TRAVEO™ T2G family AUTOSAR MCAL ICU release notes

SRN223357 version 1.16

About this document

Scope and purpose

Thank you for your interest in the TRAVEO™ T2G family AUTOSAR MCAL ICU driver version 1.16. This document lists the installation requirements, software changes, limitations, and known issues.

Intended audience

This document is intended for anyone who uses the input capture unit (ICU) driver of the TRAVEO™ T2G family.

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1 System requirements and recommendations

Software prerequisites	Supported version
EB tresos Studio package for Infineon	26.2.0

1.1 Supported compilers

Green Hills Software, compiler v2017.1.4

IAR Embedded Workbench 8.0 EWARM FS 8.22.3

1.2 Compiler options

This section summarizes the compiler options used to build and test the module. When changing the compiler options, the module must be considered untested.

Compiler	Option (Cortex®-M4F core)
Green Hills Software, compiler v2017.1.4	`-cpu=cortexm4f -thumb -thumb_lib -C99 --short_enum -align4 --no_commons --no_alternative_tokens -asm3g -preprocess_assembly_files -nostartfiles -globalcheck=normal -globalcheck_qualifiers --prototype_errors -Wformat -Wimplicit-int -Wshadow -Wtrigraphs -Wundef -reject_duplicates -c -list -Ospeed -OI -Olink -Ointerproc -Omax -fsingle`

Compiler	Option (Cortex®-M7 core)
Green Hills Software, compiler v2017.1.4	`-cpu=cortexm7 -thumb -thumb_lib -C99 --short_enum -align4 --no_commons --no_alternative_tokens -asm3g -preprocess_assembly_files -nostartfiles -globalcheck=normal -globalcheck_qualifiers --prototype_errors -Wformat -Wimplicit-int -Wshadow -Wtrigraphs -Wundef -reject_duplicates -c -list -Ospeed -OI -Olink -Ointerproc -Omax -fhard`

Compiler	Option (Cortex®-M4F core)
IAR Embedded Workbench 8.0, EWARM FS 8.22.3	`--debug --endian=little --cpu=Cortex-M4 -e --fpu=VFPv4_sp -Ohs --no_size_constraints`

Compiler	Option (Cortex®-M7 core)
IAR Embedded Workbench 8.0, EWARM FS 8.22.3	`--debug --endian=little --cpu=Cortex-M7 -e --fpu=VFPv5_d16 -Ohs --no_size_constraints`

1.3 Library compiler options

If a binary library has been delivered with this module, it has been built using the following options:

Compiler	Option (Cortex®-M4F core)
Green Hills Software, compiler v2017.1.4	`-cpu=cortexm4f -thumb -thumb_lib -C99 --short_enum -align4 --no_commons --no_alternative_tokens -asm3g -preprocess_assembly_files -nostartfiles -globalcheck=normal -globalcheck_qualifiers --prototype_errors -Wformat -Wimplicit-int -Wshadow -Wtrigraphs -Wundef -reject_duplicates -c -list -Ospeed -OI -Olink -Ointerproc -Omax -fsingle`

Compiler	Option (Cortex®-M7 core)
Green Hills Software, compiler v2017.1.4	`-cpu=cortexm7 -thumb -thumb_lib -C99 --short_enum -align4 --no_commons --no_alternative_tokens -asm3g -preprocess_assembly_files -nostartfiles -globalcheck=normal -globalcheck_qualifiers --prototype_errors -Wformat -Wimplicit-int -Wshadow -Wtrigraphs -Wundef -reject_duplicates -c -list -Ospeed -OI -Olink -Ointerproc -Omax -fhard`

Compiler	Option (Cortex®-M4F core)
IAR Embedded Workbench 8.0, EWARM FS 8.22.3	`--debug --endian=little --cpu=Cortex-M4 -e --fpu=VFPv4_sp -Ohs --no_size_constraints`

Compiler	Option (Cortex®-M7 core)
IAR Embedded Workbench 8.0, EWARM FS 8.22.3	`--debug --endian=little --cpu=Cortex-M7 -e --fpu=VFPv5_d16 -Ohs --no_size_constraints`

1.4 Memory consumption

GHS (Icu_lib) section	Size (in bytes)
.text	6914
.rodata	212
Combined	7126

GHS (Icu_src) section	Size (in bytes)
.text	5416
.data	1
.bss	204

GHS (Icu_src) section	Size (in bytes)
.rodata	764
Combined	6385

IAR (Icu_lib) section	Size (in bytes)
.text	6520
Combined	6520

IAR (Icu_src) section	Size (in bytes)
.text	4418
.data	8
.bss	195
.rodata	724
Combined	5345

Note: *The memory consumption of *_src.lib depends on the configuration.*

Note: *The listed memory consumption will vary depending on customer configuration.*

Explanatory notes for this section

Section	Description
.text	Program code
.data	Variables with explicitly initialized values
.bss	Variables that are not explicitly initialized
.rodata	Read-only data

1.5 Stack consumption

1.5.1 Green Hills Software

Function	Max stack usage (in bytes)
`Icu_Init`	44
`Icu_DeInit`	40
`Icu_SetMode`	92
`Icu_DisableWakeup`	24
`Icu_EnableWakeup`	24
`Icu_SetActivationCondition`	40
`Icu_DisableNotification`	60
`Icu_EnableNotification`	60
`Icu_GetInputState`	76
`Icu_StartTimestamp`	80
`Icu_StopTimestamp`	36

