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Requirements on Hardware Test Manager on start
up and shutdown
AUTOSAR CP R25-11

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2017-12-08	4.3.1	AUTOSAR Release Management	• Editorial changes
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Requirements on Hardware Test Manager on start
up and shutdown
AUTOSAR CP R25-11

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Table of Contents

1 Scope of Document

This document lists the requirements applicable to the design of the HTMSS module of AUTOSAR.

Requirements on Hardware Test Manager on start
up and shutdown
AUTOSAR CP R25-11

2 Conventions to be used

The representation of requirements in AUTOSAR documents follows the table specified in [TPS_STDT_00078], see [1, Standardization Template].

The verbal forms for the expression of obligation specified in [TPS_STDT_00053] shall be used to indicate requirements, see [1, Standardization Template].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as follows.

Note that the requirement level of the document in which they are used modifies the force of these words.

- MUST: This word, or the adjective "LEGALLY REQUIRED", means that the definition is an absolute requirement of the specification due to legal issues.

- MUST NOT: This phrase, or the phrase "MUST NOT", means that the definition is an absolute prohibition of the specification due to legal issues.

- SHALL: This phrase, or the adjective "REQUIRED", means that the definition is an absolute requirement of the specification.

- SHALL NOT: This phrase means that the definition is an absolute prohibition of the specification.

- SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

- SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED", means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

- MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item.

An implementation, which does not include a particular option, SHALL be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, SHALL be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides).

Requirements on Hardware Test Manager on start
up and shutdown
AUTOSAR CP R25-11

3 Acronyms and abbreviations

The glossary below includes acronyms and abbreviations relevant to CP RS HWTest-Manager that are not included in the AUTOSAR Glossary [2].

Abbreviation / Acronym:	Description:
ADC	Analog to Digital converter
BIST	Built In Self Test
BSW	Basic Software
ECU	Electronic Control Unit
ECUM	Electronic Control Unit Manager
HTMSS	Hardware Test Management startup shutdown
MCU	Micro Controller Unit
MSTP	Microcontroller Specific Test Package

Table 3.1: Acronyms and abbreviations used in the scope of this Document

4 Requirements Specification

This chapter describes all requirements driving the work to define the CP RS HWTest-Manager.

4.1 Functional Overview

The purpose of this module is to provide an infrastructure for integrating/transforming the microcontroller manufacturer specific start up and shutdown tests (e.g. BIST) test results/status within the AUTOSAR standard software platform.

The basic functionalities of this module includes collecting the test results/status from the MSTP, configure MSTP tests, start tests execution, provide the MSTP test status to EcuM module and application SWC to evaluate the test results for the system behavior.

The HTMSS module integrates on the level of the AUTOSAR BSW service layer. Below figure shows the functional integration of the HTMSS module in AUTOSAR software platform.
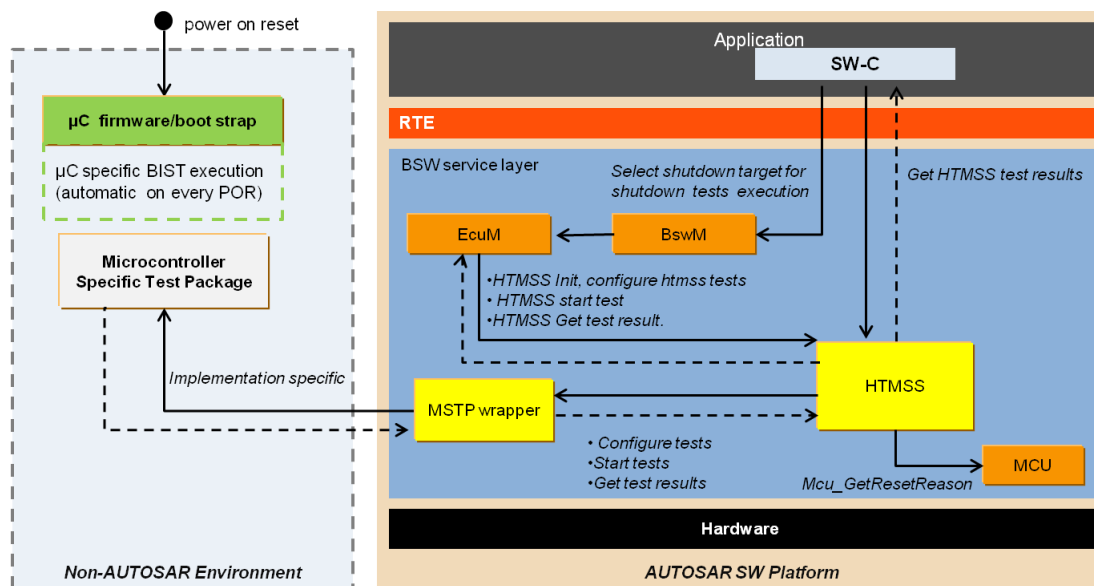

Figure 4.1: HTMSS interaction overview

The HTMSS module pre-integration requirements are:

