, uint32 size)

  Checks whether or not an area in the serial flash is erased.
- Qspi_Ip_StatusType Qspi_Ip_Program (uint32 instance, uint32 address, const uint8 ∗data, uint32 size)

  Writes data in serial flash.
- Qspi_Ip_StatusType Qspi_Ip_RunCommand (uint32 instance, uint16 lut, uint32 addr)

  Launches a simple command for the serial flash.
- Qspi_Ip_StatusType Qspi_Ip_RunReadCommand (uint32 instance, uint16 lut, uint32 addr, uint8 ∗dataRead, const uint8 ∗dataCmp, uint32 size)

  Launches a read command for the serial flash.
- Qspi_Ip_StatusType Qspi_Ip_RunWriteCommand (uint32 instance, uint16 lut, uint32 addr, const uint8 ∗data, uint32 size)

  Launches a write command for the serial flash.
- Qspi_Ip_StatusType Qspi_Ip_AhbReadEnable (uint32 instance)

  Sets up AHB reads to the serial flash.
- Qspi_Ip_StatusType Qspi_Ip_ControllerGetStatus (uint32 instance)

  Check the status of the QSPI controller.
- Qspi_Ip_StatusType Qspi_Ip_ControllerInit (uint32 instance, const Qspi_Ip_ControllerConfigType ∗user←
ConfigPtr)

Initializes the qspi driver.

- Qspi_Ip_StatusType Qspi_Ip_ControllerDeinit (uint32 instance)

  De-initialize the qspi driver.
- Qspi_Ip_StatusType Qspi_Ip_Abort (uint32 instance)

  Aborts any on-going transactions.
- Qspi_Ip_StatusType Qspi_Ip_ReadSfdp (Qspi_Ip_MemoryConfigType ∗pConfig, const Qspi_Ip_MemoryConnectionTy
  ∗pConnect)

  Initializes the serial flash memory configuration from SFDP table.

6.3.2 Data Structure Documentation

6.3.2.1 struct Qspi_Ip_HyperFlashConfigType

Hyperflash configuration structure.

This structure is used to provide configuration parameters for HyperFlash at initialization time.

Definition at line 216 of file Qspi_Ip_HyperflashTypes.h.

Data Fields

Type	Name	Description
Qspi_Ip_HyperflashDrvStrengthType	outputDriverStrength	Output driver level of the device
boolean	RWDSLowOnDualError	Specifies if RWDS will stall upon Dual Error Detect
boolean	secureRegionUnlocked	If true, the secure silicon region will be locked
Qspi_Ip_HyperflashReadLatencyType	readLatency	Read latency
Qspi_Ip_HyperflashParamSectorMapType	paramSectorMap	Parameter sector mapping
uint32	deviceIdWordAddress	The word address of the device Id in ASO

6.3.2.2 struct Qspi_Ip_DllSettingsType

DLL configuration structure.

This structure contains initialization settings for DLL and slave delay chain

Definition at line 322 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
Qspi_Ip_DllModeType	dllMode	Mode in which DLL is used
boolean	freqEnable	Selects delay-chain for high frequency of operation
uint8	referenceCounter	Select the "n+1" interval of DLL phase detection and reference delay updating interval
uint8	resolution	Minimum resolution for DLL phase detector
uint8	coarseDelay	Coarse delay DLL slave delay chain
uint8	fineDelay	Fine delay DLL slave delay chain
uint8	tapSelect	Selects the Nth tap provided by the slave delay-chain

6.3.2.3 struct Qspi_Ip_ControllerAhbConfigType

AHB configuration structure.

This structure is used to provide configuration parameters for AHB access to the external flash

Definition at line 339 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint8	masters[4U]	List of AHB masters assigned to each buffer
uint16	sizes[4U]	List of buffer sizes
boolean	allMasters	Indicates that any master may access the last buffer

6.3.2.4 struct Qspi_Ip_ControllerConfigType

Driver configuration structure.

This structure is used to provide configuration parameters for the qspi driver at initialization time.

Definition at line 459 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
Qspi_Ip_DataRateType	dataRate	Single/double data rate
uint32	memSizeA1	Size of serial flash A1
uint32	memSizeA2	Size of serial flash A2
uint8	csHoldTime	CS hold time, expressed in serial clock cycles
uint8	csSetupTime	CS setup time, expressed in serial clock cycles
uint8	columnAddr	Width of the column address, 0 if not used
boolean	wordAddresable	True if serial flash is word addressable
Qspi_Ip_ReadModeType	readModeA	Read mode for incoming data from serial flash A
Qspi_Ip_SampleDelayType	sampleDelay	Delay (in clock cycles) used for sampling Rx data
Qspi_Ip_SamplePhaseType	samplePhase	Clock phase used for sampling Rx data
Qspi_Ip_DllSettingsType	dllSettingsA	DLL settings for side A
Qspi_Ip_FlashDataAlignType	dataAlign	Alignment of output data sent to serial flash
uint8	io2IdleValueA	(0 / 1) Logic level of IO[2] signal when not used on side A
uint8	io3IdleValueA	(0 / 1) Logic level of IO[3] signal when not used on side A
boolean	byteSwap	Enable byte swap in octal DDR mode
Qspi_Ip_ControllerAhbConfigType	ahbConfig	AHB buffers configuration

6.3.2.5 struct Qspi_Ip_StatusConfigType

Status register configuration structure.