Function	Max stack usage (in bytes)
Icu_GetTimestampIndex	28
Icu_ResetEdgeCount	24
Icu_EnableEdgeCount	32
Icu_DisableEdgeCount	32
Icu_GetEdgeNumbers	28
Icu_GetTimeElapsed	72
Icu_GetDutyCycleValues	76
Icu_GetVersionInfo	12
Icu_StartSignalMeasurement	56
Icu_StopSignalMeasurement	32
Icu_CheckWakeup	28
Icu_EnableEdgeDetection	36
Icu_DisableEdgeDetection	36
Icu_CheckChannelStatus	92
Icu_StartGroupTrigger	96
Icu_StopGroupTrigger	72
Icu_GetInputLevel	28
Icu_SetPrescaler	36
Icu_DisableOverflowNotification	36
Icu_EnableOverflowNotification	36
Icu_Isr_Vector_21_Cat1	108
Icu_Isr_Vector_21_Cat2	108
Icu_Isr_Vector_277_Cat1	104
Icu_Isr_Vector_277_Cat2	104
Icu_Isr_Vector_284_Cat1	104
Icu_Isr_Vector_284_Cat2	104
Icu_Isr_Vector_286_Cat1	104
Icu_Isr_Vector_286_Cat2	104
Icu_Isr_Vector_337_Cat1	104
Icu_Isr_Vector_337_Cat2	104
Icu_Isr_Vector_338_Cat1	104
Icu_Isr_Vector_338_Cat2	104
Icu_Isr_Vector_343_Cat1	104
Icu_Isr_Vector_343_Cat2	104
Icu_DwIsr_Vector_163_Cat1	52
Icu_DwIsr_Vector_163_Cat2	52

Note: *Stack consumption has been evaluated using the gstack utility program, which is part of the Green Hills release package. To enable the measurement of stack consumption in your project, build the source code according to the instructions given in the "Measuring Stack Consumption" section of the module's user guide.*

Note: *The listed stack consumption will vary depending on customer configuration.*

Note: *The GHS stack consumption listed in the release notes was measured using the additional compile option "`-gs`". The GHS compiler cannot measure stack consumption for the selected optimization level (see compilation options). Green Hills cannot exclude possible effects of "`-gs`" on optimization and stack consumption. Therefore, Infineon cannot guarantee the accuracy of these values. For more information on measuring GHS stack consumption, see the section gstack utility program in Build_arm.pdf.*

1.5.2 IAR Embedded Workbench

Function	Max stack usage (in bytes)
Icu_Init	52
Icu_DeInit	44
Icu_SetMode	96
Icu_DisableWakeup	16
Icu_EnableWakeup	16
Icu_SetActivationCondition	32
Icu_DisableNotification	64
Icu_EnableNotification	64
Icu_GetInputState	72
Icu_StartTimestamp	76
Icu_StopTimestamp	32
Icu_GetTimestampIndex	40
Icu_ResetEdgeCount	16
Icu_EnableEdgeCount	32
Icu_DisableEdgeCount	32
Icu_GetEdgeNumbers	32
Icu_GetTimeElapsed	80
Icu_GetDutyCycleValues	56
Icu_GetVersionInfo	16
Icu_StartSignalMeasurement	40
Icu_StopSignalMeasurement	16
Icu_CheckWakeup	40
Icu_EnableEdgeDetection	32
Icu_DisableEdgeDetection	32
Icu_CheckChannelStatus	96
Icu_StartGroupTrigger	100
Icu_StopGroupTrigger	72
Icu_GetInputLevel	32
Icu_SetPrescaler	32
Icu_DisableOverflowNotification	40
Icu_EnableOverflowNotification	40

Function	Max stack usage (in bytes)
Icu_Isr_Vector_21_Cat1	56
Icu_Isr_Vector_21_Cat2	56
Icu_Isr_Vector_277_Cat1	48
Icu_Isr_Vector_277_Cat2	48
Icu_Isr_Vector_284_Cat1	48
Icu_Isr_Vector_284_Cat2	48
Icu_Isr_Vector_286_Cat1	48
Icu_Isr_Vector_286_Cat2	48
Icu_Isr_Vector_337_Cat1	48
Icu_Isr_Vector_337_Cat2	48
Icu_Isr_Vector_338_Cat1	48
Icu_Isr_Vector_338_Cat2	48
Icu_Isr_Vector_343_Cat1	48
Icu_Isr_Vector_343_Cat2	48
Icu_DwIsr_Vector_163_Cat1	40
Icu_DwIsr_Vector_163_Cat2	40

Note: *To enable the measurement of stack consumption in your project, build the source code with the linker option "`--enable_stack_usage --log call_graph`". See stack usage analysis of the IAR C/C++ development guide for details.*

Note: *The listed stack consumption will vary depending on customer configuration.*

1.6 Note on "*_Bswmd.arxml"

Note that the <*Module*>*_Bswmd.arxml* files are templates that can be freely modified by the customer or RTE vendor.

These are in the *output**generated**swcd* subfolder of your project folder.

Named files are not tested.

1.7 Release details

Module software version
1.16.x (x=software patch version; see the delivery notes for details)

AUTOSAR specification version (ASR)
4.2.2

Target
MXS40

MCAL configuration settings	Supported derivatives
See the resource release notes	See the resource release notes

Corresponding Icu_MemMap.h stub file version
1.0.1

2 Installation

See the installation manual for EB tresos Studio for INFINEON AUTOSAR software products and installation manual for MCAL42-TRAVEO.

3 Deviations from AUTOSAR

T2MC-13593 - [SWS_Icu_00138] Function definitions: Icu_Init behavior: Pointer parameter for variant PC

Title: [SWS_Icu_00138] Function definitions: `Icu_Init` behavior: Pointer parameter for variant PC

Description: [SWS_Icu_00138] [The initialization function of this module shall always have a pointer as a parameter, even though for Variant PC no configuration set shall be given. Instead a NULL pointer shall be passed to the initialization function.] ()

Reason for rejection: Because post-build is supported, a NULL pointer will be reported as an error.

