1 Introduction

IEC60730B_CM4_CM7_4_2 is the actual version of the core self-test library for NXP devices with the CM4 and CM7 core. The library is certified by VDE. It is dedicated for use in applications compliant with the Safety class B standard (specified by IEC 60730, IEC60335 and/or UL 60730, and UL 1998).

The library is released in a precompiled format, together with functional example projects and documentation describing the respective tests.

The library is created in close cooperation with the application team, who have vast experience in customer projects. The customer feedback is also taken into consideration.

2 What is new

When compared to the previous version of the library, the main changes are:

The AIO functions were renamed and consolidated. See the dedicated function chapter in the library user guide for your device or Library.

The DIO test functions were updated. The API was not changed, but it has more informative return values.

The following devices were added to the CM4/CM7 library: LPC540x, LPC54S0x, MIMXRT116x, and K32L3Ax.

2.1 Description

The supported devices are as follows:

- MKV3x
- MKV4x
- MKV5x
- MKE1xF
- MK2xF
- MIMXRT10xx
- MIMXRT117x
- MIMXRT116x
- MIMX8MNx
- MIMX8MMx
- LPC540x
- LPC54S0x
- K32L3Ax

The supported/recommended IDEs are as follows:
• IAR v9.10.2 and higher
• Keil μVision V5.34 (C compiler V6) and higher
• MCUXpresso IDE V11.4 and higher

The tested components are as follows:
• CPU registers
• Program counter
• Variable memory (RAM)
• Invariable memory (flash)
• Clock
• Digital I/O
• Analog I/O
• Stack
• Watchdog
• Touch Sensing Interface (TSI)

3 Optimizations, improvements, and changes

3.1 Library

The AIO functions were renamed and consolidated. See the dedicated function chapter in the respective library user guide for your device or Table 1.

Table 1. Analog test function conversion table

<table>
<thead>
<tr>
<th>Function name in version 4.1</th>
<th>New function name</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS_AIO_InputInit_LPC_ADC16</td>
<td>FS_AIO_InputInit_A1</td>
</tr>
<tr>
<td>FS_AIO_InputInit_IMXRT117X</td>
<td></td>
</tr>
<tr>
<td>FS_AIO_InputSet_LPC55SXX</td>
<td>FS_AIO_InputSet_A1</td>
</tr>
<tr>
<td>FS_AIO_InputSet_IMXRT117X_SWTRIG</td>
<td></td>
</tr>
<tr>
<td>FS_AIO_InputInit</td>
<td>FS_AIO_InputInit_A2346</td>
</tr>
<tr>
<td>FS_AIO_InputSet()</td>
<td>FS_AIO_InputSet_A23</td>
</tr>
<tr>
<td>FS_AIO_InputCheck</td>
<td>FS_AIO_InputCheck_A23</td>
</tr>
<tr>
<td>FS_AIO_InputSet_KKE</td>
<td>FS_AIO_InputSet_A4</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_KKE</td>
<td>FS_AIO_InputCheck_A4</td>
</tr>
<tr>
<td>FS_AIO_InputInit_LPC_ADC12</td>
<td>FS_AIO_InputInit_A5</td>
</tr>
<tr>
<td>FS_AIO_InputSet_LPC_ADC12</td>
<td>FS_AIO_InputSet_A5</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_LPC_ADC12</td>
<td>FS_AIO_InputCheck_A5</td>
</tr>
<tr>
<td>FS_AIO_InputSet_IMXRT10XX_SWTRIG</td>
<td>FS_AIO_InputSet_A6</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_IMXRT10XX_SWTRIG</td>
<td>FS_AIO_InputCheck_A6</td>
</tr>
</tbody>
</table>

Table continues on the next page...
### Table 1. Analog test function conversion table (continued)

<table>
<thead>
<tr>
<th>Function name in version 4.1</th>
<th>New function name</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS_AIO_InputInit_CYCLIC</td>
<td>FS_AIO_InputInit_A7</td>
</tr>
<tr>
<td>FS_AIO_InputSet_CYCLIC</td>
<td>FS_AIO_InputSet_A7</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_CYCLIC</td>
<td>FS_AIO_InputCheck_A7</td>
</tr>
</tbody>
</table>

The DIO test function was updated. It now has an extended set of error types that the functions can return:

```c
#define FS_FAIL_DIO (FS_DIO_CODE + 0x1U)
#define FS_FAIL_DIO_OUTPUT (FS_DIO_CODE + 0x2U)
#define FS_FAIL_DIO_INPUT (FS_DIO_CODE + 0x3U)
#define FS_FAIL_DIO_NOT_SET (FS_DIO_CODE + 0x4U)
#define FS_FAIL_DIO_NOT_CLEAR (FS_DIO_CODE + 0x5U)
#define FS_FAIL_DIO_MODE (FS_DIO_CODE + 0x6U)
#define FS_FAIL_DIO_WRONG_VALUE (FS_DIO_CODE + 0x7U)
```

For more information, see the corresponding chapter in the library user guide.

New devices were added to the library for LPC540x, LPC54S0x, MIMXRT116x, and K32L3Ax.

There is a new flash-test function `FS_FLASH_C_HW16_L`. This function has a different API than the software version of the function. See the corresponding chapter in the library user guide.

### 3.2 Documentation

The documentation for the library is a part of the SDK package and it is also available at [www.nxp.com/iec60730](http://www.nxp.com/iec60730).

The documentation of the IEC60730B library consists of:

- IEC60730B_Library_User_Guide_CM4_CM7_v4_2.pdf
- IEC60730B_Library_Release_Notes_CM4_CM7_v4_2.pdf

The example applications have dedicated release notes and user guides.

### 3.3 Functional example projects

All information about the IEC60730B library are available at [www.nxp.com/iec60730](http://www.nxp.com/iec60730).

The example projects are available only in the MCUXpresso SDK as middleware.

To open an example, use the link from the table at [http://www.nxp.com/iec60730](http://www.nxp.com/iec60730) or perform the following steps:

- Go to [http://mcuxpresso.nxp.com](http://mcuxpresso.nxp.com).
- Click Select Development Board.
- Select the supported board and add the Safety middleware.
- Build and download the SDK package.
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