This structure contains information about the status registers of the external flash

Definition at line 501 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	statusRegInitReadLut	Command used to read the status register during initialization
uint16	statusRegReadLut	Command used to read the status register
uint16	statusRegWriteLut	Command used to write the status register
uint16	writeEnableSRLut	Write enable command used before writing to status register
uint16	writeEnableLut	Write enable command used before write or erase operations
uint8	regSize	Size in bytes of status register
uint8	busyOffset	Position of "busy" bit inside status register
uint8	busyValue	Value of "busy" bit which indicates that the device is busy; can be 0 or 1
uint8	writeEnableOffset	Position of "write enable" bit inside status register
uint8	blockProtectionOffset	Offset of block protection bits inside status register
uint8	blockProtectionWidth	Width of block protection bitfield
uint8	blockProtectionValue	Value of block protection bitfield, indicate the protected area

6.3.2.6 struct Qspi_Ip_EraseVarConfigType

Describes one type of erase.

This structure contains information about one type of erase supported by the external flash

Definition at line 523 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	eraseLut	Lut index for erase command
uint8	size	Size of the erased area: 2 ^ size; e.g. 0x0C means 4 Kbytes

6.3.2.7 struct Qspi_Ip_EraseConfigType

Erase capabilities configuration structure.

This structure contains information about the erase capabilities of the external flash

Definition at line 535 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
Qspi_Ip_EraseVarConfigType	eraseTypes[4U]	Erase types supported by the device
uint16	chipEraseLut	Lut index for chip erase command

6.3.2.8 struct Qspi_Ip_ReadIdConfigType

Read Id capabilities configuration structure.

This structure contains information about the read manufacturer/device ID command

Definition at line 547 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	readIdLut	Read Id command
uint8	readIdSize	Size of data returned by Read Id command
uint8	readIdExpected[FEATURE_QSPI_FLASH_MDID_SIZE]	Device ID configured value (Memory density | Memory type | Manufacturer ID)

6.3.2.9 struct Qspi_Ip_SuspendConfigType

Suspend capabilities configuration structure.

This structure contains information about the Program / Erase Suspend capabilities of the external flash

Definition at line 560 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	eraseSuspendLut	Lut index for the erase suspend operation
uint16	eraseResumeLut	Lut index for the erase resume operation
uint16	programSuspendLut	Lut index for the program suspend operation
uint16	programResumeLut	Lut index for the program resume operation

6.3.2.10 struct Qspi_Ip_ResetConfigType

Soft Reset capabilities configuration structure.

This structure contains information about the Soft Reset capabilities of the external flash

Definition at line 574 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	resetCmdLut	First command in reset sequence
uint8	resetCmdCount	Number of commands in reset sequence

6.3.2.11 struct Qspi_Ip_LutConfigType

List of LUT sequences.

List of LUT sequences. Each sequence describes a command to the external flash. Sequences are separated by a 0 operation

Definition at line 602 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint16	opCount	Number of operations in the LUT table
Qspi_Ip_InstrOpType *	lutOps	List of operations

6.3.2.12 struct Qspi_Ip_InitOperationType

Initialization operation.

This structure describes one initialization operation.

Definition at line 614 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
Qspi_Ip_OpType	opType	Operation type

Data Fields

Type	Name	Description
uint16	command1Lut	Index of first command sequence in Lut; for RMW type this is the read command
uint16	command2Lut	Index of second command sequence in Lut, only used for RMW type, this is the write command
uint16	weLut	Index of write enable sequence in Lut, only used for Write and RMW type
uint32	addr	Address, if used in command.
uint8	size	Size in bytes of configuration register
uint8	shift	Position of configuration field inside the register
uint8	width	Width in bits of configuration field.
uint32	value	Value to set in the field
const Qspi_Ip_ControllerConfigType ∗	ctrlCfgPtr	New controller configuration, valid only for QSPI_IP_OP_TYPE_QSPI_CFG type

6.3.2.13 struct Qspi_Ip_InitConfigType

Initialization sequence.