T2MC-13839 - [SWS_Icu_00188] Configuration specification: Variants VARIANT-PRE-COMPILE

Title: [SWS_Icu_00188] Configuration specification: Variants VARIANT-PRE-COMPILE

Description: [SWS_Icu_00188] [VARIANT-PRE-COMPILE (Pre Compile): The module ICU shall support a configuration variant pre-compile required for pre-compile time parameters] ()

Reason for rejection: Only post-build time is supported.

T2MC-13501 - [SWS_Icu_00248] Header file structure: Icu_Lcfg.c include

Title: [SWS_Icu_00248] Header file structure: Icu_Lcfg.c include

Description: [SWS_Icu_00248] [*Icu_Lcfg.c* shall include *Icu_Cbk.h* for a link time configuration if the call back function is linked to the module via the ROM structure.] ()

Reason for rejection: Only post-build is supported. Therefore, the *Icu_Lcfg.c* file is not required.

T2MC-13502 - [SWS_Icu_00249] Header file structure: Icu_PBcfg.c include

Title: [SWS_Icu_00249] Header file structure: Icu_PBcfg.c include

Description: [SWS_Icu_00249] [*Icu_PBcfg.c* shall include *Icu_Cbk.h* for post build time configuration if the call back function is linked to the module via the ROM structure.] (SRS_BSW_00435)

Reason for rejection: The callback function is not defined in ICU SWS and is not needed by the implementation specification.

T2MC-13503 - [SWS_Icu_00250] Header file structure: Icu.c include

Title: [SWS_Icu_00250] Header file structure: Icu.c include

Description: [SWS_Icu_00250] [*Icu.c* shall include *Icu_Cbk.h* for pre-compile time configuration] ()

Reason for rejection: The callback function is not defined in ICU SWS and is not needed by the implementation specification.

T2MC-13506 - [SWS_Icu_00253] Header file structure: Icu_Lcfg.c include

Title: [SWS_Icu_00253] Header file structure: Icu_Lcfg.c include

Description: [SWS_Icu_00253] [*Icu_Lcfg.c* shall include [*ICU.h* and *Icu_MemMap.h*.] ()

Reason for rejection: Only post-build is supported. Therefore, the *Icu_Lcfg.c* file is not required.

T2MC-13887 - [SWS_Icu_00380] Not applicable requirements

Title: [SWS_Icu_00380] Not applicable requirements

Description: [SWS_Icu_00380] [These requirements are not applicable to this specification.] (SRS_BSW_00300, SRS_BSW_00301, SRS_BSW_00302, SRS_BSW_00304, SRS_BSW_00305, SRS_BSW_00306, SRS_BSW_00307, SRS_BSW_00308, SRS_BSW_00309, SRS_BSW_00310, SRS_BSW_00312, SRS_BSW_00314, SRS_BSW_00318, SRS_BSW_00321, BSW00324, SRS_BSW_00325, SRS_BSW_00326, SRS_BSW_00327, SRS_BSW_00328, SRS_BSW_00329, SRS_BSW_00330, SRS_BSW_00331, SRS_BSW_00333, SRS_BSW_00334, SRS_BSW_00335, SRS_BSW_00341, SRS_BSW_00342, SRS_BSW_00347, SRS_BSW_00348, SRS_BSW_00350, SRS_BSW_00353, SRS_BSW_00355, SRS_BSW_00357, SRS_BSW_00358, SRS_BSW_00360, SRS_BSW_00361, SRS_BSW_00370, SRS_BSW_00371, SRS_BSW_00373, SRS_BSW_00376, SRS_BSW_00377, SRS_BSW_00378, SRS_BSW_00379, SRS_BSW_00383, SRS_BSW_00387, SRS_BSW_00395, SRS_BSW_00397, SRS_BSW_00398, SRS_BSW_00399, SRS_BSW_00400, SRS_BSW_00408, SRS_BSW_00409, SRS_BSW_00413, SRS_BSW_00414, SRS_BSW_00005, SRS_BSW_00006, SRS_BSW_00007, SRS_BSW_00009, SRS_BSW_00010, SRS_BSW_00160, SRS_BSW_00161, SRS_BSW_00162, SRS_BSW_00164, SRS_BSW_00167, SRS_BSW_00168, SRS_BSW_00170, SRS_BSW_00172, SRS_BSW_00415, SRS_BSW_00416, SRS_BSW_00417, BSW00420,BSW00421, SRS_BSW_00422, SRS_BSW_00423, SRS_BSW_00424, SRS_BSW_00425, SRS_BSW_00426, SRS_BSW_00427, SRS_BSW_00428, SRS_BSW_00429, BSW00431, SRS_BSW_00432, SRS_BSW_00433, BSW00434, SRS_BSW_00437, SRS_BSW_00439, SRS_BSW_00440, SRS_BSW_00441, SRS_SPAL_12068, SRS_SPAL_12077, SRS_SPAL_12092, SRS_SPAL_12265, SRS_SPAL_12463

Reason for rejection: Named RQMs are not applicable

4 Limitations

T2MC-13844 - [ECUC_Icu_00232] Configuration specification: IcuGeneral IcuDevErrorDetect

Title: [ECUC_Icu_00232] Configuration specification: `IcuGeneral IcuDevErrorDetect`

Description:

SWS Item	ECUC_Icu_00232 :		
Name	`IcuDevErrorDetect`		
Description	Switches the Default Error Tracer (Det) detection and notification ON or OFF. - true: enabled (ON). - false: disabled (OFF).		
Multiplicity	1		
Type	`EcucBooleanParamDef`		
Default Value	--		
Post-Build Variant Value	False		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

Limitation: DET error detection mechanism is used as a safety mechanism (fault detection), so detection of development errors cannot be disabled.

T2MC-15970 - [ICU] AUTOSAR C implementation rules

Title: [ICU] AUTOSAR C implementation rules

Description: The MCAL modules shall fulfill all design and implementation guidelines as described in Specification of C Implementation Rules AUTOSAR_TR_CImplementationRules.pdf.

