

MCAL Configuration Verification Manual for Icu_17_TimerIp

32-bit TriCore™ AURIX™ TC3xx microcontroller family

About this document

Scope and purpose

This Configuration Data Reference document is applicable to all TC3xx devices in the TriCore™ AURIX™ family of 32-bit microcontrollers.

The purpose of this document is to facilitate the integrator to verify the generated code based on the input configuration parameters. This document describes details of structures, defines, macros and variables generated from the configuration parameters.

Intended audience

This document is intended for integrators who need to understand the logic of the generated configuration code of AURIX™ AUTOSAR MCAL.

Reference documents

This document should be read in conjunction with the following documents:

- AURIX™ TC3xx MCAL User Manual Icu_17_TimerIp

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Icu_17_TimerIp driver

This chapter describes the details of the configuration data generated from the ICU driver.

1.1 File: Icu_17_TimerIp_Cfg.h

The generated header file contains all pre-compile configuration parameters. Pre-compile time configuration allows decoupling of the static configuration from implementation. The file is generated in 'inc' folder.

1.1.1 Macro: ICU_17_TIMERIP_AR_RELEASE_MAJOR_VERSION

Table 1 ICU_17_TIMERIP_AR_RELEASE_MAJOR_VERSION

Name	ICU_17_TIMERIP_AR_RELEASE_MAJOR_VERSION	
Description	Major version number of AUTOSAR release on which the Icu_17_TimerIp implementation is based on.	
Verification method	<p>The macro is generated with the value present in 'CommonPublishedInformation/ArMajorVersion'.</p> <p><i>Note: The macro is not user configurable.</i></p>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with ArMajorVersion 4	<pre>#define ICU_17_TIMERIP_AR_RELEASE_MAJOR_VERSION (4U)</pre>

1.1.2 Macro: ICU_17_TIMERIP_AR_RELEASE_MINOR_VERSION

Table 2 ICU_17_TIMERIP_AR_RELEASE_MINOR_VERSION

Name	ICU_17_TIMERIP_AR_RELEASE_MINOR_VERSION	
Description	Minor version number of AUTOSAR release on which the Icu_17_TimerIp implementation is based on.	
Verification method	<p>The macro is generated with the value present in 'CommonPublishedInformation/ArMinorVersion'.</p> <p><i>Note: The macro is not user configurable.</i></p>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with ArMinorVersion 2	<pre>#define ICU_17_TIMERIP_AR_RELEASE_MINOR_VERSION (2U)</pre>

1.1.3 Macro: ICU_17_TIMERIP_AR_RELEASE_REVISION_VERSION

Table 3 ICU_17_TIMERIP_AR_RELEASE_REVISION_VERSION

Name	ICU_17_TIMERIP_AR_RELEASE_REVISION_VERSION	
Description	Revision version number of AUTOSAR release on which the Icu_17_TimerIp implementation is based on.	
Verification method	The macro is generated with the value present in 'CommonPublishedInformation/ArPatchVersion'. <i>Note: The macro is not user configurable.</i>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with ArPatchVersion 2	<pre>#define ICU_17_TIMERIP_AR_RELEASE_REVISION_VERSION (2U)</pre>

1.1.4 Macro: ICU_17_TIMERIP_SW_MAJOR_VERSION

Table 4 ICU_17_TIMERIP_SW_MAJOR_VERSION

Name	ICU_17_TIMERIP_SW_MAJOR_VERSION	
Description	Major version number of the Icu_17_TimerIp module.	
Verification method	The macro is generated with the value present in 'CommonPublishedInformation/SwMajorVersion'. <i>Note: The macro is not user configurable.</i>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with SwMajorVersion 10	<pre>#define ICU_17_TIMERIP_SW_MAJOR_VERSION (10U)</pre>

1.1.5 Macro: ICU_17_TIMERIP_SW_MINOR_VERSION

Table 5 ICU_17_TIMERIP_SW_MINOR_VERSION

Name	ICU_17_TIMERIP_SW_MINOR_VERSION	
Description	Minor version number of the Icu_17_TimerIp module.	
Verification method	The macro is generated with the value present in 'CommonPublishedInformation/SwMinorVersion'. <i>Note: The macro is not user configurable.</i>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with SwMinorVersion 10	<pre>#define ICU_17_TIMERIP_SW_MINOR_VERSION (10U)</pre>

1.1.6 Macro: ICU_17_TIMERIP_SW_PATCH_VERSION

Table 6 ICU_17_TIMERIP_SW_PATCH_VERSION

Name	ICU_17_TIMERIP_SW_PATCH_VERSION	
Description	Patch level version number of the Icu_17_TimerIp module.	
Verification method	The macro is generated with the value present in 'CommonPublishedInformation/SwPatchVersion'. <i>Note: The macro is not user configurable.</i>	
Example(s)	Action	Generated output
	Generate Icu_17_TimerIp_Cfg.h file with SwPatchVersion 0	#define ICU_17_TIMERIP_SW_PATCH_VERSION (0U)

1.1.7 Macro: ICU_17_TIMERIP_SAFETY_ENABLE

Table 7 ICU_17_TIMERIP_SAFETY_ENABLE

Name	ICU_17_TIMERIP_SAFETY_ENABLE	
Description	Enables/disables safety features	
Verification method	The macro is generated as STD_ON if IcuSafetyEnable configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuSafetyEnable = True	#define ICU_17_TIMERIP_SAFETY_ENABLE (STD_ON)
	IcuSafetyEnable = False	#define ICU_17_TIMERIP_SAFETY_ENABLE (STD_OFF)

1.1.8 Macro: ICU_17_TIMERIP_INITCHECK_API

Table 8 ICU_17_TIMERIP_INITCHECK_API

Name	ICU_17_TIMERIP_INITCHECK_API	
Description	Enables/disables Icu_17_TimerIp_InitCheck API	
Verification method	The macro is generated as STD_ON if IcuInitCheckApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuInitCheckApi = True	#define ICU_17_TIMERIP_INITCHECK_API (STD_ON)
	IcuInitCheckApi = False	#define ICU_17_TIMERIP_INITCHECK_API (STD_OFF)

1.1.9 Macro: ICU_17_TIMERIP_RUNTIME_API_MODE

Table 9 ICU_17_TIMERIP_RUNTIME_API_MODE

Name	ICU_17_TIMERIP_RUNTIME_API_MODE	
Description	Decides the mode of execution of Run Time API's	
Verification method	The macro is generated as ICU_17_TIMERIP_MCAL_USER1 if IcuRuntimeApiMode configuration parameter is set to 'ICU_MCAL_USER1' else the macro is generated as ICU_17_TIMERIP_MCAL_SUPERVISOR.	
Example(s)	Action	Generated output
	IcuRuntimeApiMode = ICU_MCAL_USER1	#define ICU_17_TIMERIP_RUNTIME_API_MODE (ICU_17_TIMERIP_MCAL_USER1)
	IcuRuntimeApiMode = ICU_MCAL_SUPERVISOR	#define ICU_17_TIMERIP_RUNTIME_API_MODE (ICU_17_TIMERIP_MCAL_SUPERVISOR)

1.1.10 Macro: ICU_17_TIMERIP_INIT_DEINIT_API_MODE

Table 10 ICU_17_TIMERIP_INIT_DEINIT_API_MODE

Name	ICU_17_TIMERIP_INIT_DEINIT_API_MODE	
Description	Decides the mode of execution of Init and DeInit API's.	
Verification method	The macro is generated as ICU_17_TIMERIP_MCAL_USER1 if IcuInitDeInitApiMode configuration parameter is set to 'ICU_MCAL_USER1' else the macro is generated as ICU_17_TIMERIP_MCAL_SUPERVISOR.	
Example(s)	Action	Generated output
	IcuInitDeInitApiMode = ICU_MCAL_USER1	#define ICU_17_TIMERIP_INIT_DEINIT_API_MODE (ICU_17_TIMERIP_MCAL_USER1)
	IcuInitDeInitApiMode = ICU_MCAL_SUPERVISOR	#define ICU_17_TIMERIP_INIT_DEINIT_API_MODE (ICU_17_TIMERIP_MCAL_SUPERVISOR)

1.1.11 Macro: ICU_17_TIMERIP_DEV_ERROR_DETECT

Table 11 ICU_17_TIMERIP_DEV_ERROR_DETECT

Name	ICU_17_TIMERIP_DEV_ERROR_DETECT	
Description	Enables/disables the Development Error Detection.	
Verification method	The macro is generated as STD_ON if IcuDevErrorDetect configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output

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IcuDevErrorDetect = True	#define ICU_17_TIMERIP_DEV_ERROR_DETECT (STD_ON)
IcuDevErrorDetect = False	#define ICU_17_TIMERIP_DEV_ERROR_DETECT (STD_OFF)

1.1.12 Macro: ICU_17_TIMERIP_RUNTIME_ERROR_DETECT

Table 12 ICU_17_TIMERIP_RUNTIME_ERROR_DETECT

Name	ICU_17_TIMERIP_RUNTIME_ERROR_DETECT	
Description	Enables/disables the Runtime Error Detection.	
Verification method	<p>For Autosar version 4.2.2, the macro is generated as STD_OFF. For Autosar version 4.4.0, the macro is generated as STD_ON if IcuRunTimeErrorDetect configuration parameter is set to 'True' else the macro is generated as STD_OFF.</p> <p><i>Note: IcuRunTimeErrorDetect parameter is not available in Autosar version 4.2.2.</i></p>	
Example(s)	Action	Generated output
	IcuRunTimeErrorDetect = True	#define ICU_17_TIMERIP_DEV_ERROR_DETECT (STD_ON)
	"IcuRunTimeErrorDetect = False" or Autosar version is 4.2.2	#define ICU_17_TIMERIP_DEV_ERROR_DETECT (STD_OFF)