Describe sequence that will be performed only once during initialization to put the flash in the desired state for operation. This may include, for example, setting the QE bit, activating 4-byte addressing, activating XPI mode

Definition at line 635 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint8	opCount	Number of operations
Qspi_Ip_InitOperationType ∗	operations	List of operations

6.3.2.14 struct Qspi_Ip_MemoryConfigType

Driver configuration structure.

This structure is used to provide configuration parameters for the external flash driver at initialization time.

Definition at line 658 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
Qspi_Ip_FlashMemoryType	memType	Mmemory device type
const Qspi_Ip_HyperFlashConfigType ∗	hfConfig	Hyperflash configuration, NULL if not used
uint32	memSize	Memory size (in bytes)
uint32	pageSize	Page size (in bytes)
uint16	readLut	Command used to read data from flash
uint16	writeLut	Command used to write data to flash
uint16	read0xxLut	0-x-x mode read command
uint16	read0xxLutAHB	0-x-x mode AHB read command
Qspi_Ip_ReadIdConfigType	readIdSettings	Erase settings of the external flash
Qspi_Ip_EraseConfigType	eraseSettings	Erase settings of the external flash
Qspi_Ip_StatusConfigType	statusConfig	Status register information
Qspi_Ip_SuspendConfigType	suspendSettings	Program / Erase Suspend settings
Qspi_Ip_ResetConfigType	resetSettings	Soft Reset settings, used at runtime
Qspi_Ip_ResetConfigType	initResetSettings	Soft Reset settings, used for first time reset
Qspi_Ip_InitConfigType	initConfiguration	Operations for initial flash configuration
Qspi_Ip_LutConfigType	lutSequences	List of LUT sequences describing flash commands
Qspi_Ip_InitCalloutPtrType	initCallout	Pointer to init callout
Qspi_Ip_ResetCalloutPtrType	resetCallout	Pointer to reset callout
Qspi_Ip_ErrorCheckCalloutPtrType	errorCheckCallout	Pointer to error check callout
Qspi_Ip_EccCheckCalloutPtrType	eccCheckCallout	Pointer to ecc check callout
const Qspi_Ip_ControllerConfigType ∗	ctrlAutoCfgPtr	Initial controller configuration, if needed

6.3.2.15 struct Qspi_Ip_MemoryConnectionType

Flash-controller conections configuration structure.

This structure specifies thte connecctions of each flash device to QSPI controllers at initialization time.

Definition at line 690 of file Qspi_Ip_Types.h.

Data Fields

Type	Name	Description
uint32	qspiInstance	QSPI Instance where this device is connected
Qspi_Ip_ConnectionType	connectionType	Device connection to QSPI module
uint8	memAlignment	Memory alignment required by the external flash

6.3.3 Macro Definition Documentation

6.3.3.1 QSPI_IP_MAX_READ_SIZE

```
#define QSPI_IP_MAX_READ_SIZE
```

Maximum number of bytes then can be read in one operation

Definition at line 100 of file Qspi_Ip.h.

6.3.3.2 QSPI_IP_MAX_WRITE_SIZE

```
#define QSPI_IP_MAX_WRITE_SIZE
```

Maximum number of bytes then can be written in one operation

Definition at line 102 of file Qspi_Ip.h.

6.3.3.3 QSPI_IP_ERASE_TYPES

```
#define QSPI_IP_ERASE_TYPES
```

Number of erase types that can be supported by a flash device

Definition at line 138 of file Qspi_Ip_Types.h.

6.3.3.4 QSPI_IP_AHB_BUFFERS

```
#define QSPI_IP_AHB_BUFFERS
```

Number of AHB buffers in the device.

Definition at line 141 of file Qspi_Ip_Types.h.

6.3.3.5 QSPI_IP_LUT_INVALID

```
#define QSPI_IP_LUT_INVALID
```

Invalid index in virtual LUT, used for unsupported features

Definition at line 144 of file Qspi_Ip_Types.h.

6.3.3.6 QSPI_IP_LUT_SEQ_END

```
#define QSPI_IP_LUT_SEQ_END
```

End operation for a LUT sequence

Definition at line 146 of file Qspi_Ip_Types.h.

6.3.3.7 QSPI_IP_PACK_LUT_REG

```
#define QSPI_IP_PACK_LUT_REG(
              ops0,
              ops1 )
```

Pack the two operations into a LUT register (each operation is a pair of instruction-operand)

Definition at line 148 of file Qspi_Ip_Types.h.

6.3.4 Types Reference

6.3.4.1 Qspi_Ip_InstrOpType

```
typedef uint16 Qspi_Ip_InstrOpType
```

Operation in a LUT sequence.