Limitation: Out of scope: keyword macros 'CONST' and 'VAR' are not required for declaration/definition of the local variable, function parameter, and structure/union fields.

T2MC-13782 - [SWS_Icu_00084] Function definitions: Icu_GetDutyCycleValues behavior: Read the active time and period time

Title: [SWS_Icu_00084] Function definitions: `Icu_GetDutyCycleValues` behavior: Read the active time and period time

Description: [SWS_Icu_00084] [The function `Icu_GetDutyCycleValues` shall read the coherent active time and period time for the given ICU Channel, if it is configured in Measurement Mode "Signal Measurement, Duty Cycle Values".] (SRS_Icu_12436)

Limitation: Because duty cycle cannot be measured accurately when both edges are set on ICU, it is run as falling edge and an active time is low time.

T2MC-13752 - [SWS_Icu_00140] Function definitions: Icu_StartSignalMeasurement behavior: Start the measurement of signals

Title: [SWS_Icu_00140] Function definitions: `Icu_StartSignalMeasurement` behavior: Start the measurement of signals

Description: [SWS_Icu_00140] [The function `Icu_StartSignalMeasurement` shall start the measurement of signals beginning with the configured default start edge which occurs first after the call of this service.] ()

Limitation: Because duty cycle cannot be measured accurately when both edges are set on ICU, it is run as falling edge.

T2MC-13500 - [SWS_Icu_00247] Header file structure: Type definitions for Icu_Lcfg.c and Icu_PBcfg.c

Title: [SWS_Icu_00247] Header file structure: Type definitions for *Icu_Lcfg.c* and *Icu_PBcfg.c*

Description: [SWS_Icu_00247] [The Type definitions for *Icu_Lcfg.c* and *Icu_PBcfg.c* are located in the file *Icu_Cfg.h* or *Icu.h*.

The implicit include of *Icu_Cfg.h* via *Icu.h* in the files *Icu_Lcfg.c* and *Icu_PBcfg.c* is necessary and can be solved like in the following construct:

Icu.h shall include *EcuM_Cbk.h*, if wakeup functionality is configured.

Icu.h

#if defined ICU_VERSION_INFO_API
`Icu_GetVersionInfo(...)`
#endif

Icu_Cfg.h

#include "*Icu.h*"
#define ICU_VERSION_INFO_API] ()

Limitation: Only post-build is supported. Therefore, *Icu_Lcfg.c* file is not required.

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5 Known defects

The listed issues were known at the day this release note was generated. Further problems may have been discovered in the meantime. For an up-to-date list of known issues, contact your Infineon sales representative.

This release has no known issues at the time of release.

6 Documentation

All user guides for MCAL drivers are in the *doc* subdirectory of the *installation* directory. The default location is:

C:\INFINEON_ESDB\Tresos26_2_0\doc

7 Technical support

If you have questions related to the driver, contact the local support application engineer.

8 Version history

8.1 Module SW-Version 1.3

Initial module setup.

8.2 Module SW-Version 1.4

T2MC-39176 - [All] Correcting vendor-specific module definition

Title: [All] Correcting vendor-specific module definition

Description: The following rules should be followed in the vendor-specific module definition.

- The multiplicity of each AUTOSAR parameter, reference and container is not correctly derived.
- The DEFAULT-VALUE of each parameter is not valid.
- If the target of DESTINATION-REF is not the standard AUTOSAR container, the reference should not start with '/AUTOSAR/EcucDefs/'.

T2MC-38077 - [GPT, ICU, PWM] Wrong config data is generated when ordering of configuration is changed

Title: [GPT, ICU, PWM] Wrong config data is generated when ordering of configuration is changed

Description: In Tresos GUI, when the order of configuration is changed intentionally the following configuration lists, the configuration data is generated by wrong order. In such cases, the module API cannot operate correctly. It should be generated not by the index list but by the channel ID.

GPT: GptChannelConfiguration
ICU: IcuChannelGroup
PWM: PwmChannelGroup

T2MC-38067 - [ICU] The duration of interrupt protection service in Icu_DeInit

Title: [ICU] The duration of interrupt protection service in Icu_DeInit

Description: The duration of interrupt service in Icu_DeInit. There is redundant de-init operation in Icu_DeInit. It should be modified to improve its performance.

- Measurement condition
  Source oscillation: 8 MHz
  PLL clock multiplier: x10 (80 MHz)
  Configuration channel: 11 ch
  Duration of interrupt protection service: Entering critical section to Leaving critical section
- Measurement result
  61.2 µs

T2MC-38074 - File extension should be changed from .bmd to .arxml

Title: File extension should be changed from .bmd to .arxml

Description: The file extension should be changed from *.bmd to *.arxml.
Each module still has an autosar/<module>.bmd file.

8.3 Module SW-Version 1.5

T2MC-39747 - [All] Checking for valid C function name and including filename in configuration parameters

Title: [All] Checking for valid C function name and including filename in configuration parameters

Description: Checking for valid C function name:
Check all configuration parameters related to the function name to see if it is a valid C function name.
A part of parameters are not checked.
If an invalid function name is set, a compile error will occur during the build process, which is inconvenient for users.
Therefore, it is better to check whether the configured function names are valid C function names in advance (i.e. during configuration phase).

Checking for valid filename:
Check all configuration parameters related to the file name to see if it is valid.
A part of parameters cannot check the fact that empty file name (i.e. ".h") is wrong.
If an invalid file name is set, a compile error will occur during the build process, which is inconvenient for users.
Therefore, it is better, to check in advance, whether the configured file names are valid.

This CR is intended to solve the inconvenience.

T2MC-41850 - [General] <CODE-DESCRIPTORS> Node should be added to the *arxml* files of all modules

Title: [General] <CODE-DESCRIPTORS> Node should be added to the *arxml* files of all modules

Description: For all modules, the <CODE-DESCRIPTORS> Node needs to be added for the RTE within the BSWMD *arxml* file.