1.1.13 Macro: ICU_17_TIMERIP_MULTICORE_ERROR_DETECT

Table 13 ICU_17_TIMERIP_MULTICORE_ERROR_DETECT

Name	ICU_17_TIMERIP_MULTICORE_ERROR_DETECT	
Description	Enables/disables MultiCore DET Check	
Verification method	The macro is generated as STD_ON if IcuMultiCoreErrorDetect configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuMultiCoreErrorDetect = True	#define ICU_17_TIMERIP_MULTICORE_ERROR_DETECT (STD_ON)
	IcuMultiCoreErrorDetect = False	#define ICU_17_TIMERIP_MULTICORE_ERROR_DETECT (STD_OFF)

1.1.14 Macro: ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE

Table 14 ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE

Name	ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE	
Description	Enables/disables the wakeup source reporting.	
Verification method	The macro is generated as STD_ON if IcuReportWakeupSource configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuReportWakeupSource = True	#define ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE (STD_ON)
	IcuReportWakeupSource = False	#define ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE (STD_OFF)

1.1.15 Macro: ICU_17_TIMERIP_DE_INIT_API

Table 15 ICU_17_TIMERIP_DE_INIT_API

Name	ICU_17_TIMERIP_DE_INIT_API	
Description	Enables/disables Icu_17_TimerIp_DeInit API.	
Verification method	The macro is generated as STD_ON if IcuDeInitApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuDeInitApi = True	#define ICU_17_TIMERIP_DE_INIT_API (STD_ON)
	IcuDeInitApi = False	#define ICU_17_TIMERIP_DE_INIT_API (STD_OFF)

1.1.16 Macro: ICU_17_TIMERIP_DISABLE_WAKEUP_API

Table 16 ICU_17_TIMERIP_DISABLE_WAKEUP_API

Name	ICU_17_TIMERIP_DISABLE_WAKEUP_API	
Description	Enables/disables Icu_17_TimerIp_DisableWakeup API	
Verification method	The macro is generated as STD_ON if IcuDisableWakeupApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuDisableWakeupApi = True	#define ICU_17_TIMERIP_DISABLE_WAKEUP_API (STD_ON)

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IcuDisableWakeupApi = False	#define ICU_17_TIMERIP_DISABLE_WAKEUP_API (STD_OFF)
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1.1.17 Macro: ICU_17_TIMERIP_ENABLE_WAKEUP_API

Table 17 ICU_17_TIMERIP_ENABLE_WAKEUP_API

Name	ICU_17_TIMERIP_ENABLE_WAKEUP_API	
Description	Enables/disables Icu_17_TimerIp_EnableWakeup API	
Verification method	The macro is generated as STD_ON if IcuEnableWakeupApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuEnableWakeupApi = True	#define ICU_17_TIMERIP_ENABLE_WAKEUP_API (STD_ON)
	IcuEnableWakeupApi = False	#define ICU_17_TIMERIP_ENABLE_WAKEUP_API (STD_OFF)

1.1.18 Macro: ICU_17_TIMERIP_EDGE_COUNT_API

Table 18 ICU_17_TIMERIP_EDGE_COUNT_API

Name	ICU_17_TIMERIP_EDGE_COUNT_API	
Description	Enable/disable following APIs: Icu_17_TimerIp_EnableEdgeCount Icu_17_TimerIp_DisableEdgeCount Icu_17_TimerIp_ResetEdgeCount Icu_17_TimerIp_GetEdgeNumbers	
Verification method	The macro is generated as STD_ON if IcuEdgeCountApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuEdgeCountApi = True	#define ICU_17_TIMERIP_EDGE_COUNT_API (STD_ON)
	IcuEdgeCountApi = False	#define ICU_17_TIMERIP_EDGE_COUNT_API (STD_OFF)

1.1.19 Macro: ICU_17_TIMERIP_GET_DUTY_CYCLE_VALUES_API

Table 19 ICU_17_TIMERIP_GET_DUTY_CYCLE_VALUES_API

Name	ICU_17_TIMERIP_GET_DUTY_CYCLE_VALUES_API	
Description	Enables/disables Icu_17_TimerIp_GetDutyCycleValues API	

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Verification method	The macro is generated as STD_ON if IcuGetDutyCycleValuesApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuGetDutyCycleValuesApi = True	#define ICU_17_TIMERIP_GET_DUTY_CYCLE_VALUES_API (STD_ON)
	IcuGetDutyCycleValuesApi = False	#define ICU_17_TIMERIP_GET_DUTY_CYCLE_VALUES_API (STD_OFF)

1.1.20 Macro: ICU_17_TIMERIP_GET_INPUT_STATE_API

Table 20 ICU_17_TIMERIP_GET_INPUT_STATE_API

Name	ICU_17_TIMERIP_GET_INPUT_STATE_API	
Description	Enables/disables Icu_17_TimerIp_GetInputState API	
Verification method	The macro is generated as STD_ON if IcuGetInputStateApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuGetInputStateApi = True	#define ICU_17_TIMERIP_GET_INPUT_STATE_API (STD_ON)
	IcuGetInputStateApi = False	#define ICU_17_TIMERIP_GET_INPUT_STATE_API (STD_OFF)

1.1.21 Macro: ICU_17_TIMERIP_GET_TIME_ELAPSED_API

Table 21 ICU_17_TIMERIP_GET_TIME_ELAPSED_API

Name	ICU_17_TIMERIP_GET_TIME_ELAPSED_API	
Description	Enables/disables Icu_17_TimerIp_GetTimeElapsed API	
Verification method	The macro is generated as STD_ON if IcuGetTimeElapsedApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuGetTimeElapsedApi = True	#define ICU_17_TIMERIP_GET_TIME_ELAPSED_API (STD_ON)
	IcuGetTimeElapsedApi = False	#define ICU_17_TIMERIP_GET_TIME_ELAPSED_API (STD_OFF)

1.1.22 Macro: ICU_17_TIMERIP_GET_VERSION_INFO_API

Table 22 ICU_17_TIMERIP_GET_VERSION_INFO_API

Name	ICU_17_TIMERIP_GET_VERSION_INFO_API	
Description	Enables/disables Icu_17_TimerIp_GetVersionInfo API	
Verification method	The macro is generated as STD_ON if IcuGetVersionInfoApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuGetVersionInfoApi = True	#define ICU_17_TIMERIP_GET_VERSION_INFO_API (STD_ON)
	IcuGetVersionInfoApi = False	#define ICU_17_TIMERIP_GET_VERSION_INFO_API (STD_OFF)

1.1.23 Macro: ICU_17_TIMERIP_SET_MODE_API

Table 23 ICU_17_TIMERIP_SET_MODE_API

Name	ICU_17_TIMERIP_SET_MODE_API	
Description	Enables/disables Icu_17_TimerIp_SetMode API	
Verification method	The macro is generated as STD_ON if IcuSetModeApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuSetModeApi= True	#define ICU_17_TIMERIP_SET_MODE_API (STD_ON)
	IcuSetModeApi= False	#define ICU_17_TIMERIP_SET_MODE_API (STD_OFF)

1.1.24 Macro: ICU_17_TIMERIP_TIMESTAMP_API

Table 24 ICU_17_TIMERIP_TIMESTAMP_API

Name	ICU_17_TIMERIP_TIMESTAMP_API	
Description	Enable/disable following APIs: Icu_17_TimerIp_StartTimestamp Icu_17_TimerIp_StopTimestamp Icu_17_TimerIp_GetTimestampIndex	
Verification method	The macro is generated as STD_ON if IcuTimestampApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuTimestampApi = True	#define ICU_17_TIMERIP_TIMESTAMP_API (STD_ON)

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IcuTimestampApi = False	#define ICU_17_TIMERIP_TIMESTAMP_API (STD_OFF)
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1.1.25 Macro: ICU_17_TIMERIP_SIGNAL_MEASUREMENT_API

Table 25 ICU_17_TIMERIP_SIGNAL_MEASUREMENT_API

Name	ICU_17_TIMERIP_SIGNAL_MEASUREMENT_API	
Description	Enable/disable following APIs: Icu_StartSignalMeasurement Icu_StopSignalMeasurement	
Verification method	The macro is generated as STD_ON if IcuSignalMeasurementApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuSignalMeasurementApi = True	#define ICU_17_TIMERIP_SIGNAL_MEASUREMENT_API (STD_ON)
	IcuSignalMeasurementApi = False	#define ICU_17_TIMERIP_SIGNAL_MEASUREMENT_API (STD_OFF)

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1.1.26 Macro: ICU_17_TIMERIP_EDGE_DETECT_API

Table 26 ICU_17_TIMERIP_EDGE_DETECT_API

Name	ICU_17_TIMERIP_EDGE_DETECT_API	
Description	Enable/disable following APIs: Icu_17_TimerIp_EnableEdgeDetection Icu_17_TimerIp_DisableEdgeDetection	
Verification method	The macro is generated as STD_ON if IcuEdgeDetectApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuEdgeDetectApi = True	#define ICU_17_TIMERIP_EDGE_DETECT_API (STD_ON)
	IcuEdgeDetectApi = False	#define ICU_17_TIMERIP_EDGE_DETECT_API (STD_OFF)