This type describes one basic operation inside a LUT sequence. Each operation contains:

- instruction (6 bits)
- number of PADs (2 bits)
- operand (8 bits) Qspi_Ip_LutCommandsType and Qspi_Ip_LutPadsType types should be used to form operations

Definition at line 235 of file Qspi_Ip_Types.h.

6.3.4.2 Qspi_Ip_InitCalloutPtrType

```
typedef Qspi_Ip_StatusType(* Qspi_Ip_InitCalloutPtrType) (uint32 instance)
```

Init callout pointer type.

Definition at line 298 of file Qspi_Ip_Types.h.

6.3.4.3 Qspi_Ip_ResetCalloutPtrType

```
typedef Qspi_Ip_StatusType(* Qspi_Ip_ResetCalloutPtrType) (uint32 instance)
```

Reset callout pointer type.

Definition at line 302 of file Qspi_Ip_Types.h.

6.3.4.4 Qspi_Ip_ErrorCheckCalloutPtrType

```
typedef Qspi_Ip_StatusType(* Qspi_Ip_ErrorCheckCalloutPtrType) (uint32 instance)
```

Error Check callout pointer type.

Definition at line 306 of file Qspi_Ip_Types.h.

6.3.4.5 Qspi_Ip_EccCheckCalloutPtrType

```
typedef Qspi_Ip_StatusType(* Qspi_Ip_EccCheckCalloutPtrType) (uint32 instance, uint32 startAddress, uint32
dataLength)
```

Ecc Check callout pointer type.

Definition at line 310 of file Qspi_Ip_Types.h.

6.3.5 Enum Reference

6.3.5.1 Qspi_Ip_HyperflashParamSectorMapType

```
enum Qspi_Ip_HyperflashParamSectorMapType
```

Parameter sector map.

This structure is used to configure how the Parameter-Sectors are used and how they are mapped into the address map.

Definition at line 130 of file Qspi_Ip_HyperflashTypes.h.

6.3.5.2 Qspi_Ip_HyperflashDrvStrengthType

```
enum Qspi_Ip_HyperflashDrvStrengthType
```

Drive strength.

Hyperflash driver strength settings.

Enumerator

QSPI_IP_HF_DRV_STRENGTH_000	Typical Impedance for 1.8V: 27, Typical Impedance 3V: 20
QSPI_IP_HF_DRV_STRENGTH_001	Typical Impedance for 1.8V: 117, Typical Impedance 3V: 71
QSPI_IP_HF_DRV_STRENGTH_002	Typical Impedance for 1.8V: 68, Typical Impedance 3V: 40
QSPI_IP_HF_DRV_STRENGTH_003	Typical Impedance for 1.8V: 45, Typical Impedance 3V: 27
QSPI_IP_HF_DRV_STRENGTH_004	Typical Impedance for 1.8V: 34, Typical Impedance 3V: 20
QSPI_IP_HF_DRV_STRENGTH_005	Typical Impedance for 1.8V: 27, Typical Impedance 3V: 16
QSPI_IP_HF_DRV_STRENGTH_006	Typical Impedance for 1.8V: 24, Typical Impedance 3V: 14
QSPI_IP_HF_DRV_STRENGTH_007	Typical Impedance for 1.8V: 20, Typical Impedance 3V: 12

Definition at line 144 of file Qspi_Ip_HyperflashTypes.h.

6.3.5.3 Qspi_Ip_HyperflashReadLatencyType

```
enum Qspi_Ip_HyperflashReadLatencyType
```

Read latency.

Enumerator

QSPI_IP_HF_READ_LATENCY_5_CLOCKS	Read latency 5 clocks
QSPI_IP_HF_READ_LATENCY_6_CLOCKS	Read latency 6 clocks
QSPI_IP_HF_READ_LATENCY_7_CLOCKS	Read latency 7 clocks
QSPI_IP_HF_READ_LATENCY_8_CLOCKS	Read latency 8 clocks
QSPI_IP_HF_READ_LATENCY_9_CLOCKS	Read latency 9 clocks
QSPI_IP_HF_READ_LATENCY_10_CLOCKS	Read latency 10 clocks
QSPI_IP_HF_READ_LATENCY_11_CLOCKS	Read latency 11 clocks
QSPI_IP_HF_READ_LATENCY_12_CLOCKS	Read latency 12 clocks
QSPI_IP_HF_READ_LATENCY_13_CLOCKS	Read latency 13 clocks
QSPI_IP_HF_READ_LATENCY_14_CLOCKS	Read latency 14 clocks
QSPI_IP_HF_READ_LATENCY_15_CLOCKS	Read latency 15 clocks
QSPI_IP_HF_READ_LATENCY_16_CLOCKS	Read latency 16 clocks

Definition at line 161 of file Qspi_Ip_HyperflashTypes.h.