T2MC-43302 - [GPT, ICU, OCU, PWM] Improve trigger configuration check

Title: [GPT, ICU, OCU, PWM] Improve trigger configuration check

Description: If the input trigger resource for TCPWM is shared by other modules, a warning message is output. To improve usability and prevent misuse, make conflict processing clear when it is shared in related config parameters.

The related configurations are as follows. For more details, please see the attached file.

GPT

- GptPredefTimerStartTriggerSelect
- GptInputTriggerSelection

ICU

- IcuInputTriggerSelection
- IcuChannelGroupStartTrigger
- IcuChannelGroupStopTrigger

OCU

- OcuStartTriggerSelect0
- OcuStartTriggerSelect1

PWM

- PwmChannelGroupStartTrigger
- PwmChannelGroupStopTrigger
- PwmStartTriggerSelect0
- PwmStartTriggerSelect1
- PwmStartDelayTrigger

T2MC-39475 - [ICU, OCU, PWM] Wrong behavior occurred due to API input while waiting for synchronous start/stop trigger

Title: [ICU, OCU, PWM] Wrong behavior occurred due to API input while waiting for synchronous start/stop trigger

Description: Malfunction occurred due to other API input while waiting for synchronous start trigger.

T2MC-39472 - [ICU] MCDC coverage does not reach 100%

Title: [ICU] MCDC coverage does not reach 100%

Description: Coverage does not reach 100% because the 2nd judgment in the following 'and condition' does not become false.
function: Icu_TimeStamp_InterruptEvent

```
ChExtStatePtr->EdgeNumber++;                                    (1)
if ((ChExtStatePtr->NotifyInterval == ChExtStatePtr->EdgeNumber)
  && (ChExtStatePtr->NotifyInterval != 0U))                     (2)
```

(1) EdgeNumber is incremented before the judgment.
(2) Therefore, the 2nd judgment is always true.

T2MC-39459 - [ICU] Support TRAVEO™ T2G-B-H-8M

Title: [ICU] Support TRAVEO™ T2G-B-H-8M

Description: AUTOSAR MCAL supports the TRAVEO™ T2G-B-H-8M.

TCPWM resource data has instances of TCPWM. Therefore, the Icu driver must identify TCPWM resource instances in the following cases.

- TCPWM resources for all instances need to be obtained from the resource properties file and made selectable in the module configuration.
- Instance support is required for processing associated with TCPWM resources (for example, configuration, generated code, etc.).

In addition to the above, users guide needs update.

8.4 Module SW-Version 1.6

T2MC-50519 - [General] Export issue with MCAL ES10_20180308

Title: [General] Export issue with MCAL ES10_20180308

Description: An example of the issue is described below.
The configuration exported from Tresos does not correspond to the real configuration shown in Tresos. See the attached example.
The issue concerns other modules too, not only the Port described in attached pdf file.

T2MC-50612 - [General] Delete device-dependent information from the user guide

Title: [General] Delete device-dependent information from the user guide

Description: Any device-dependent information should not be included in the user guide.
Therefore, delete the datasheet name from the related documentation in the user guide.

T2MC-51851 - [ICU] Add notes of reentrants in the user guide

Title: [ICU] Add notes of reentrants in the user guide

Description: Add notes in user guide for the following requirement.
[SWS_Icu_00149]
The Icu module's environment shall check the integrity if several calls for the same ICU channel are used during runtime in different tasks or ISRs.

T2MC-52908 - [ICU] Warning message is output when IcuSetModeApi is false

Title: [ICU] Warning message is output when IcuSetModeApi is false

Description: When configuration IcuSetModeApi is false, the following warning message is output during compilation, function "Icu_CheckDriverBusy" was declared but never referenced.
Since internal function "Icu_CheckDriverBusy" is called only within Icu_SetMode, Icu_CheckDriverBusy should be optimized so that it is not defined by the preprocessor if IcuSetModeApi is false.

8.5 Module SW-Version 1.7

T2MC-57099 - [ICU] Some definitions are missing in the BSWMD file

Title: [ICU] Some definitions are missing in the BSWMD file

Description: The following APIs are not defined in BSWMD file:

- Icu_EnableOverflowNotification
- Icu_DisableOverflowNotification

Also, the service ID of the following APIs are incorrect:

- Icu_SetPrescaler
- Icu_GetInputLevel

T2MC-59531 - [GPT] Correction of prescale and input trigger selection of the external input clock

Title: [GPT] Correction of prescale and input trigger selection of the external input clock

Description: In case of the external clock input (CLI_EXT), the following configuration parameters should be corrected:

#1. GptChannelPrescale
Prescale value should be fixed to 1 since the prescaler cannot be used in the case of the external clock.

#2. GptInputTriggerSelection
Allow to select trigger multiplexer as the clock sources of external input clock for external clock input functional enhancement.

Note: *Modification of #2 affects resource conflict check processing in ICU, OCU, and PWM modules (xdm files, user guides).*

T2MC-59536 - [ICU] Channel state inconsistency may occur due to HW state transition delay

Title: [ICU] Channel state inconsistency may occur due to HW state transition delay

Description: Channel state inconsistency may occur in the following condition:
Previous condition:
Channel WakeupEnable is TRUE and channel status is not running.
Sequence:

1. Call Icu_SetMode(Sleep)
2. Call Icu_SetMode(Normal)
3. When one of the following APIs is called before HW is stopped by Icu_SetMode:
   Call Icu_EnableEdgeDetection or Icu_StartGroupTrigger if channel is edge detection mode
   Call Icu_EnableEdgeCount or Icu_StartGroupTrigger if channel is edge count mode
   Call Icu_StartSignalMeasurement or Icu_StartGroupTrigger if channel is signal measurement mode
   Call Icu_StartTimestamp or Icu_StartGroupTrigger if channel is time stamp mode

Result:
The hardware state may be stopped.