1.1.27 Macro: ICU_17_TIMERIP_INCREMENTAL_INTERFACE_API

Table 27 ICU_17_TIMERIP_INCREMENTAL_INTERFACE_API

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Name	ICU_17_TIMERIP_INCREMENTAL_INTERFACE_API	
Description	Enable/disable following APIs: Icu_17_TimerIp_StartIncInterface Icu_17_TimerIp_StopIncInterface Icu_17_TimerIp_CalibratePos Icu_17_TimerIp_ReadEncCount Icu_17_TimerIp_ReadEncCountDir	
Verification method	The macro is generated as STD_ON if IcuIncrementalInterfaceApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuIncrementalInterfaceApi = True	#define ICU_17_TIMERIP_INCREMENTAL_INTERFACE_API (STD_ON)
	IcuIncrementalInterfaceApi = False	#define ICU_17_TIMERIP_INCREMENTAL_INTERFACE_API (STD_OFF)

1.1.28 Macro: ICU_17_TIMERIP_TIMEOUT_DETECTION_API

Table 28 ICU_17_TIMERIP_TIMEOUT_DETECTION_API

Name	ICU_17_TIMERIP_TIMEOUT_DETECTION_API	
Description	Enable/disable following APIs: Icu_17_TimerIp_SetTimeoutValue	
Verification method	The macro is generated as STD_ON if IcuTimeoutDetectionApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	IcuTimeoutDetectionApi = True	#define ICU_17_TIMERIP_TIMEOUT_DETECTION_API (STD_ON)
	IcuTimeoutDetectionApi = False	#define ICU_17_TIMERIP_TIMEOUT_DETECTION_API (STD_OFF)

1.1.29 Macro: ICU_17_TIMERIP_WAKEUP_FUNCTIONALITY_API

Table 29 ICU_17_TIMERIP_WAKEUP_FUNCTIONALITY_API

Name	ICU_17_TIMERIP_WAKEUP_FUNCTIONALITY_API	
Description	Adds/removes the service Icu_17_TimerIp_CheckWakeup from the code	
Verification method	The macro is generated as STD_ON if IcuWakeupFunctionalityApi configuration parameter is set to 'True' else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output

Icu_17_TimerIp driver

IcuWakeupFunctionalityApi = True	#define ICU_17_TIMERIP_WAKEUP_FUNCTIONALITY_API (STD_ON)
IcuWakeupFunctionalityApi = False	#define ICU_17_TIMERIP_WAKEUP_FUNCTIONALITY_API (STD_OFF)

1.1.30 Macro: ICU_17_TIMERIP_INSTANCE_ID

Table 30 ICU_17_TIMERIP_INSTANCE_ID

Name	ICU_17_TIMERIP_INSTANCE_ID	
Description	Instance ID of ICU module.	
Verification method	The macro is generated as a numeric value set in the configuration parameter 'IcuGeneral/IcuIndex'	
Example(s)	Action	Generated output
	Set IcuIndex as 0	#define ICU_17_TIMERIP_INSTANCE_ID (0U)
	Set IcuIndex as 240	#define ICU_17_TIMERIP_INSTANCE_ID (240U)

1.1.31 Macro: IcuConf_IcuChannel_<channel name>

Table 31 IcuConf_IcuChannel_<channel name>

Name	IcuConf_IcuChannel_<channel name>	
Description	The macro is the symbolic name generated for the configuration parameter 'IcuConfigSet/IcuChannel/IcuChannelId'	
Verification method	The macro is generated as a numeric value which is configured in 'IcuConfigSet/IcuChannel/IcuChannelId'. <channel name> is the name of the ICU channel's container name.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Conatianer for Channel ID 0 is named CrankInput. Conatianer for Channel ID 1 is named CamInput. Conatianer for Channel ID 2 is named PressSensrInput Conatianer for Channel ID 3 is named PedalPosition 	<pre>#define IcuConf_IcuChannel_CrankInput (0U) #define IcuConf_IcuChannel_CamInput (1U) #define IcuConf_IcuChannel_PressSensrInput (2U) #define IcuConf_IcuChannel_PedalPosition (3U)</pre>

1.1.32 Macro: ICU_17_TIMERIP_MAX_CHANNELS_CORE<x>

Table 32 ICU_17_TIMERIP_MAX_CHANNELS_CORE<x>

Name	ICU_17_TIMERIP_MAX_CHANNELS_CORE<x> (x ranges from 0 to 5)	
Description	Indicates the total number of channels configured for CORE<x>.	
Verification method	<p>The macro is generated as total number of channels allocated to CORE<x>.</p> <p><i>Note: Channels not assigned to any core are assigned to master core (ResourceMMasterCore).</i></p>	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels (Icu_Channel0 to Icu_Channel3). Set ResourceMMasterCore as CORE1. Do not assign ICU channels in any ResourceMAllocation 	<pre>#define ICU_17_TIMERIP_MAX_CHANNELS_CORE0 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE1 (4U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE2 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE3 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE4 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE5 (0U)</pre>
	<ul style="list-style-type: none"> Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8). Set ResourceMMasterCore as CORE2. Assign Icu_Channel0, Icu_Channel3 and Icu_Channel7 under ResourceMAllocation with ResourceMCoreID as CORE0. Assign Icu_Channel1, Icu_Channel2 and Icu_Channel8 under ResourceMAllocation with ResourceMCoreID as CORE2 	<pre>#define ICU_17_TIMERIP_MAX_CHANNELS_CORE0 (3U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE1 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE2 (6U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE3 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE4 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE5 (0U)</pre>

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<ul style="list-style-type: none"> • Configure 4 ICU channels (Icu_Channel0 to Icu_Channel3). • Assign all the channels under ResourceMAllocation with ResourceMCoreID as CORE0 	<pre>#define ICU_17_TIMERIP_MAX_CHANNELS_CORE0 (4U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE1 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE2 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE3 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE4 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE5 (0U)</pre>
<ul style="list-style-type: none"> • Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8). • ResourceMMasterCore is CORE4. • Assign Icu_Channel0, Icu_Channel3 and Icu_Channel7 under ResourceMAllocation with ResourceMCoreID as CORE3 	<pre>#define ICU_17_TIMERIP_MAX_CHANNELS_CORE0 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE1 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE2 (0U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE3 (3U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE4 (6U) #define ICU_17_TIMERIP_MAX_CHANNELS_CORE5 (0U)</pre>

1.1.33 Macro: ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_CORE<x>

Table 33 ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_CORE<x>

Name	ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_CORE<x>
Description	Indicates the total number of non-ERU channels configured for Core <x>.
Verification method	<p>The macro is generated as total number of non-ERU channels allocated to CORE<x>.</p> <p><i>Note: Channels not assigned to any core are assigned to master core (ResourceMMasterCore).</i></p>

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Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8) of which 2 are ERU channels. Set ResourceMMasterCore as CORE5. Do not assign ICU channels in any ResourceMAllocation 	<pre>#define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE0 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE1 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE2 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE3 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE4 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE5 (7U)</pre>
	<ul style="list-style-type: none"> Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8). Only one ERU channel. ResourceMMasterCore is CORE5. Assign Icu_Channel0, Icu_Channel3(ERU) and Icu_Channel7 under ResourceMAllocation with ResourceMCoreID as CORE3 	<pre>#define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE0 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE1 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE2 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE3 (2U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE4 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE5 (6U)</pre>
	<ul style="list-style-type: none"> Configure 4 ICU channels (Icu_Channel0 to Icu_Channel3) with all non-ERU channels. Set ResourceMMasterCore as CORE1. Do not assign ICU channels in any ResourceMAllocation 	<pre>#define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE0 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE1 (4U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE2 (0U)</pre>

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	<pre>#define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE3 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE4 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE5 (0U)</pre>
<ul style="list-style-type: none"> Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8), 8 of which use ERU except Icu_Channel8. ResourceMMasterCore is CORE4. Assign Icu_Channel0, Icu_Channel3 and Icu_Channel7 under ResourceMAllocation with ResourceMCoreID as CORE2 	<pre>#define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE0 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE1 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE2 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE3 (0U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE4 (1U) #define ICU_17_TIMERIP_CHNL_DATA_MAX_CHANNELS_C ORE5 (0U)</pre>

1.1.34 Macro: ICU_17_TIMERIP_MAX_CHANNELS

Table 34 ICU_17_TIMERIP_MAX_CHANNELS

Name	ICU_17_TIMERIP_MAX_CHANNELS	
Description	Indicates the total number of channels configured.	
Verification method	The macro is generated as a numeric value which corresponds to the number of elements in the list 'IcuConfigSet/IcuChannel'.	
Example(s)	Action	Generated output
	Configure 4 ICU channels (Icu_Channel0 to Icu_Channel3)	#define ICU_17_TIMERIP_MAX_CHANNELS (4U)
	Configure 9 ICU channels (Icu_Channel0 to Icu_Channel8)	#define ICU_17_TIMERIP_MAX_CHANNELS (9U)

1.1.35 Macro: ICU_17_TIMERIP_SINGLE_CORE

Table 35 ICU_17_TIMERIP_SINGLE_CORE

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Name	ICU_17_TIMERIP_SINGLE_CORE	
Description	Enables/disables multi-core features	
Verification method	<p>The macro is generated as STD_ON if all the channels are configured to a single core else the macro is generated as STD_OFF.</p> <p><i>Note: Channels not assigned to any core are assigned to master core (ResourceMMasterCore).</i></p>	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Do not configure any channel to any core. 	#define ICU_17_TIMERIP_SINGLE_CORE (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel0 to non-master core. 	#define ICU_17_TIMERIP_SINGLE_CORE (STD_OFF)