6.3.5.4 Qspi_Ip_HyperflashAsoEntryCommandsType

```
enum Qspi_Ip_HyperflashAsoEntryCommandsType
```

Enumerator

QSPI_IP_HF_PASSWORD_ASO_ENTRY	Password ASO Entry command
QSPI_IP_HF_PPB_ASO_ENTRY	PPB ASO Entry command
QSPI_IP_HF_PPB_LOCK_ASO_ENTRY	PPB Lock ASO Entry command
QSPI_IP_HF_DYB_ASO_ENTRY	DYB ASO Entry command
QSPI_IP_HF_ECC_ASO_ENTRY	ECC ASO Entry command
QSPI_IP_HF_SSR_ASO_ENTRY	Secure Silicon Region command

Enumerator

QSPI_IP_HF_CRC_ASO_ENTRY	CRC ASO Entry command
QSPI_IP_HF_ASPR_ASO_ENTRY	ASP Configuration Register ASO entry command
QSPI_IP_HF_FLASH_MEMORY_ARRAY	No ASO entry

Definition at line 179 of file Qspi_Ip_HyperflashTypes.h.

6.3.5.5 Qspi_Ip_HyperflashSectorProtectionType

`enum Qspi_Ip_HyperflashSectorProtectionType`

Sector protection type.

Definition at line 197 of file Qspi_Ip_HyperflashTypes.h.

6.3.5.6 Qspi_Ip_StatusType

`enum Qspi_Ip_StatusType`

qspi return codes

Enumerator

STATUS_QSPI_IP_SUCCESS	Successful job
STATUS_QSPI_IP_ERROR	IP is performing an operation
STATUS_QSPI_IP_BUSY	Error - general code
STATUS_QSPI_IP_TIMEOUT	Error - exceeded timeout
STATUS_QSPI_IP_ERROR_PROGRAM_VERIFY	Error - selected memory area doesn't contain desired value

Definition at line 157 of file Qspi_Ip_Types.h.

6.3.5.7 Qspi_Ip_ConnectionType

`enum Qspi_Ip_ConnectionType`

flash connection to the QSPI module

Enumerator

QSPI_IP_SIDE_A1	Serial flash connected on side A1
QSPI_IP_SIDE_A2	Serial flash connected on side A2
QSPI_IP_SIDE_B1	Serial flash connected on side B1
QSPI_IP_SIDE_B2	Serial flash connected on side B2

Definition at line 169 of file Qspi_Ip_Types.h.

6.3.5.8 Qspi_Ip_OpType

```
enum Qspi_Ip_OpType
```

flash operation type

Enumerator

QSPI_IP_OP_TYPE_CMD	Simple command
QSPI_IP_OP_TYPE_WRITE_REG	Write value in external flash register
QSPI_IP_OP_TYPE_RMW_REG	RMW command on external flash register
QSPI_IP_OP_TYPE_READ_REG	Read external flash register until expected value is read
QSPI_IP_OP_TYPE_QSPI_CFG	Re-configure QSPI controller

Definition at line 180 of file Qspi_Ip_Types.h.

6.3.5.9 Qspi_Ip_LutCommandsType

```
enum Qspi_Ip_LutCommandsType
```

Lut commands.

Enumerator

QSPI_IP_LUT_INSTR_STOP	End of sequence

Enumerator

QSPI_IP_LUT_INSTR_CMD	Command
QSPI_IP_LUT_INSTR_ADDR	Address
QSPI_IP_LUT_INSTR_DUMMY	Dummy cycles
QSPI_IP_LUT_INSTR_MODE	8-bit mode
QSPI_IP_LUT_INSTR_MODE2	2-bit mode
QSPI_IP_LUT_INSTR_MODE4	4-bit mode
QSPI_IP_LUT_INSTR_READ	Read data
QSPI_IP_LUT_INSTR_WRITE	Write data
QSPI_IP_LUT_INSTR_JMP_ON_CS	Jump on chip select deassert and stop
QSPI_IP_LUT_INSTR_ADDR_DDR	Address - DDR mode
QSPI_IP_LUT_INSTR_MODE_DDR	8-bit mode - DDR mode
QSPI_IP_LUT_INSTR_MODE2_DDR	2-bit mode - DDR mode
QSPI_IP_LUT_INSTR_MODE4_DDR	4-bit mode - DDR mode
QSPI_IP_LUT_INSTR_READ_DDR	Read data - DDR mode
QSPI_IP_LUT_INSTR_WRITE_DDR	Write data - DDR mode
QSPI_IP_LUT_INSTR_DATA_LEARN	Data learning pattern
QSPI_IP_LUT_INSTR_CMD_DDR	Command - DDR mode
QSPI_IP_LUT_INSTR_CADDR	Column address
QSPI_IP_LUT_INSTR_CADDR_DDR	Column address - DDR mode
QSPI_IP_LUT_INSTR_JMP_TO_SEQ	Jump on chip select deassert and continue

Definition at line 191 of file Qspi_Ip_Types.h.