T2MC-59537 - [ICU] Channels of different ConfigSet might be listed in IcuChannelRef

Title: [ICU] Channels of different ConfigSet might be listed in IcuChannelRef

Description: The channels in the configuration set containing the same character string are also listed in the IcuChannelRef. For example, the channels in IcuConfigSet_01 are listed in the IcuChannelRef of IcuConfigSet_0.
IcuChannelRef should be selectable only by channels in the same configuration set.

T2MC-63138 - [ICU] Incorrect API ID at DET error due to DW interrupt

Title: [ICU] Incorrect API ID at DET error due to DW interrupt

Description: The API ID of the DW interrupt is ICU_API_DW_INTERRUPT_EVENT.
However, ICU_API_INTERRUPT_EVENT is set to APIID and reported when a DET error occurs.

8.6 Module SW-Version 1.8

T2MC-65899 - [ICU] Incorrect Icu_CheckChannelStatus result after Icu_DeInit

Title: [ICU] Incorrect Icu_CheckChannelStatus result after Icu_DeInit

Description: If Icu CheckChannelStatus is called after Icu_DeInit, the return value may be returned as E_NOT_OK.
It occurs when all of the following conditions are satisfied:

- IcuMeasurementMode is ICU_MODE_EDGE_COUNTER or ICU_MODE_SIGNAL_EDGE_DETECT.
- IcuResource is GPIO.
- Call Icu_DeInit before Icu_DisableEdgeCount or Icu_DisableEdgeDetection.

T2MC-66350 - [ICU] Incorrect Icu_GetInputState result after Icu_SetMode

Title: [ICU] Incorrect Icu_GetInputState result after Icu_SetMode

Description: In some cases, the input state of the previously detected edge is cleared after mode transition by Icu_SetMode.
These occur under the following conditions:
[Case1]
Precondition

- IcuMeasurementMode: ICU_MODE_SIGNAL_EDGE_DETECT
- IcuResource: TCPWM
- Wakeup enabled: False
- Notification enabled: False
- Channel Status: Running (After Icu_EnableEdgeDetection called)

Sequence

1. Detect input edge
2. Transition to sleep mode by Icu_SetMode (In the case of the above conditions, the input state is not updated.)
3. The return value by Icu_GetInputState returns ICU_IDLE.

[Case2]
Precondition

- IcuMeasurementMode: ICU_MODE_SIGNAL_EDGE_DETECT
- IcuResource: TCPWM or GPIO
- Wakeup enabled: False
- Notification enabled: True
- Channel Status: Running (After Icu_EnableEdgeDetection called)

Sequence

1. Transition to sleep mode by Icu_SetMode
2. Detect input edge
3. Transition to normal mode by Icu_SetMode (In the case of the above conditions, the input state is cleared to ICU_IDLE.)
4. The return value by Icu_GetInputState returns ICU_IDLE.

In either case, Icu_GetInputState will return the correct input state until mode transition.

T2MC-77594 - Support IAR compiler

Title: Support IAR compiler

Description: Support IAR compiler (IAR EWARM FS 8.22.3.15992).

8.7 Module SW-Version 1.9

T2MC-83826 - [ICU] Incorrect configuration parameter range for TRAVEO™ T2G-B-H-8M

Title: [ICU] Incorrect configuration parameter range for TRAVEO™ T2G-B-H-8M

Description: Some GPIO channels cannot be used for the ICU driver because these do not support interrupts for edge detection. It is necessary to prevent these channels from being selected in configuration: IcuResource.
In addition, some of the GPIO channels and the DW triggers that can be used in TRAVEO™ T2G-B-H-8M must be added because they are not defined in the *.arxml* file.

8.8 Module SW-Version 1.10

T2MC-90283 - [ICU] Active mode GPIO interrupts are not supported

Title: [ICU] Active mode GPIO interrupts are not supported

Description: IcuResource does not allow you to select GPIO ports that have active mode interrupts. Only those GPIOs with DeepSleep interrupts can be selected.

T2MC-91258 - [ICU] Icu.xdm is inconsistent with Icu.arxml

Title: [ICU] Icu.xdm is inconsistent with Icu.arxml

Description: There are some inconsistencies between the Icu.xdm and Icu.arxml files in the following definitions.

Icu.xdm

- TS_T40D13M1I0R0 and ICU_EcuParameterDefinition have missing UUID attribute.
- There is an inconsistency in the default values for IcuOverflowNotification, IcuSignalNotification, IcuTimestampNotification, and IcuDmaErrorNotification in the *Icu.xdm* and *Icu.arxml* files.
- IMPLEMENTATIONCONFIGCLASS and POSTBUILDVARIANTMULTIPLICITY are incorrect in some parameters.

Icu.arxml

- There is an inconsistency in the default values for IcuOverflowNotification, IcuSignalNotification, IcuTimestampNotification, and IcuDmaErrorNotification in the *Icu.xdm* and *Icu.arxml* files.
- ECUC-MULTIPLICITY-CONFIGURATION-CLASS is incorrect in IcuDemEventParameterRefs and IcuIncludeFile.
- POST-BUILD-VARIANT-MULTIPLICITY is incorrect in some parameters.
- LOWER-MULTIPLICITY and UPPER-MULTIPLICITY are incorrect in some parameters.

T2MC-91748 - [ICU] Incorrect consistency check is executed when a GPIO resource is selected

Title: [ICU] Incorrect consistency check is executed when a GPIO resource is selected

Description: When a GPIO resource is selected in IcuResource, the range is checked even if IcuInputTriggerSelection and IcuDmaChannel are disabled, and an error that an invalid path exists is displayed on EB tresos. The range should only be checked when IcuInputTriggerSelection and IcuDmaChannel are enabled.