1.1.36 Macro: ICU_17_TIMERIP_SINGLE_CORE_ID

Table 36 ICU_17_TIMERIP_SINGLE_CORE_ID

Name	ICU_17_TIMERIP_SINGLE_CORE_ID	
Description	Core ID of the core incase of a single core configuration.	
Verification method	The macro is generated as a numeric value which denotes the Core ID to which all the ICU channel are allocated. If ICU channels are split between multiple cores, the macro is generated as 0.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Do not configure any channel to any core. Master Core is 4 	#define ICU_17_TIMERIP_SINGLE_CORE_ID (4)
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure all channels to Core 2. Master Core is 1 	#define ICU_17_TIMERIP_SINGLE_CORE_ID (2)
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel0 to non-master core. 	#define ICU_17_TIMERIP_SINGLE_CORE_ID (0)

1.1.37 Macro: ICU_17_TIMERIP_GTM_TIM_USED

Table 37 ICU_17_TIMERIP_GTM_TIM_USED

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Name	ICU_17_TIMERIP_GTM_TIM_USED	
Description	Enables/disables GTM-TIM hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses GTM-TIM else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel2 to use GTM-TIM 	#define ICU_17_TIMERIP_GTM_TIM_USED (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. All channels use CCU6 	#define ICU_17_TIMERIP_GTM_TIM_USED (STD_OFF)

1.1.38 Macro: ICU_17_TIMERIP_CCU6_USED
Table 38 ICU_17_TIMERIP_CCU6_USED

Name	ICU_17_TIMERIP_CCU6_USED	
Description	Enables/disables CCU6 hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses CCU6 else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel1 to use CCU6 	#define ICU_17_TIMERIP_CCU6_USED (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. All channels use TIM 	#define ICU_17_TIMERIP_CCU6_USED (STD_OFF)

1.1.39 Macro: ICU_17_TIMERIP_CCU6_KERNEL0_USED
Table 39 ICU_17_TIMERIP_CCU6_KERNEL0_USED

Name	ICU_17_TIMERIP_CCU6_KERNEL0_USED	
Description	Enables/disables CCU6 Kernel 0 hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses CCU6 kernel 0 else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel2 to use CCU6 Kernel 0 	#define ICU_17_TIMERIP_CCU6_KERNEL0_USED (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. All channels use TIM 	#define ICU_17_TIMERIP_CCU6_KERNEL0_USED (STD_OFF)

1.1.40 Macro: ICU_17_TIMERIP_CCU6_KERNEL1_USED

Table 40 ICU_17_TIMERIP_CCU6_KERNEL1_USED

Name	ICU_17_TIMERIP_CCU6_KERNEL1_USED	
Description	Enables/disables CCU6 Kernel 1 hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses CCU6 kernel 1 else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel2 to use CCU6 Kernel 1 	#define ICU_17_TIMERIP_CCU6_KERNEL1_USED (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. All channels use TIM 	#define ICU_17_TIMERIP_CCU6_KERNEL1_USED (STD_OFF)

1.1.41 Macro: ICU_17_TIMERIP_GPT12_USED

Table 41 ICU_17_TIMERIP_GPT12_USED

Name	ICU_17_TIMERIP_GPT12_USED	
Description	Enables/disables GPT12 hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses GPT12 else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel2 to use GPT12 	#define ICU_17_TIMERIP_GPT12_USED (STD_ON)
	<ul style="list-style-type: none"> Configure 4 ICU channels. All channels use CCU6 	#define ICU_17_TIMERIP_GPT12_USED (STD_OFF)

1.1.42 Macro: ICU_17_TIMERIP_ERU_SIGEDGE_USED

Table 42 ICU_17_TIMERIP_ERU_SIGEDGE_USED

Name	ICU_17_TIMERIP_ERU_SIGEDGE_USED	
Description	Enables/disables ERU hardware usage.	
Verification method	The macro is generated as STD_ON if atleast one of the ICU channel uses ERU else the macro is generated as STD_OFF.	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. Configure Channel2 to use ERU 	#define ICU_17_TIMERIP_ERU_SIGEDGE_USED (STD_ON)

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<ul style="list-style-type: none"> • Configure 4 ICU channels. • All channels use CCU6 	<pre>#define ICU_17_TIMERIP_ERU_SIGEDGE_USED (STD_OFF)</pre>
--	--

1.2 File: Icu_17_TimerIp[_<variant>]_PBcfg.c

The generated source file contains all post-build configuration parameters. Post-build time configuration mechanism allows configurable functionality of ICU driver that is deployed as object code. The file is generated in 'src' folder.

1.2.1 Callback function declaration

Callback function declaration

Name	<User configured callback function name>	
Type	Icu_17_TimerIp_NotifiPtrType	
Description	Declaration of the notification callback function configured by the user for a notification capable ICU channel. <i>Note: The declaration is not generated if the user configures NULL or the address of the callback function instead of function name.</i>	
Verification method	The declaration is generated with function name configured in the configuration parameter IcuTimestampNotification (for a time stamping channel) or IcuSignalNotification (for an edge detection channel).	
Example(s)	Action	Generated output
	Configure Channel 2's notification as 23245 (Edge detect)	<pre>/* No declaration is available */</pre>
	Configure Channel 3's notification as 0.	<pre>/* No declaration is available */</pre>
	Configure Channel 3's notification as NULL.	<pre>/* No declaration is available */</pre>
	Configure Channel 4's notification as Notification_Icu_Chanl4 (Time stamp).	<pre>extern void Notification_Icu_Chanl4 (void);</pre>

1.2.2 Structure: Icu_17_TimerIp_Config[_<variant>]

Table 43 Icu_17_TimerIp_Config[_<variant>]

Name	Icu_17_TimerIp_Config[_<variant>]
Type	Icu_17_TimerIp_ConfigType
Description	Root configuration structure of ICU driver which will be used during initialization.

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Verification method	The generated structure is present in Icu_17_TimerIp[_<variant>]_PBcfg.c file. The <variant> indicates the name of the post-build variant. For a variant-aware configuration the structure name is appended with the variant name. For variant-unaware configuration <variant> is ignored.	
Example(s)	Action	Generated output
	Configure 1 ICU(GTM) to Core0 (variant-unaware)	<pre> const Icu_17_TimerIp_ConfigType Icu_17_TimerIp_Config = { /* Pointer to channel configuration set per core */ { &Icu_17_TimerIp_kConfigCore_0, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR }, #if (ICU_17_TIMERIP_SINGLE_CORE == STD_OFF) { (uint16) (ICU_CORE0 (uint8) 0), }, #endif #if (ICU_17_TIMERIP_ERU_SIGEDGE_USED == STD_ON) { ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED }, #endif #if (ICU_17_TIMERIP_GPT12_USED == STD_ON) ICU_GPT12_BPSX_NONE, ICU_GPT12_BPSX_NONE </pre>

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	<pre> #endif }; </pre>
Configure 1 ICU(GTM) to Core0 (variant-aware. Variant name is 'Petrol')	<pre> const Icu_17_TimerIp_ConfigType Icu_17_TimerIp_Config_Petrol = { /* Pointer to channel configuration set per core */ { &Icu_17_TimerIp_kConfigCore_0_Petrol, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR }, #if (ICU_17_TIMERIP_SINGLE_CORE == STD_OFF) { (uint16) (ICU_CORE0 (uint8) 0), }, #endif #if (ICU_17_TIMERIP_ERU_SIGEDGE_USED == STD_ON) { ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED, ERU_OGULINE_UNUSED }, #endif #if (ICU_17_TIMERIP_GPT12_USED == STD_ON) ICU_GPT12_BPSX_NONE, ICU_GPT12_BPSX_NONE #endif } </pre>

	} ;
--	-----

1.2.2.1 Member: CoreConfig[6]

Table 44 CoreConfig[6]

Name	CoreConfig[6]	
Type	Icu_17_TimerIp_CoreConfigType *	
Description	Array of core-specific configuration.	
Verification method	The generated structure member is present in the Icu_17_TimerIp_Config[_<variant>] structure. If a Core<x> is allocated at least one channel, then the element <x> shall be generated as '&Icu_17_TimerIp_kConfigCore_<x>' else 'NULL_PTR' is generated.(x in range 0 to 5).	
Example(s)	Action	Generated output
	All the ICU channels are allocated to Core 0 (variant-unaware)	<pre>{ &Icu_17_TimerIp_kConfigCore_0, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR }</pre>
	All the ICU channels are allocated to Core 0 (variant-aware. Variant name is 'Petrol')	<pre>{ &Icu_17_TimerIp_kConfigCore_0_Petrol, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR, NULL_PTR }</pre>
	All the ICU channels are split between all cores except Core 0. (variant-unaware)	<pre>{ NULL_PTR, &Icu_17_TimerIp_kConfigCore_1, &Icu_17_TimerIp_kConfigCore_2, &Icu_17_TimerIp_kConfigCore_3, &Icu_17_TimerIp_kConfigCore_4, &Icu_17_TimerIp_kConfigCore_5 }</pre>

1.2.2.2 Member: ChannelMapping[ICU_17_TIMERIP_MAX_CHANNELS]

Table 45 ChannelMapping[ICU_17_TIMERIP_MAX_CHANNELS]

Name	ChannelMapping[ICU_17_TIMERIP_MAX_CHANNELS]	
Type	uint16	
Description	Array of channel specific data, which stores information of the core and index. Lower 8-bit for core specific channel identifier. Upper 8-bit to identify which core is using that channel	
Verification method	The generated structure member contains an array entry for each configured channel at 'IcuConfigSet\IcuChannelId' index. The core specific channel identifier is the index of the channel in the list ordered in ascending order of "IcuConfigSet\IcuChannelId" for the channels allocated to that core.	
Example(s)	Action	Generated output
	One ICU channel allocated to Core 0 and one channel allocated to Core 1	<pre>{ 0x000, /* Core 0 Index 0*/ 0x100 /* Core 1 Index 0*/ }</pre>
Example(s)	9 ICU channels. Channel2, Channel4 allocated to Core 4. Channel 3, Channel8 allocated to Core 1. Rest of the channels allocated to Core 2	<pre>{ 0x200, /* Core 2 Index 0*/ 0x201, /* Core 2 Index 1*/ 0x400, /* Core 4 Index 0*/ 0x100, /* Core 1 Index 0*/ 0x401, /* Core 4 Index 1*/ 0x202, /* Core 2 Index 2*/ 0x203, /* Core 2 Index 3*/ 0x204, /* Core 2 Index 4*/ 0x101 /* Core 1 Index 1*/ }</pre>