6.3.5.10 Qspi_Ip_LutPadsType

`enum Qspi_Ip_LutPadsType`

Lut pad options.

Enumerator

QSPI_IP_LUT_PADS←_1	1 Pad
QSPI_IP_LUT_PADS←_2	2 Pads
QSPI_IP_LUT_PADS←_4	4 Pads
QSPI_IP_LUT_PADS←_8	8 Pads

Definition at line 218 of file Qspi_Ip_Types.h.

6.3.5.11 Qspi_Ip_ReadModeType

```
enum Qspi_Ip_ReadModeType
```

Read mode.

Enumerator

QSPI_IP_READ_MODE_EXTERNAL_DQS	Use external strobe signal

Definition at line 239 of file Qspi_Ip_Types.h.

6.3.5.12 Qspi_Ip_DataRateType

```
enum Qspi_Ip_DataRateType
```

Clock phase used for sampling Rx data.

Enumerator

QSPI_IP_DATA_RATE_SDR	Single data rate
QSPI_IP_DATA_RATE_DDR	Double data rate

Definition at line 256 of file Qspi_Ip_Types.h.

6.3.5.13 Qspi_Ip_SampleDelayType

```
enum Qspi_Ip_SampleDelayType
```

Delay used for sampling Rx data.

Enumerator

QSPI_IP_SAMPLE_DELAY_SAME_DQS	Same DQS
QSPI_IP_SAMPLE_DELAY_HALFCYCLE_EARLY_DQS	Half-cycle early DQS

Definition at line 265 of file Qspi_Ip_Types.h.

6.3.5.14 Qspi_Ip_SamplePhaseType

```
enum Qspi_Ip_SamplePhaseType
```

Clock phase used for sampling Rx data.

Enumerator

QSPI_IP_SAMPLE_PHASE_NON_INVERTED	Sampling at non-inverted clock
QSPI_IP_SAMPLE_PHASE_INVERTED	Sampling at inverted clock

Definition at line 273 of file Qspi_Ip_Types.h.

6.3.5.15 Qspi_Ip_FlashDataAlignType

```
enum Qspi_Ip_FlashDataAlignType
```

Alignment of outgoing data with serial clock.

Enumerator

QSPI_IP_FLASH_DATA_ALIGN_REFCLK	Data aligned with the posedge of Internal reference clock of QSPI
QSPI_IP_FLASH_DATA_ALIGN_2X_REFCLK	Data aligned with 2x serial flash half clock

Definition at line 281 of file Qspi_Ip_Types.h.

6.3.5.16 Qspi_Ip_DllModeType

```
enum Qspi_Ip_DllModeType
```

DLL configuration modes.

Enumerator

QSPI_IP_DLL_BYPASSED	DLL bypass mode
QSPI_IP_DLL_MANUAL_UPDATE	DLL manual update mode
QSPI_IP_DLL_AUTO_UPDATE	DLL auto update mode

Definition at line 289 of file Qspi_Ip_Types.h.

6.3.5.17 Qspi_Ip_LastCommandType

```
enum Qspi_Ip_LastCommandType
```

Last command that was executed by the device flash.

Definition at line 584 of file Qspi_Ip_Types.h.

6.3.5.18 Qspi_Ip_FlashMemoryType

```
enum Qspi_Ip_FlashMemoryType
```

Parameter memory type.

Enumerator

QSPI_IP_HYPER_FLASH	Hyperbus devices
QSPI_IP_SERIAL_FLASH	Traditional xSPI devices

Definition at line 645 of file Qspi_Ip_Types.h.

6.3.6 Function Reference

6.3.6.1 Qspi_Ip_Init()

```
Qspi_Ip_StatusType Qspi_Ip_Init (
             uint32 instance,
             const Qspi_Ip_MemoryConfigType * pConfig,
             const Qspi_Ip_MemoryConnectionType * pConnect )
```

Initializes the serial flash memory driver.

This function initializes the external flash driver and prepares it for operation.

Parameters

instance	External flash instance number
pConfig	Pointer to the driver configuration structure.
pConnect	Pointer to the flash device connection structure.

Returns

Error or success status returned by API

6.3.6.2 Qspi_Ip_Deinit()

```
Qspi_Ip_StatusType Qspi_Ip_Deinit (
             uint32 instance )
```

De-initializes the serial flash memory driver.

This function de-initializes the qspi driver. The driver can't be used again until reinitialized. The state structure is no longer needed by the driver and may be freed after calling this function.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.3 Qspi_Ip_EraseBlock()

```
Qspi_Ip_StatusType Qspi_Ip_EraseBlock (
            uint32 instance,
            uint32 address,
            uint32 size )
```

Erase a sector in the serial flash.