However, these configurations are not necessary when using GPIO resources and can be successfully generated even if the error message is displayed.

In addition, the conditions for enabling the selection of the following configurations will also be changed to ensure consistency:

- IcuMeasurementMode
- IcuSignalEdgeDetection
- IcuSignalMeasurement
- IcuTimestampMeasurement
- IcuWakeup

8.9 Module SW-Version 1.11

T2MC-97127 - [ICU] ICU_E_PARAM_NOTIFY_INTERVAL error condition not described in user guide

Title: [ICU] ICU_E_PARAM_NOTIFY_INTERVAL error condition not described in user guide

Description: The ICU driver reports ICU_E_PARAM_NOTIFY_INTERVAL to DET when Icu_StartTimestamp is called under the following conditions. However, this error condition is not described in the user guide.

- IcuUseDma is TRUE
- IcuTimestampNotification is enabled
- The parameter BuffSize of Icu_StartTimestamp is not a multiple of NotifyInterval

T2MC-97129 - [ICU] Unused members exist for variables used in signal measurement mode

Title: [ICU] Unused members exist for variables used in signal measurement mode

Description: The Index and InputStateIndex that exist as members in the variable Icu_SignalMeasChannelStateData are not used by any API.

These two members should be removed to reduce RAM usage.

T2MC-96771 - Some memory placement restrictions are not mentioned in the user guide

Title: Some memory placement restrictions are not mentioned in the user guide

Description: Modules that work with other bus masters such as DW should have restrictions on memory placement.

However, there is insufficient information on these memory restrictions in the user guide. Add the restriction that tightly coupled memories (TCMs) do not support DMA to the user guide.

T2MC-97131 - Different macros are used for setting and checking the value

Title: Different macros are used for setting and checking the value

Description: Some modules differ in the macro names defined and the macro names used in the processing.

For example, when the macro set to TRUE is judged as STD_ON, the definition value is 1 for both, but the same macro must be used.

```
#define MACRO_DEFINE (TRUE)
-
#if MACRO_DEFINE == STD_ON
xxx
#endif
```

In Platform_Types.h of the base module
```
#define TRUE 1U
#define FALSE 0U
```

In Std_Types.h of the base module
```
#define STD_ON 0x01U
#define STD_OFF 0x00U
```

T2MC-97382 - Macro definition at variable declaration is missing and the limitation is not mentioned in release notes

Title: Macro definition at variable declaration is missing and the limitation is not mentioned in release notes

Description: Macro definitions are not used when declaring some variables and pointers (in FLS, MCU, PORT, SPI, and WDG).

According to AUTOSAR specification:
[SWS_COMPILER_00026]
```
#define VAR(vartype, memclass)
```

True:
```
volatile P2VAR(Spi_DmaChannelRegsType, AUTOMATIC, REGSPACE) retPtr;
```

False:
```
volatile Spi_DmaChannelRegsType * retPtr;
```

This issue is present in the following cases:

- All types of pointer declaration/definition are defined without macros.

These contain the function parameter/global variable/local variable/structure field/union field.

- All types of function declaration/definition are defined without macros.
- When there is nested macro usage in function macros.
- Raw pointer is used in the function macro:

e.g., FUNC(int *, memclass) function(void);

- Global variable or static variable in the function is not defined with macros.

To fully comply with the above cases, change variable and function definitions in FLS, MCU, PORT, SPI, and WDG.

In requirements, keyword macros 'CONST' and 'VAR' are not required for declaration/definition of the local variable, function parameter, and structure/union fields.

The information must be described in all release notes.

T2MC-39519 - Support EB tresos V26.2.0

Title: Support EB tresos V26.2.0

Description: Support EB tresos V26.2.0

[Impact]
Strict AUTOSAR specification and check for parameter configuration errors are implemented in EB tresos V26.2.0.
In addition, handling of reference paths (relative paths) such as system description file (ARXML) is changed in EB tresos V26.2.0.

Therefore, if the current ECUC configuration definitions XML file contains deviations or errors, you may find errors during import to tresos26. In that case, the ECUC configuration definitions XML file must be modified appropriately.
In addition, if the current ARXML file contains unresolvable paths, you may find errors during import to tresos26. In that case, ARXML file must be modified.

The SW has been tested; no risks except for the low-level risk listed above were found.

T2MC-97128 - Unnecessary exclusive control for a process

Title: Unnecessary exclusive control for a process

Description: Some modules have exclusive control in the section where only variables and registers are written atomically. Exclusive control should not be performed for a process that is clearly not affected by interference.

8.10 Module SW-Version 1.12

T2MC-164408 - Improvement of interrupt register clear processing

Title: Improvement of interrupt register clear processing

Description: Some modules clear the interrupt register by read modify write (RMW). However, there is a possibility that unintended bits might also be cleared, if some bits are already set before clearing, because the attribute of the interrupt register is RW1C (every bit is cleared upon writing 1).

Also, unnecessary read access to the register reduces performance.

Therefore, change the clearing process to write intended bit only.

T2MC-164778 - Support MISRA C:2012 coding rule

Title: Support MISRA C:2012 coding rule

Description: Support MISRA C:2012 coding rule.

The MISRA C:2012 coding rule checks the source code.

If a deviation from the rules is required, add the deviation comment to the code and report the result.

If a deviation is for MISRA-C:2004 only, remove the deviation comment.

8.11 Module SW-Version 1.13

T2MC-164831 - [ALL] Misleading comment in Module_MemMap.h

Title: [ALL] Misleading comment in Module_MemMap.h

Description: *{Mip}_MemMap.h* files are provided as sample template files. But, the file header comment cannot be modified, which is a contradiction. To resolve this contradiction, change the file header comment to allow user modification.
Also, to make sure that the file is not a part of the commercial product, move the *{Mip}_MemMap.h* files to the *MemMap* stub folder.