1.2.3 Structure: Icu_17_TimerIp_kConfigCore_<x>[_<variant>]

Table 46 Icu_17_TimerIp_kConfigCore_<x>[_<variant>]

Name	Icu_17_TimerIp_kConfigCore_<x>[_<variant>]	
Type	Icu_17_TimerIp_CoreConfigType	
Description	Configuration structure of ICU driver for Core <x> which will be referenced in root configuration structure. (x ranges from 0 to 5)	
Verification method	The generated file has this structure if atleast one channel is assigned to Core <x>. <Variant> indicates the name of the post-build variant. For a variant-aware configuration, the structure name is appended with the variant name. For variant-unaware configuration, <variant> is ignored.	
Example(s)	Action	Generated output

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Configure 3 ICU(1GTM,1CCU,1ERU) channels to Core0 (variant-unaware)	<pre>static const Icu_17_TimerIp_CoreConfigType Icu_17_TimerIp_kConfigCore_0 = { &Icu_17_TimerIp_kChannelConfigCore_0[0], 3, 2, };</pre>
Configure 10 ICU(4GTM,2GPT,4ERU) channels to Core2 (variant-aware. Variant name is 'Petrol')	<pre>static const Icu_17_TimerIp_CoreConfigType Icu_17_TimerIp_kConfigCore_0_Petrol = { &Icu_17_TimerIp_kChannelConfigCore_0_Petrol[0], 10, 6, };</pre>

1.2.3.1 Member: ChannelConfigPtr

Table 47 ChannelConfigPtr

Name	ChannelConfigPtr	
Type	Icu_17_TimerIp_ChannelConfigType *	
Description	Pointer to the base of array which stores the data of each channel configured to Core<x>.	
Verification method	The structure member is generated with base address of array which stores the channel data of Core <x>.	
Example(s)	Action	Generated output
	Configure atleast 1 ICU channel to Core 3.(variant-unaware)	&Icu_17_TimerIp_kChannelConfigCore_3[0]
	Configure atleast 1 ICU channel to Core 4. (variant-aware. Variant name is 'Petrol')	&Icu_17_TimerIp_kChannelConfigCore_4_Petrol[0]

1.2.3.2 Member: MaxChannelCore

Table 48 MaxChannelCore

Name	MaxChannelCore
Type	uint8
Description	Indicates the total number of channels assigned to Core for which the structure is generated.
Verification method	The structure member is generated as total number of channels allocated to CORE<x>.

	<i>Note: Channels not assigned to any core are assigned to master core (ResourceMMasterCore).</i>	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. 3 channels are allocated to Core 0. 1 channel is allocated to Core 1. Output is shown for Core 0	3
	<ul style="list-style-type: none"> Configure 14 ICU channels. 3 channels are allocated to Core 1. ResourceMMasterCore is CORE0. Rest of the channels are not allocated to any core. Output is shown for Core 0	11

1.2.3.3 Member: MaxDataChannelCore

Table 49 MaxDataChannelCore

Name	MaxDataChannelCore	
Type	uint8	
Description	Indicates the total number of non-ERU channels configured for Core for which the structure is generated.	
Verification method	The structure member is generated as total number of non-ERU channels allocated to CORE<x>. <i>Note: Channels not assigned to any core are assigned to master core (ResourceMMasterCore).</i>	
Example(s)	Action	Generated output
	<ul style="list-style-type: none"> Configure 4 ICU channels. 3(2 GTM and 1 ERU) channels are allocated to Core 0. 1 channel is allocated to Core 1 Output is shown for Core 0	2
	<ul style="list-style-type: none"> Configure 14(8 ERU, 4 GTM, 2CCU6) ICU channels. 3(3 GTM) channels are allocated to Core 1. ResourceMMasterCore is CORE0. Rest of the channels are not allocated to any core. 	3/* 1GTM + 2CCU6 */

Output is shown for Core 0

1.2.4 Structure: Icu_17_TimerIp_kChannelConfigCore_<x>[_<variant>]

Table 50 Icu_17_TimerIp_kChannelConfigCore_<x>[_<variant>]

Name	Icu_17_TimerIp_kChannelConfigCore_<x>[_<variant>]	
Type	Icu_17_TimerIp_ChannelConfigType	
Description	Configuration structure of ICU driver for all channels belonging to Core <x> which will be referenced in core specific configuration structure (Icu_17_TimerIp_kConfigCore_<x>[_<variant>]). (x ranges from 0 to 5)	
Verification method	The generated file has this structure if atleast one channel is assigned to Core <x>. <variant> indicates the name of the post-build variant. For a variant-aware configuration, the structure name is appended with the variant name. For variant-unaware configuration, <variant> is ignored.	
Example(s)	Action	Generated output
	Configure 1 ICU(1GTM) channel to Core0 (variant-unaware)	<pre>static const Icu_17_TimerIp_ChannelConfigType Icu_17_TimerIp_kChannelConfigCore_0[] = { { /* ICU Channel 0 */ (Icu_17_TimerIp_NotifiPtrType)0, { (uint8) ICU_17_TIMERIP_MODE_SIGNAL_EDGE_DETECT, (uint8)ICU_17_TIMERIP_RISING_EDGE, (uint8)0U, /*Measurement Property*/ ICU_NOT_WAKEUPCAPABLE, (uint16)0U, (uint8)ICU_17_TIMERIP_GTM_OPTION, 1, /* PinSelection */ 0U, /* Reserved */ 0U, 0U, 0U, /* Overflow ISR threshold */ ICU_GTM_INTERRUPT_LEVEL_MODE ICU_GTM_CONFIGURABLE_CLOCK_0, ICU_TIMEBASE_TBU_TS0, 0U, ICU_GTM_CONFIGURABLE_CLOCK_0,</pre>

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	<pre> ICU_IMMEDIATE_EDGE_PROPAGATION_MODE, ICU_IMMEDIATE_EDGE_PROPAGATION_MODE, ICU_INPUT_OF_CURRENT_TIM_CHANNEL }, #if (ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE == STD_ON) { 0U /*Not applicable*/ }, #endif /* Ram needed for this channel */ 0U } } </pre>
Configure 1 ICU (1GTM) channel to Core2(variant-aware. Variant name is 'Petrol')	<pre> static const Icu_17_TimerIp_ChannelConfigType Icu_17_TimerIp_kChannelConfigCore_2_Petrol[] = { { /* ICU Channel 0 */ (Icu_17_TimerIp_NotifiPtrType)0, { (uint8) ICU_17_TIMERIP_MODE_SIGNAL_EDGE_DETECT, (uint8)ICU_17_TIMERIP_RISING_EDGE, (uint8)0U, /*Measurement Property*/ ICU_NOT_WAKEUPCAPABLE, (uint16)0U, (uint8)ICU_17_TIMERIP_GTM_OPTION, 1, /* PinSelection */ 0U, /* Reserved */ 0U, 0U, 0U, /* Overflow ISR threshold */ ICU_GTM_INTERRUPT_LEVEL_MODE ICU_GTM_CONFIGURABLE_CLOCK_0, ICU_TIMEBASE_TBU_TS0, 0U, ICU_GTM_CONFIGURABLE_CLOCK_0, ICU_IMMEDIATE_EDGE_PROPAGATION_MODE, </pre>

	<pre> ICU_IMMEDIATE_EDGE_PROPAGATION_MODE, ICU_INPUT_OF_CURRENT_TIM_CHANNEL }, #if (ICU_17_TIMERIP_REPORT_WAKEUP_SOURCE == STD_ON) { 0U /*Not applicable*/ }, #endif /* Ram needed for this channel */ 0U } } </pre>
--	--

1.2.4.1 Member: NotificationPointer

Table 51 NotificationPointer

Name	NotificationPointer	
Type	Icu_17_TimerIp_NotifiPtrType	
Description	Pointer to the callback functions configured by the user.	
Verification method	The structure member is generated with function name or address configured in the configuration parameter IcuTimestampNotification (for a time stamping channel) or IcuSignalNotification (for an edge detection channel) or IcuIncrementalModeEdgeNotification (for an incremental interface channel).	
Example(s)	Action	Generated output
	Configure Channel 2's notification as 23245 (Edge detect)	(Icu_17_TimerIp_NotifiPtrType)23245
	Configure Channel 3's notification as 0.	(Icu_17_TimerIp_NotifiPtrType)0
	Configure Channel 3's notification as NULL.	(Icu_17_TimerIp_NotifiPtrType)0
	Configure Channel 4's notification as Notification_Icu_Chanel4 (Time stamp).	&(Icu_17_TimerIp_NotifiPtrType) Notification_Icu_Chanel4

1.2.4.2 Member: TimeOutNotificationPointer

Table 52 TimeOutNotificationPointer

Name	TimeOutNotificationPointer	
Type	Icu_17_TimerIp_NotifiPtrType	
Description	Pointer to the callback functions configured by the user for a timeout enabled channel.	