This function performs one erase sector (block) operation on the external flash. The erase size must match one of the device's erase types.

Parameters

instance	External flash instance number
address	Address of sector to be erased
size	Size of the sector to be erase. The sector size must match one of the supported erase sizes of the device.

Returns

Error or success status returned by API

6.3.6.4 Qspi_Ip_EraseChip()

```
Qspi_Ip_StatusType Qspi_Ip_EraseChip (
            uint32 instance )
```

Erase the entire serial flash.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.5 Qspi_Ip_GetMemoryStatus()

```
Qspi_Ip_StatusType Qspi_Ip_GetMemoryStatus (
            uint32 instance )
```

Check the status of the flash device.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.6 Qspi_Ip_SetProtection()

```
Qspi_Ip_StatusType Qspi_Ip_SetProtection (
            uint32 instance,
            uint8 value )
```

Sets the protection bits to the requested value.

Parameters

instance	External flash instance number
value	New value for the protection bits

Returns

Error or success status returned by API

6.3.6.7 Qspi_Ip_GetProtection()

```
Qspi_Ip_StatusType Qspi_Ip_GetProtection (
            uint32 instance,
            uint8 * value )
```

Returns the current value of the protection bits.

Parameters

instance	External flash instance number
value	Current value of the protection bits

Returns

Error or success status returned by API

6.3.6.8 Qspi_Ip_Reset()

```
Qspi_Ip_StatusType Qspi_Ip_Reset (
            uint32 instance )
```

Resets the flash device.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.9 Qspi_Ip_Enter0XX()

```
Qspi_Ip_StatusType Qspi_Ip_Enter0XX (
            uint32 instance )
```

Enters 0-X-X (no command) mode. This mode assumes only reads are performed.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.10 Qspi_Ip_Exit0XX()

```
Qspi_Ip_StatusType Qspi_Ip_Exit0XX (
            uint32 instance )
```

Exits 0-X-X (no command) mode. This allows operations other than reads to be performed.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.11 Qspi_Ip_ProgramSuspend()

```
Qspi_Ip_StatusType Qspi_Ip_ProgramSuspend (
            uint32 instance )
```

Suspends a program operation.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.12 Qspi_Ip_ProgramResume()

```
Qspi_Ip_StatusType Qspi_Ip_ProgramResume (
            uint32 instance )
```

Resumes a program operation.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.13 Qspi_Ip_EraseSuspend()

```
Qspi_Ip_StatusType Qspi_Ip_EraseSuspend (
            uint32 instance )
```

Suspends an erase operation.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.14 Qspi_Ip_EraseResume()

```
Qspi_Ip_StatusType Qspi_Ip_EraseResume (
            uint32 instance )
```

Resumes an erase operation.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.15 Qspi_Ip_Read()

```
Qspi_Ip_StatusType Qspi_Ip_Read (
            uint32 instance,
            uint32 address,
            uint8 * data,
            uint32 size )
```

Read data from serial flash.

Parameters

instance	External flash instance number
address	Start address for read operation
data	Buffer where to store read data
size	Size of data buffer

Returns

Error or success status returned by API

6.3.6.16 Qspi_Ip_ReadId()

```
Qspi_Ip_StatusType Qspi_Ip_ReadId (
            uint32 instance,
            uint8 * data )
```

Read manufacturer ID/device ID from serial flash.

Parameters

instance	External flash instance number
data	Buffer where to store read data. Buffer size must match ReadId initialization settings.

Returns

Error or success status returned by API

6.3.6.17 Qspi_Ip_ProgramVerify()

```
Qspi_Ip_StatusType Qspi_Ip_ProgramVerify (
            uint32 instance,
            uint32 address,
            const uint8 * data,
            uint32 size )
```

Verifies the correctness of the programmed data.

Parameters

instance	External flash instance number
address	Start address of area to be verified
data	Data to be verified
size	Size of area to be verified

Returns

Error or success status returned by API

6.3.6.18 Qspi_Ip_EraseVerify()

```
Qspi_Ip_StatusType Qspi_Ip_EraseVerify (
            uint32 instance,
            uint32 address,
            uint32 size )
```

Checks whether or not an area in the serial flash is erased.

Parameters

instance	External flash instance number
address	Start address of area to be verified
size	Size of area to be verified

Returns

Error or success status returned by API

6.3.6.19 Qspi_Ip_Program()

```
Qspi_Ip_StatusType Qspi_Ip_Program (
            uint32 instance,
            uint32 address,
            const uint8 * data,
            uint32 size )
```

Writes data in serial flash.