T2MC-166667 - [ICU] Added limitation to timestamp mode using DMA

Title: [ICU] Added limitation to timestamp mode using DMA

Description: When Icu_StartTimestamp is called and DMA is enabled, the timestamp value is not be transferred correctly to the buffer under the following conditions:

Case1: Notification is configured

- NotifyInterval exceeds 256
- The BufferSize value divided by NotifyInterval exceeds 256

These should be treated as errors when calling Icu_StartTimestamp.

Case2: Notification is not configured

- BufferSize is specified more than 256

This should be supported as Icu_StartTimestamp.

8.12 Module SW-Version 1.14

T2MC-170293 - [ICU] Interrupt status flag cleared at the end of interrupt processing

Title: [ICU] Interrupt status flag cleared at the end of interrupt processing

Description: The ICU interrupt function clears the interrupt flag after performing interrupt processing. So, if an interrupt of the same factor occurs during interrupt processing, it is not processed. The interrupt function should clear the flag at its beginning to allow handling of factors that occur during ICU interrupts.

If the same interrupt factor occurs during interrupt processing, it will be missed and the following may occur:

- Edge detection mode
  Edge detection is lost.
- Edge count mode
  Edge count value is lower by one count.
- Signal measurement mode
  No impact.
- Timestamp mode
  The timestamp value of the detected edge is lost.
  However, the ICU module does not stack when interrupt factor occurs during interrupt processing.

Work around:

To avoid interrupt detection loss, do not use the input signal that causes edges at almost the same time.

T2MC-170795 - [ICU] Need to guarantee the order of register settings between relevant peripherals

Title: [ICU] Need to guarantee the order of register settings between relevant peripherals

Description: If a driver controls different peripherals that have different bridges and buffers, then the order of access needs to be guaranteed.

It is also necessary to guarantee the order of CPU instruction and peripheral operations, if needed.

TCPWM control, before Port_ActTrigger, DW control, and some CPU instructions, must meet the above conditions for the ICU driver.

Therefore, the register read back process should be added to avoid this issue.

T2MC-170542 - [ICU] Unused structure members found

Title: [ICU] Unused structure members found

Description: Unused structure members have been found inside MCAL code.

The following structure members are not used:

- `ChannelID` in `Icu_ChannelConfigType`
- `IcuGroupId` in `Icu_ChannelGroupConfigType`

This would not affect any function and its behavior. However, the unused structure members should be removed as they are redundant.

T2MC-170664 – Limitation on notification is missing in the user guide

Title: Limitation on notification is missing in the user guide

Description: There is a possibility that notifications might occur (under a particular condition) even if the notification is disabled. This unexpected behavior would hardly ever occur; however, it should be described in the user guide with a workaround.

[Conditions]

- Notification is enabled in advance before the notification is called.
- Notification is disabled in a few cycles just before the notification is called.

[Workaround]

Disable the notification in advance prior to running the service.

The following is supported in release V1.10.0.

T2MC-172517 - Add a description on DeepSleep in the user guide

Title: Add a description on DeepSleep in the user guide

Description: Add a note on DeepSleep mode in the user guide.

8.13 Module SW-Version 1.15

T2MC-172491 - [ICU] Disable EcuM_CheckWakeup call by IcuDisableEcumWakeupNotification

Title: [ICU] Disable EcuM_CheckWakeup call by IcuDisableEcumWakeupNotification

Description: The enable/disable function call of `IcuDisableEcumWakeupNotification` is changed to `EcuM_CheckWakeup()`.

If `IcuDisableEcumWakeupNotification` is TRUE, `EcuM_CheckWakeup()` is not called when the HW wakeup event occurs. It is possible to identify whether `EcuM_CheckWakeup()` is called at channel level.

T2MC-178170 - [ICU] Change ExtStatePtr in Icu_ChannelCommonStateType to be placed in constant data area

Title: [ICU] Change ExtStatePtr in Icu_ChannelCommonStateType to be placed in constant data area

Description: The pointer data in `ExtStatePtr` is a member of the Icu_ChannelCommonStateType structure defined as a variable. However, this pointer address does not change dynamically at runtime and should be placed in the constant data area.

8.14 Module SW-Version 1.16

T2MC-179490 - [ICU] Memory allocation to unintended sections

Title: [ICU] Memory allocation to unintended sections

Description: The following the static variable is defined as `VAR_INIT` even though the static variable does not have an initial value. It should be defined as `VAR_NO_INIT`.

`Icu_Config<ConfigSet No>ChannelCommonStateData[ICU_NUMBER_OF_CFG<ConfigSet No>_CHANNELS]` in *Icu_PBcfg.c.*

```
#define ICU_START_SEC_VAR_INIT_ASIL_B_UNSPECIFIED
:
static VAR(Icu_ChannelCommonStateType, ICU_VAR_INIT)
Icu_Config0ChannelCommonStateData[ICU_NUMBER_OF_CFG0_CHANNELS];
:
#define ICU_STOP_SEC_VAR_INIT_ASIL_B_UNSPECIFIED
```

T2MC-178684 - Addition of necessary steps before entering DeepSleep mode in the user guide

Title: Addition of necessary steps before entering DeepSleep mode in the user guide

Description: Add the information in the user guide on the API that needs to be called to stop the TCPWM counter before entering DeepSleep mode.

T2MC-178688 - Addition of the notice for Arm® errata and workaround in the user guide

Title: Addition of the notice for Arm® errata and workaround in the user guide

Description: Add a notice for Arm® Cortex®-M4 errata 838869 and software workaround in the user guide.

The following are supported in release V1.15.0.

T2MC-183983 - Update copyright notice and disclaimer statement

Title: Update copyright notice and disclaimer statement

Description: Copyright notice and disclaimer statement in the file header comment are updated to follow the up-to-date specifications.

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