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Verification method	The structure member is generated with function name or address configured in the configuration parameter IcuTimeoutNotification (for a GTM TIM channel with timeout enabled.).	
Example(s)	Action	Generated output
	Configure Channel 2's timeout notification as 23245.	(Icu_17_TimerIp_NotifiPtrType) 23245U
	Configure Channel 3's timeout notification as 0.	(Icu_17_TimerIp_NotifiPtrType) 0
	Configure Channel 3's timeout notification as NULL.	(Icu_17_TimerIp_NotifiPtrType) 0
	Configure Channel 4's timeout notification as Notification_Icu_Chanl4.	&Notification_Icu_Chanl4

1.2.4.3 Member: CntOvflNotificationPointer
Table 53 CntOvflNotificationPointer

Name	CntOvflNotificationPointer	
Type	Icu_17_TimerIp_NotifiPtrType	
Description	Pointer to the callback functions configured by the user for an incremental interface counter overflow event.	
Verification method	The structure member is generated with function name or address configured in the configuration parameter IcuCounterOverflowNotification	
Example(s)	Action	Generated output
	Configure Channel 2's notification as 23245 .	(Icu_17_TimerIp_NotifiPtrType) 23245U
	Configure Channel 3's notification as 0.	(Icu_17_TimerIp_NotifiPtrType) 0
	Configure Channel 3's notification as NULL.	(Icu_17_TimerIp_NotifiPtrType) 0
	Configure Channel 4's notification as Notification_Icu_Chanl4.	&Notification_Icu_Chanl4

1.2.4.4 Member: MeasurementMode
Table 54 MeasurementMode

Name	MeasurementMode	
Type	unsigned_int : 3	
Description	Measurement Mode of ICU channel.	
Verification method	The structure member is generated as the measurement mode configured in IcuMeasurementMode parameter	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuMeasurementMode = ICU_MODE_EDGE_COUNTER	ICU_17_TIMERIP_MODE_EDGE_COUNTER

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Configure an ICU channel with IcuMeasurementMode = ICU_MODE_SIGNAL_MEASUREMENT	ICU_17_TIMERIP_MODE_SIGNAL_MEASUREMENT
--	--

1.2.4.5 Member: DefaultStartEdge

Table 55 DefaultStartEdge

Name	DefaultStartEdge	
Type	unsigned_int : 2	
Description	Default edge used for measurements of ICU channel.	
Verification method	For a signal measurement ICU channel measuring High Time, the member is generated as ICU_17_TIMERIP_FALLING_EDGE. For a signal measurement ICU channel measuring Low Time, the member is generated as ICU_17_TIMERIP_RISING_EDGE. For all the other configurations the structure member is generated as edge configured in IcuDefaultStartEdge.	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuSignalMeasurementProperty = ICU_HIGH_TIME	ICU_17_TIMERIP_FALLING_EDGE
	Configure an ICU channel with IcuSignalMeasurementProperty = ICU_LOW_TIME	ICU_17_TIMERIP_RISING_EDGE
	Configure an ICU channel with IcuDefaultStartEdge = ICU_FALLING_EDGE	ICU_17_TIMERIP_FALLING_EDGE
	Configure an ICU channel with IcuDefaultStartEdge = ICU_BOTH_EDGES	ICU_17_TIMERIP_BOTH_EDGES

1.2.4.6 Member: MeasurementProperty

Table 56 MeasurementProperty

Name	MeasurementProperty	
Type	unsigned_int : 2	
Description	Measurement property for the selected measurement mode of ICU channel.	
Verification method	The structure member is generated as the measurement property configured in IcuSignalMeasurementProperty for signal measurement mode or in IcuTimestampMeasurementProperty for time stamping channel or in GPT12CounterType for incremental interface channel. For all other modes member is generated as 0.	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuMeasurementMode = ICU_MODE_EDGE_COUNTER	0U
	Configure an ICU channel with IcuMeasurementMode = ICU_MODE_SIGNAL_MEASUREMENT IcuSignalMeasurementProperty = ICU_LOW_TIME	ICU_17_TIMERIP_LOW_TIME

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Configure an ICU channel with IcuMeasurementMode = ICU_MODE_TIMESTAMP IcuTimestampMeasurementProperty = ICU_CIRCULAR_BUFFER	ICU_17_TIMERIP_CIRCULAR_BUFFER
Configure an ICU channel with IcuMeasurementMode = ICU_MODE_INCREMENTAL_INTERFACE GPT12CounterType = ICU_2_COUNT_INPUT	ICU_17_TIMERIP_2_COUNT_INPUT

1.2.4.7 Member: WakeupCapability
Table 57 WakeupCapability

Name	WakeupCapability	
Type	unsigned_int : 1	
Description	Enables/disables the wakeup capability of ICU channel.	
Verification method	The structure member is generated as ICU_WAKEUPCAPABLE if IcuWakeupCapability is 'True' else it is generated as ICU_NOT_WAKEUPCAPABLE	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuWakeupCapability = True	ICU_WAKEUPCAPABLE
	Configure an ICU channel with IcuWakeupCapability = False	ICU_NOT_WAKEUPCAPABLE

1.2.4.8 Member: AssignedHwUnitNumber
Table 58 AssignedHwUnitNumber

Name	AssignedHwUnitNumber	
Type	unsigned_int : 16	
Description	Hardware Unit number used for the ICU channel.	
Verification method	The structure member is generated differently for different channels depending on the channel's hardware selection(IcuAssignedHwUnit) as mentioned below:	
	<ul style="list-style-type: none"> GTM-TIM channel: Lower 6 bits are used. Unused bits are set to 0. The value is generated depending on the TIM selection in GtmTimerUsed using following formula: (TimModuleID << 3) + TimChannelID 	
	<ul style="list-style-type: none"> CCU6 channel: Generated in below format ICU_CCU6<CCU kernel>_CC6<CCU comparator> Kerendl is selected in CCU6KernelUsed and comparator is selected in Cc6xChannel 	
	<ul style="list-style-type: none"> GPT12 channel: Generated in below format ICU_ASSIGN_GPT12_<Timer selected> 	

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	<p>Timer is selected in GPT12BlockReference.</p> <ul style="list-style-type: none"> ERU channel: Generated in below format <pre>(ICU_ASSIGN_ERS<ERS selected> ICU_ASSIGN_INPUT_CHL_<Input pin selected> ICU_ASSIGN_OGU<OGU selected>)</pre> <p>ERS is selected in EruErsReference, OGU is selected in EruOguReference and Input pin is selected in EruInputPin.</p>	
Example(s)	Action	Generated output
	Configure an ICU channel with <ul style="list-style-type: none"> IcuAssignedHwUnit = GTM GtmTimerUsed = /Mcu/Mcu/McuHardwareResourceAllocationConf_0/ McuGtmAllocationConf_0/McuGtmTimAllocationCo nf_2/McuGtmTimChannelAllocationConf_0 (Tim module is 2 and channel is 0) 	16U
	Configure an ICU channel with <ul style="list-style-type: none"> IcuAssignedHwUnit = CCU6 CCU6KernelUsed = /Mcu/Mcu/McuHardwareResourceAllocationConf_0/ McuCcu6ModuleAllocationConf_0 Cc6xChannel = Cc62 	ICU_CCU60_CC62
	Configure an ICU channel with <ul style="list-style-type: none"> IcuAssignedHwUnit = GPT12 GPT12BlockReference = T2 	ICU_ASSIGN_GPT12_T2
	Configure an ICU channel with <ul style="list-style-type: none"> IcuAssignedHwUnit = ERU EruErsReference = /Mcu/Mcu/McuHardwareResourceAllocationConf_0/ McuEruAllocationConf_0/McuEruChannelInputLineC onf_0 EruOguReference = /Mcu/Mcu/McuHardwareResourceAllocationConf_0/ McuEruAllocationConf_0/McuEruChannelOutputUni tConf_5 EruInputPin = ERU_INPUT0A_PORT15_PIN4 	(uint16) (ICU_ASSIGN_ERS0 ICU_ASSIGN_INPUT_CHL_A ICU_ASSIGN_OGU5)

1.2.4.9 Member: AssignedHwUnit

Table 59 AssignedHwUnit

Name	AssignedHwUnit
Type	unsigned_int : 2
Description	Hardware type selected for the ICU channel.

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Verification method	The structure member is generated as the hardware type selected in IcuAssignedHwUnit	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuAssignedHwUnit = GTM	ICU_17_TIMERIP_GTM_OPTION
	Configure an ICU channel with IcuAssignedHwUnit = CCU6	ICU_17_TIMERIP_CCU_OPTION
	Configure an ICU channel with IcuAssignedHwUnit = GPT12	ICU_17_TIMERIP_GPT12_OPTION
	Configure an ICU channel with IcuAssignedHwUnit = ERU	ICU_17_TIMERIP_ERU_OPTION

1.2.4.10 Member: PinSelection

Table 60 PinSelection

Name	PinSelection	
Type	unsigned_int : 4	
Description	Port selection configuration of the ICU channel.	
Verification method	<p>The structure member is generated differently for different channels depending on the channel's hardware selection(IcuAssignedHwUnit) as mentioned below:</p> <ul style="list-style-type: none"> ERU channel: Member is generated as 0 CCU6 channel: Member is generated as ICU_CCU6_CCIN<x> where <x> stands for input selection (CCChannelInputSelection). GPT12 channel: Member is generated as the combination of GPT12DirPortSelection and GPT12InputPortSelection. For GPT12InputPortSelection, the value used in combination are : <ul style="list-style-type: none"> For INA, 0 For INB, 1 For INC, 2 For IND, 3 For any other input selection, 0 For GPT12DirPortSelection, the value used in combination are : <ul style="list-style-type: none"> For EUDA, 0 For EUDB, 1 For any other input selection, 0 The generated values is of format “(value for GPT12InputPortSelection) (value for GPT12DirPortSelection << 2))” GTM-TIM channel: Member is generated as 0 	
Example(s)	Action	Generated output
	Configure a CCU6 ICU channel with CCChannelInputSelection = CCINB_PORT0_PIN3	ICU_CCU6_CCINB
	Configure a GTM ICU channel	0U
	Configure an ERU ICU channel	0U