- It shall be possible to run Microcontroller Specific Test Package (MSTP) startup and shutdown tests on the device under development

- The test results/status are available to the HTMSS module access

- It shall be possible to configure the MSTP start up and shutdown tests via HTMSS module

4.2 Functional Requirements

4.2.1 Configuration requirements of HTMSS and MSTP tests

[SRS_HTMSS_00001] The HTMSS shall allow configuration of start up and shutdown tests ⌈

Description:	It shall be possible to configure the microcontroller specific start up and shutdown tests
Rationale:	It is necessary to be able to select and configure the tests based on HTMSS integrator requirements
Use Case:	The HTMSS configuration developer maps the microcontroller specific tests in the module configuration set
Dependencies:	[SRS_HTMSS_00002]

⌋

[SRS_HTMSS_00002] The HTMSS shall allow the configuration of tests at individual hardware resource level ⌈

Description:	It shall be possible to test the individual hardware resources (e.g. selected via module / channel ID) on the given hardware
Rationale:	The given hardware may contain two hardware unit for the resource considered under test (e.g. 2 separate ADC hardware units). In this example, it may be possible to test/obtain result for each ADC unit individually.
Use Case:	The user may need to test all the hardware resources under test (used and unused), since certain microcontroller manufacturer may state that there is no guarantee that errors in unused hardware resource do not propagate or have influence on the rest of the microcontroller.
Dependencies:	

⌋

4.2.2 Main functionalities of HTMSS

[SRS_HTMSS_00003] The HTMSS shall provide a service to collect the MSTP tests results ⌈

Description:	The HTMSS shall collect and provide the test results of all executed tests
Rationale:	The MSTP test results shall be accessible
Use Case:	Having the tests results details, shall convey the fault status of the microcontroller.
Dependencies:	[SRS_HTMSS_00001], [SRS_HTMSS_00002]

⌋

[SRS_HTMSS_00004] The HTMSS shall provide a mechanism to share the test results with the application layer software ⌈

Description:	The current MSTP test results shall be provided to the application layer software during RUN time
Rationale:	The applicative software evaluates and react on critical errors to ensure the safe state (e.g. change from normal run time to a degradation mode)
Use Case:	The application software shall maintain the safe state based on the test results. E.g. a critical error judged according to the safety goals of the system may result in going to a safe state
Dependencies:	[SRS_HTMSS_00001], [SRS_HTMSS_00002]

⌋

4.2.3 ECUM integration functionalities of HTMSS

Below HTMSS module functions shall be integrated in the ECUM module.

[SRS_HTMSS_00005] The HTMSS shall provide a service to configure/Initialise the MSTP tests during ECUM start up phase ⌈

Description:	It shall be possible to configure the start up and shutdown tests during the ECUM start up phase via HTMSS interface
Rationale:	Initialization is required to pre-initialize the variables of HTMSS and the MSTP tests
Use Case:	During MCU start up the hardware is initialised to execute MSTP tests
Dependencies:	[SRS_HTMSS_00001], [SRS_HTMSS_00002]

⌋

[SRS_HTMSS_00006] The HTMSS shall provide a service to trigger the tests execution ⌈

Description:	It shall be possible to trigger the start up tests during the ECUM start up phase and shutdown tests during ECUM shut down phase via HTMSS provided service function
Rationale:	The start up tests shall be performed during ECUM start up phase and the shut down tests shall be performed during the ECUM shutdown phase
Use Case:	During ECU start up and shutdown phase the configured MSTP tests are triggered for its execution
Dependencies:	

⌋

4.2.4 Fault Operation

[SRS_HTMSS_00007] HTMSS shall provide callout options to handle the test failure conditions ⌈

Description:	On test failure (critical error conditions) it shall be possible to initiate error hooks as callout functions.
Rationale:	e.g. React to test failure to initiate ECU reset, safe state etc.
Use Case:	The ECU software need to react to the test failures by preparing the system state (e.g. reset, halt, safe state)
Dependencies:	

⌋

5 References

5.1 Deliverables of AUTOSAR

[1] Standardization Template
AUTOSAR_FO_TPS_StandardizationTemplate

[2] Glossary
AUTOSAR_FO_TR_Glossary

5.2 Related standards and norms

The ISO26262 part 5 chapter 8 requirements for hardware architecture metrics.

A   Change history of AUTOSAR traceable items

Please note that the lists in this chapter also include traceable items that have been removed from the specification in a later version. These items do not appear as hyperlinks in the document.

A.1   Traceable item history of this document according to AUTOSAR Release R25-11

A.1.1   Added Requirements in R25-11

A.1.2   Changed Requirements in R25-11

[SRS_HTMSS_00001] [SRS_HTMSS_00002] [SRS_HTMSS_00003] [SRS_HTMSS_00004] [SRS_HTMSS_00005] [SRS_HTMSS_00006] [SRS_HTMSS_00007]

A.1.3   Deleted Requirements in R25-11