Writes data in serial flash memory then exits (Async mode) The status of the flash memory must be verified by calling asynchronously the Qspi_Ip_GetMemoryStatus function until it is not busy, meaning that the write operation is complete. The maximum supported size is equal to the Qspi hardware TxBuffer size.

Parameters

instance	External flash instance number
address	Start address of area to be programmed
data	Data to be programmed in flash
size	Size of data buffer

Returns

Error or success status returned by API

6.3.6.20 Qspi_Ip_RunCommand()

```
Qspi_Ip_StatusType Qspi_Ip_RunCommand (
            uint32 instance,
            uint16 lut,
            uint32 addr )
```

Launches a simple command for the serial flash.

Parameters

instance	External flash instance number
lut	Index of command in virtual LUT
addr	Address used in the command, or base address of the target serial flash

Returns

Error or success status returned by API

6.3.6.21 Qspi_Ip_RunReadCommand()

```
Qspi_Ip_StatusType Qspi_Ip_RunReadCommand (
            uint32 instance,
            uint16 lut,
            uint32 addr,
            uint8 * dataRead,
            const uint8 * dataCmp,
            uint32 size )
```

Launches a read command for the serial flash.

This function can launch a read command in 3 modes:

- normal read (dataRead != NULL_PTR): Data is read from serial flash and placed in the buffer
- verify (dataRead == NULL_PTR, dataCmp != NULL_PTR): Data is read from serial flash and compared to the reference buffer
- blank check (dataRead == NULL_PTR, dataCmp == NULL_PTR): Data is read from serial flash and compared to 0xFF

Parameters

instance	External flash instance number
lut	Index of command in virtual LUT
addr	Start address for read operation in serial flash
dataRead	Buffer where to store read data
dataCmp	Buffer to be compared to read data
size	Size of data buffer

Returns

Error or success status returned by API

6.3.6.22 Qspi_Ip_RunWriteCommand()

```
Qspi_Ip_StatusType Qspi_Ip_RunWriteCommand (
            uint32 instance,
            uint16 lut,
            uint32 addr,
            const uint8 * data,
            uint32 size )
```

Launches a write command for the serial flash.

Parameters

instance	External flash instance number
lut	Index of command in virtual LUT
addr	Start address for write operation in serial flash
data	Data to be programmed in flash
size	Size of data buffer

Returns

Error or success status returned by API

6.3.6.23 Qspi_Ip_AhbReadEnable()

```
Qspi_Ip_StatusType Qspi_Ip_AhbReadEnable (
            uint32 instance )
```

Sets up AHB reads to the serial flash.

Parameters

instance	External flash instance number

Returns

Error or success status returned by API

6.3.6.24 Qspi_Ip_ControllerGetStatus()

```
Qspi_Ip_StatusType Qspi_Ip_ControllerGetStatus (
            uint32 instance )
```

Check the status of the QSPI controller.

Parameters

instance	QSPI peripheral instance number

Returns

Error or success status returned by API

6.3.6.25 Qspi_Ip_ControllerInit()

```
Qspi_Ip_StatusType Qspi_Ip_ControllerInit (
            uint32 instance,
            const Qspi_Ip_ControllerConfigType * userConfigPtr )
```

Initializes the qspi driver.

This function initializes the qspi driver and prepares it for operation.

Parameters

instance	QSPI peripheral instance number
userConfigPtr	Pointer to the qspi configuration structure.

Returns

Error or success status returned by API

6.3.6.26 Qspi_Ip_ControllerDeinit()

```
Qspi_Ip_StatusType Qspi_Ip_ControllerDeinit (
            uint32 instance )
```

De-initialize the qspi driver.

This function de-initializes the qspi driver. The driver can't be used again until reinitialized. The context structure is no longer needed by the driver and can be freed after calling this function.

Parameters

instance	QSPI peripheral instance number

Returns

Error or success status returned by API

6.3.6.27 Qspi_Ip_Abort()

```
Qspi_Ip_StatusType Qspi_Ip_Abort (
            uint32 instance )
```

Aborts any on-going transactions.

Force the Qspi controller to cancel the on-going IP transaction by performing the software reset sequence.

Parameters

instance	QSPI peripheral instance number

Returns

Error or success status returned by API

6.3.6.28 Qspi_Ip_ReadSfdp()

```
Qspi_Ip_StatusType Qspi_Ip_ReadSfdp (
            Qspi_Ip_MemoryConfigType * pConfig,
            const Qspi_Ip_MemoryConnectionType * pConnect )
```

Initializes the serial flash memory configuration from SFDP table.

This function uses the information in the SFDP table to auto-fill the memory configuration structure.

Parameters

pConfig	Pointer to the driver configuration structure.
pConnect	Pointer to the flash device connection structure.

Returns

Error or success status returned by API