<Self Test>

Software Design Specification

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Revision History

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# Introduction

## Purpose

This document will define the design about functional safety library feature.

## Scope

The design of safety library will cover FCCU test, BIST test and other safety related module.

## References

S32K source codes

[2] MPC5746R Functional Safety Library TRS

# Design Specification

## Architecture Overview

Safety library is designed to do some tests related to functional safety and support some safety functions for safety application. The software structure like below.

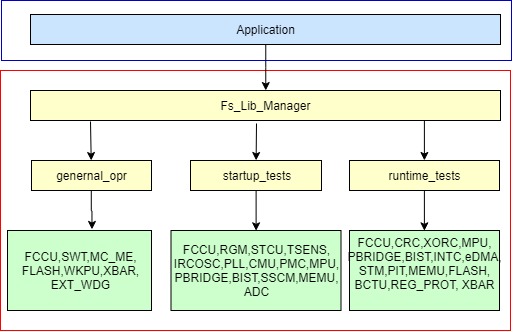


Figure 1-1 system structure

As mentioned in Figure1-1, FSLIB shall support 3 class APIs for application. Application could execute initial check tests and run-time tests based on user-defined configuration by call config API. Exclude some safety mechanism tests, FSLIB shall also provide some function related to safety.

1. Fs\_Lib\_Manager shall support at least 5 APIs for safety application.

|  |  |
| --- | --- |
| API | Description |
| mgr\_init() | do some initializations |
| mgr\_config() | Configure specify tests for 3 class tests |
| mgr\_generalTests() | do general tests |
| mgr\_startupTests() | do startup tests |
| mgr\_runtimeTests() | do runtime tests |

1. Fs\_Lib\_Manager shall manager some parameters to save or store some status.
2. For a specified module, such as FCCU, all tests about FCCU maybe exist in multi test array(general\_tests and startup\_tests).
3. For future migrating, EB tool shall do the same thing as Fs\_Lib\_Manager.

## Logical Views

This section describes the design details of every module supported by self test.

### Safety Library Configure

This part mainly to configure safety tests about start-up parse and run-time parse.

For start-up test phase and run-time test phase, FSLIB shall provide some test set for each phase. Application could do configure self-defined test set in different phase. After doing this, FSLIB manager shall store these configurations.

### General Operation

This part mainly include some function APIs related to safety mechanism. Application could call this API to implement some detailed function, such as execute CRC to generate a CRC code.

### Start-up Test

This part mainly include some initial check test set based on safety manual of MPC5746R. FSLIB shall support to do some configuration about which test should be tested in start-up parse.

### Run-time Test

This part mainly include some function related safety mechanism. Application could call this API to implement some detailed function, such as execute CRC to generate a CRC code.

## Function Specifications

### FSLIB Manager Function

#### Function <FSLIB\_Mgr\_Init>

void fs\_mgr\_init()

Documentation:

This is the main process for self test. The function will check RAM test result which is set by INT\_Ram\_Self\_Test, and perform ROM and codeplug self test. Once failed, this function will stop the rest test and notify APP to display the error/fail info and generate alert tone. For the fatal error, radio will enter self test special state; for non-fatal error, radio will continue to power up with normal operation.

This function should be called later than calling dlspi\_post\_os\_configure so that OS task had been initialized.

Parameters:

None

Return:

return error code for possible using

Pseudo Code:

/\* Warm start should disable self test enable flag \*/

if (self\_test\_enable == FALSE){

return errCode;

}

/\* For RAM test failed \*/

errCode = ram\_selftest\_result;

if (errCode != VR\_PWRUP\_STS\_OK){

vr\_log\_error(..., errCode, ...);

ll\_send\_hw\_powerup\_status(VR\_RADIO\_ID, errCode);

return errCode;

}

/\* For ROM test failed \*/

errCode = rom\_self\_test\_result;

if (errCode != VR\_PWRUP\_STS\_OK){

vr\_log\_error(..., errCode, ...);

ll\_send\_hw\_powerup\_status(VR\_RADIO\_ID, errCode);

return errCode;

}

/\* For codeplug test fatal & non-fatal error \*/

errCode = selftest\_codeplug\_checkall();

if (errCode != VR\_PWRUP\_STS\_OK){

vr\_log\_error(..., errCode, ...);

ll\_send\_hw\_powerup\_status(VR\_RADIO\_ID, errCode);

return errCode;

}

return errCode;

#### Function <FSLIB\_Mgr\_XXXConfig>

int FSLIB\_Mgr\_StartupConfig(uint8\_t index, uint32\_t \*pArgHeader)

int FSLIB\_Mgr\_RuntimeConfig(uint8\_t index, uint32\_t \*pArgHeader)

#### Function <FSLIB\_Mgr\_StartupTest>

#### Function <FSLIB\_Mgr\_RuntimeTest>

### General Operation Function

### Start-up Test Function

### Run-time Test Function

## Structure Specifications

### FSLIB Manager Block Parameter

### FSLIB Test Block Parameter

typedef struct {

uint8\_t type;

uint32\_t value ;

}fsTestPara\_t;

typedef struct {

uint8\_t count;

boolean fatal;

}fsTestCallPara\_t;