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Configure an GPT12 ICU channel with GPT12InputPortSelection = GPT12_T4INA_PORT02_PIN8 and GPT12DirPortSelection = GPT12_T4EUDB_PORT33_PIN5	(uint8) (0U (1U << 2U))
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1.2.4.11 Member: TimeoutEnabled

Table 61 TimeoutEnabled

Name	TimeoutEnabled	
Type	unsigned_int : 1	
Description	Enables/disables the timeout functionality of ICU channel.	
Verification method	The structure member is generated as '1U' if IcuTimeoutFeature is not 'TIMEOUT_DISABLED' else it is generated as '0U'	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_DISABLED	0U
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_ONLY	1U
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_MIXED	1U

1.2.4.12 Member: IsTimeoutExclusive

Table 62 IsTimeoutExclusive

Name	IsTimeoutExclusive	
Type	unsigned_int : 1	
Description	Enables/disables the exclusivity of the timeout feature.	
Verification method	The structure member is generated as '1U' if IcuTimeoutFeature is 'TIMEOUT_ONLY' else it is generated as '0U'	
Example(s)	Action	Generated output
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_ONLY	1U
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_MIXED	0U
	Configure an ICU channel with IcuTimeoutFeature = TIMEOUT_DISABLED	0U

1.2.4.13 Member: TimChFilterTimeForRisingEdge

Table 63 TimChFilterTimeForRisingEdge

Name	TimChFilterTimeForRisingEdge	
Type	uint32	
Description	The filtering time for rising edge of the TIM Channel Input.	
Verification method	The structure member is generated as 0 if the channel is a non-TIM channel. For a GTM-TIM channel the value is generated as configured in TimChannelFilterConfig/TimChFilterTimeForRisingEdge	
Example(s)	Action	Generated output
	Configure a CCU Channel	0U
	Configure a GTM-TIM with 0 configured for TimChFilterTimeForRisingEdge	0U
	Configure a GTM-TIM with 16777215 configured for TimChFilterTimeForRisingEdge	16777215

1.2.4.14 Member: TimChFilterTimeForFallingEdge

Table 64 TimChFilterTimeForFallingEdge

Name	TimChFilterTimeForFallingEdge	
Type	uint32	
Description	The filtering time for falling edge of the TIM Channel Input.	
Verification method	The structure member is generated as 0 if the channel is a non-TIM channel. For a GTM-TIM channel the value is generated as the value configured in TimChannelFilterConfig/TimChFilterTimeForFallingEdge	
Example(s)	Action	Generated output
	Configure a CCU Channel	0U
	Configure a GTM-TIM with 0 configured for TimChFilterTimeForFallingEdge	0U
	Configure a GTM-TIM with 16777215 configured for TimChFilterTimeForFallingEdge	16777215

1.2.4.15 Member: OverflowISRThreshold

Table 65 OverflowISRThreshold

Name	OverflowISRThreshold	
Type	uint32	
Description	Threshold for signal measurement overflow ISR.	
Verification method	The structure member is generated as 0 for a non-GTM channel. For a GTM-TIM channel, the value configured in OverflowISRThreshold is generated.	
Example(s)	Action	Generated output
	Configure a CCU Channel	0U

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Configure a GTM-TIM OverflowSRThreshold = 134	134U
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1.2.4.16 Member: InterruptMode
Table 66 InterruptMode

Name	InterruptMode	
Type	uint16	
Description	Interrupt mode selected for GTM-TIM channel or interrupt node selected for CCU channel.	
Verification method	<p>The structure member is generated differently for different channels depending on the channel's hardware selection(IcuAssignedHwUnit) as mentioned below:</p> <ul style="list-style-type: none"> GPT12 and ERU channel: Member is generated as 0. GTM-TIM Channel: Member is generated in the format ICU_<Interrupt mode>. Interrupt mode is selected in TimInterruptMode. CCU6 channel: Member is generated in the format ICU_CCU6_<Interrupt node>. Interrupt node is selected in CCU6InterruptNode. 	
Example(s)	Action	Generated output
	Configure an ERU ICU channel	0U
	Configure a CCU Channel CCU6InterruptNode = NODE_SR1	ICU_CCU6_NODE_SR1
	Configure a GTM-TIM TimInterruptMode = GTM_INTERRUPT_LEVEL_MODE	ICU_GTM_INTERRUPT_LEVEL_MODE

1.2.4.17 Member: TimChannelClockSelect
Table 67 TimChannelClockSelect

Name	TimChannelClockSelect	
Type	uint8	
Description	Clock selection for the ICU channel.	
Verification method	<p>The structure member is generated differently for different channels depending on the channel's hardware selection(IcuAssignedHwUnit) as mentioned below:</p> <ul style="list-style-type: none"> ERU channel: Member is generated as 0 CCU6 channel: Member is generated using the following formula ClockDivider + Prescaler ClockDivider is selected in T12ClkSelection. Prescaler is 8 if T12PrescalerEnabled is 'True' else Prescaler is 0. GPT12 channel: Member is generated as 0 GTM-TIM channel: Member is generated in the format ICU_<clock selection>. Clock is selected in TimChannelClockSelect. 	
Example(s)	Action	Generated output

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Configure a CCU6 ICU channel with T12ClkSelection = 3 T12PrescalerEnabled = False	3U
Configure a CCU6 ICU channel with T12ClkSelection = 3 T12PrescalerEnabled = True	11U
Configure a GTM ICU channel with TimChannelClockSelect = GTM_CONFIGURABLE_CLOCK_0	ICU_GTM_CONFIGURABLE_CLOCK_0
Configure an ERU channel	0U
Configure an GPT12 ICU channel	0U

1.2.4.18 Member: CTRLData

Table 68 CTRLData

Name	CTRLData
Type	uint32
Description	HW Control register data needed during initialization of channel.
Verification method	<p>The structure member is generated differently for different types (based of HW selected) of channel.</p> <p>For GPT12 channel, the value generated is written to register GPT120_T<x>CON of the GPT12 timer. The values for the following bitfields are generated. Other bitfield values are generated as 0U. "x" is in the range of 2-6.</p> <p>T<x>I – For incremental interface mode channel, the bitfield value is generated as 1U or 3U depending on the value configured in GPT12CounterType. For other modes (Edge detect and Edge counter, the value of the bitfield is generated depending on the IcuDefaultStartEdge configured.</p> <p>T<x>M – For incremental interface mode with edge notification configured, the value of the bitfield is configured as 7U. For incremental interface mode without edge notification configured, the value of the bitfield is configured as 6U. For other modes (Edge detect and Edge counter, the value of the bitfield is generated as 1U.</p> <p>T<x>R – For Edge detect channel the bitfield is generated as 1U. For other modes the bitfield is set to 0U.</p> <p>T<x>UDE – For incremental interface mode channel, the bitfield value is generated as 1U. For other modes the bitfield is set to 0U.</p> <p>CLRT3EN – The bitfield is available only for T4CON. The value of the bitfield is generated as 1U if GPT12TimerClearTrigger of the ICU channel configured to use GPT12 T3 timer is configured to GPT12_T4IN. For other configurations, the bitfield is generated as 0U.</p> <p>CLRT2EN – The bitfield is available only for T4CON. The value of the bitfield is generated as 1U if GPT12TimerClearTrigger of the ICU channel configured to use GPT12 T2 timer is configured to GPT12_T4EUD. For other configurations, the bitfield is generated as 0U.</p> <p>For GTM-TIM channel, the value generated is written to the register GTM_TIM<x>_CH<y>_CTRL of the TIM module. The values for the following bitfields are generated. Other bitfield values are generated as 0U.</p> <p>TIM_EN – TIM channel is enabled only if the channel is an edge detect channel. For other types of channels, it is disabled.</p>

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<p>TIM_MODE – TIM channel mode is set to TIEM for all types of channels except Signal measurement channel. For Signal measurement channel the mode is set to TPWM.</p> <p>CICTRL – The bit is set based on the value configured in TimChannelInputSelect config parameter.</p> <p>GPRO_SEL – For a Timestamp channel the bitfield is set with the value configured in TimChannelGpr0InputSelect. For Signal measurement mode channel, the bit field is configured to use CNTS as input. For all other modes the bitfield is set to 0U.</p> <p>GPR1_SEL – For Signal measurement channel, the bitfield is configured to use CNT as input. For all other modes the bit field is set to 0U.</p> <p>ISL and DSL – If the edge configured in IcuDefaultStartEdge is FALLING_EDGE both ISL and DSL are generated as 0U. If RISING_EDGE is configured, ISL is generated as 0U and DSL as 1U. If BOTH_EDGES is configured, DSL is generated as 0U and ISL as 1U.</p> <p>For a Signal measurement channel measuring HIGH_TIME or LOW_TIME, IcuDefaultStartEdge is considered as FALLING_EDGE or RISING_EDGE respectively.</p> <p>ECNT_RESET – For a Signal measurement channel measuring HIGH_TIME or LOW_TIME the bitfield is generated as 1. All the other scenarios, the bit field value is generated as 0U.</p> <p>FLT_EN – If the TimChannelFilterEnable configuration parameter is set, the bitfield is generated as 1U else with 0U.</p> <p>FLT_CNT_FRQ – The frequency configured in TimChFilterCounterFreqSelect is generated for this bitfield.</p> <p>FLT_MODE_RE, FLT_MODE_FE – The filter mode configured in TimChFilterModeForRisingEdge is generated for this bitfield.</p> <p>FLT_CTR_RE, FLT_CTR_FE, CLK_SEL – The filter mode configured in TimChFilterModeForFallingEdge is generated for this bitfield.</p> <p>TOCTRL – The value configured in the TimChTimeOutEdge parameter is generated for this bitfield. If the timeout feature is disabled, the bitfield is generated with 0U.</p> <p>For CCU6 and ERU channel the value is generated as 0U.</p>		
Example(s)	Action	Generated output
	For an ERU channel	0U
	For a GTM-TIM channel in edge detect mode, IcuDefaultStartEdge is ICU_RISING_EDGE	<pre> ((ICU_GTM_TIM_MODE_TIEM << IFX_GTM_TIM_CH_CTRL_TIM_MODE_OFF) ICU_GTM_TIM_ENABLE_CHANNEL (ICU_ISL_DSL_RISING << IFX_GTM_TIM_CH_CTRL_DSL_OFF) ((ICU_INPUT_OF_CURRENT_TIM_CHANNEL & IFX_GTM_TIM_CH_CTRL_CICTRL_MSK) << IFX_GTM_TIM_CH_CTRL_CICTRL_OFF) ((ICU_GTM_CONFIGURABLE_CLOCK_0 & IFX_GTM_TIM_CH_CTRL_CLK_SEL_MSK) << IFX_GTM_TIM_CH_CTRL_CLK_SEL_OFF) ((ICU_TDU_RISING_EDGE & IFX_GTM_TIM_CH_CTRL_TOCTRL_MSK) << IFX_GTM_TIM_CH_CTRL_TOCTRL_OFF) ((ICU_GTM_CONFIGURABLE_CLOCK_0 & IFX_GTM_TIM_CH_CTRL_FLT_CNT_FRQ_MSK) << IFX_GTM_TIM_CH_CTRL_FLT_CNT_FRQ_OFF) </pre>

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	<pre>((ICU_IMMEDIATE_EDGE_PROPAGATION_MODE & IFX_GTM_TIM_CH_CTRL_FLT_MODE_RE_MSK) << IFX_GTM_TIM_CH_CTRL_FLT_MODE_RE_OFF) ((ICU_IMMEDIATE_EDGE_PROPAGATION_MODE & IFX_GTM_TIM_CH_CTRL_FLT_MODE_FE_MSK) << IFX_GTM_TIM_CH_CTRL_FLT_MODE_FE_OFF) (0UL<<IFX_GTM_TIM_CH_CTRL_FLT_EN_OFF))</pre>
For a GPT12 channel in Edge detect mode, IcuDefaultStartEdge is ICU_RISING_EDGE	<pre>ICU_GPT12_COUNTER_MODE (1UL) ((uint32) ((uint32) ICU_GPT12_TX_RUN << ICU_GPT12_TXCON_TXR_POS)),</pre>

1.2.4.19 Member: TimECTRLData

Table 69 TimECTRLData

Name	TimECTRLData	
Type	uint32	
Description	HW Extended Control register data for TIM needed during timeout initialization of channel.	
Verification method	<p>For GTM-TIM channel, the value generated is written to the register GTM_TIM<x>_CH<y>_ECTRL of the TIM module. The value configured in the TimChannelTimeoutInputSelect is generate with the appropriate shift value to write to USE_PREV_CH_IN bit field. Also the bit fields TDU_START and TDU_STOP are generated with a fixed value of ICU_TDU_START_ON_FIRST_ACTIVE and ICU_TDU_STOP_ON_TIMEOUT respectively.</p> <p>For GTM-TIM channel, if the timeout is disabled, the value is generated as 0U.</p> <p>For GTP12, CCU6 and ERU channel the value is generated as 0U.</p>	
Example(s)	Action	Generated output
	Configure a CCU Channel	0U
	Configure a GTM-TIM with timeout disabled	0U
	Configure a GTM-TIM with INPUT_OF_CURRENT_TIM_CHANNEL configured for TimChannelTimeoutInputSelect	<pre>((ICU_INPUT_OF_CURRENT_TIM_CHANNEL & IFX_GTM_TIM_CH_ECTRL_USE_PREV_TDU_IN_MSK) << IFX_GTM_TIM_CH_ECTRL_USE_PREV_TDU_IN_OFF) ICU_TDU_START_ON_FIRST_ACTIVE ICU_TDU_STOP_ON_TIMEOUT</pre>

1.2.4.20 Member: TimTDUVData

Table 70 TimTDUVData

Name	TimTDUVData	
Type	uint32	
Description	HW TDUV register data for TIM needed during initialization of channel.	
Verification method	For GTM-TIM channel, the value generated is written to the register GTM_TIM<x>_CH<y>_TDUV of the TIM module. The value configured in	

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	<p>TimChTimeOutCounterFreqSelect is generated with the appropriate shift value of the TCS bit field. “y” is in the range of 0-7 and “x” is in the range of 0-5 depending on the variant.</p> <p>For GTP12, CCU6 and ERU channel the value is generated as 0U.</p>	
Example(s)	Action	Generated output
	Configure a CCU Channel	0U
	Configure a GTM-TIM with GTM_CONFIGURABLE_CLOCK_1 configured for TimChTimeOutCounterFreqSelect	((ICU_GTM_CONFIGURABLE_CLOCK_1 & IFX_GTM_TIM_CH_TDUV_TCS_MSK) << IFX_GTM_TIM_CH_TDUV_TCS_OFF)
	Configure a GTM-TIM with GTM_CONFIGURABLE_CLOCK_3 configured for TimChTimeOutCounterFreqSelect	((ICU_GTM_CONFIGURABLE_CLOCK_3 & IFX_GTM_TIM_CH_TDUV_TCS_MSK) << IFX_GTM_TIM_CH_TDUV_TCS_OFF)

1.2.4.21 Member: ChannelWakeupInfo

Table 71 ChannelWakeupInfo

Name	ChannelWakeupInfo	
Type	Icu_17_TimerIp_ChannelWakeupType	
Description	Channel wakeup information	
Verification method	<p>The structure member is generated as 0 if the channel is not wakeup capable or ‘IcuGeneral/IcuReportWakeupSource’ is set to False.</p> <p>If the channel is wakeup capable and IcuGeneral/IcuReportWakeupSource is set to true, the member is generated with the value of EcuMWakeupSourceId referenced using IcuChannelWakeupInfo of that channel.</p>	
Example(s)	Action	Generated output
	Configure the ICU channel with wakeup capability off	{ 0U }
	<ul style="list-style-type: none"> Configure the ICU channel with wakeup capability on. IcuReportWakeupSource is True EcuMWakeupSourceId referenced by IcuChannelWakeupInfo is 3 	{ 3U }

1.2.4.22 Member: ModeMappingIndex

Table 72 ModeMappingIndex

Name	ModeMappingIndex
Type	uint8
Description	Mapping index of the channel with respect to measurement mode.

Icu_17_TimerIp driver

Verification method	<p>The value is generated as 0 for an ERU channel.</p> <p>For all other types of channels, this is a running number which increments for each non-eru channel.</p>	
Example(s)	Action <ul style="list-style-type: none"> Configure 11 (0 to 10) ICU channels. Channel 2, Channel 6 uses ERU and the rest are non-ERU <p>Output is shown for Channel 0</p>	Generated output 0
	<ul style="list-style-type: none"> Configure 11 (0 to 10) ICU channels. Channel 2 uses ERU and the rest are non-ERU <p>Output is shown for Channel 1</p>	1
	<ul style="list-style-type: none"> Configure 11 (0 to 10) ICU channels. Channel 2 uses ERU and the rest are non-ERU <p>Output is shown for Channel 2</p>	0
	<ul style="list-style-type: none"> Configure 11 (0 to 10) ICU channels. Channel 2 uses ERU and the rest are non-ERU <p>Output is shown for Channel 7</p>	5

1.3 File: Icu_17_TimerIp[_<variant>]_PBcfg.h

The generated header file contains the declaration of the root configuration structure. Post-build time configuration mechanism allows configurable functionality of ICU driver that is deployed as object code. The file is generated in 'inc' folder.

1.3.1 Structure: Icu_17_TimerIp_Config[_<variant>]

Table 73 Icu_17_TimerIp_Config[_<variant>]

Name	Icu_17_TimerIp_Config[_<variant>]	
Type	Icu_17_TimerIp_ConfigType	
Description	Declaration of Root configuration structure of ICU driver which will be used during initialization.	
Verification method	<p>The generated structure is present in Icu_17_TimerIp[_<variant>]_PBcfg.h file. The <variant> indicates the name of the post-build variant. For a variant-aware configuration the structure name is appended with the variant name. For variant-unaware configuration <variant> is ignored.</p>	
Example(s)	Action	Generated output
	Configure atleast one ICU channel and generate (variant-unaware)	<pre>extern const Icu_17_TimerIp_ConfigType Icu_17_TimerIp_Config;</pre>

Icu_17_TimerIp driver

Configure atleast one ICU channel and generate (variant-aware. Variant name is 'Petrol')	<pre>extern const Icu_17_TimerIp_ConfigType Icu_17_TimerIp_Config_Petrol;</pre>
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Revision history

Revision history

Major changes since the last revision

Date	Version	Description
2020-10-20	1.0	<ul style="list-style-type: none">Released.
2020-10-19	0.1	<ul style="list-style-type: none">Added ICU_17_TIMERIP_TIMEOUT_DETECTION_API and ICU_17_TIMERIP_RUNTIME_ERROR_DETECT sections.Consider the section Icu_17_TimerIp_kChannelConfigCore_<x>[_<variant>] as new.ICU driver chapter moved from MC-ISAR_TC3xx_Config_Verification_Manual_BASIC.pdf to this document.

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