1 Introduction

IEC60730B_CM33_4_2 is the actual version of the core self-test library for NXP devices with the CM33 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 CM33 library now also supports the LPC55S36 device.

2.1 Description

The supported devices are as follows:

- LPC55Sxx
- LPC55xx

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
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_LPC_IMXRT117X</td>
<td>FS_AIO_InputInit_A1</td>
</tr>
<tr>
<td>FS_AIO_InputSet_LPC55SXX</td>
<td>FS_AIO_InputSet_A1</td>
</tr>
<tr>
<td>FS_AIO_InputSet_LPC55SXX_SWTRIG</td>
<td>FS_AIO_InputSet_A1</td>
</tr>
<tr>
<td>FS_AIO_InputInit</td>
<td>FS_AIO_InputInit_A2346</td>
</tr>
<tr>
<td>FS_AIO_InputInit()</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_KE</td>
<td>FS_AIO_InputSet_A4</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_KE</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_InputInit_A5</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_LPC_ADC12</td>
<td>FS_AIO_InputCheck_A5</td>
</tr>
<tr>
<td>FS_AIO_InputSet_LPC_ADC12_SWTRIG</td>
<td>FS_AIO_InputSet_A6</td>
</tr>
<tr>
<td>FS_AIO_InputCheck_LPC_ADC12_SWTRIG</td>
<td>FS_AIO_InputCheck_A6</td>
</tr>
<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.

The CM33 library now supports LPC55S36. There is a new flash-test function `FS_FLASH_C_HW16_K`. 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.

The documentation of the IEC60730B library consists of:

- IEC60730B_Library_User_Guide_CM33_v4_2.pdf
- IEC60730B_Library_Release_Notes_CM33_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.

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 or perform the following steps:

- Click Select Development Board.
- Select the supported board and add the Safety middleware.
- Build and download the SDK package.
Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document. NXP reserves the right to make changes without further notice to any products herein.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. “Typical” parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including “typicals,” must be validated for each customer application by customer’s technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: nxp.com/SalesTermsandConditions.

While NXP has implemented advanced security features, all products may be subject to unidentified vulnerabilities. Customers are responsible for the design and operation of their applications and products to reduce the effect of these vulnerabilities on customer’s applications and products, and NXP accepts no liability for any vulnerability that is discovered. Customers should implement appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP, the NXP logo, NXP SECURE CONNECTIONS FOR A SMARTER WORLD, COOLFLUX, EMBRACE, GREENCHIP, HITAG, I2C BUS, ICODE, JCOP, LIFE VIBES, MIFARE, MIFARE CLASSIC, MIFARE DESFire, MIFARE PLUS, MIFARE FLEX, MANTIS, MIFARE ULTRALIGHT, MIFARE4MOBILE, MIGLO, NTAG, ROADLINK, SMARTLX, SMARTMX, STARPLUG, TOPFET, TRENCHMOS, UCODE, Freescale, the Freescale logo, Altivec, C-5, CodeTEST, CodeWarrior, ColdFire, ColdFire+, C-Ware, the Energy Efficient Solutions logo, Kinetis, Layerscape, MagniV, mobileGT, PEG, PowerQUICC, Processor Expert, QorIQ, QorIQ Converge, Ready Play, SafeAssure, the SafeAssure logo, StarCore, Symphony, VertiQa, Vybird, Airfast, BeeKit, BeeStack, CoreNet, Flexis, MXC, Platform in a Package, QUICC Engine, SMARTMOS, Tower, TurboLink, UMEMS, EdgeScale, EdgeLock, eIQ, and Immersive3D are trademarks of NXP B.V. All other product or service names are the property of their respective owners. AMBA, Arm, Arm7, Arm7TDMI, Arm9, Arm11, Artisan, big.LITTLE, Cordio, CoreLink, CoreSight, Cortex, DesignStart, DynamIQ, Jazelle, Keil, Mali, Mbed, Mbed Enabled, NEON, POP, RealView, SecurCore, Socrates, Thumb, TrustZone, ULINK, ULINK2, ULINK-ME, ULINK-PLUS, ULINKpro, µVision, Versatile are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. Oracle and Java are registered trademarks of Oracle and/or its affiliates. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org.

© NXP B.V. 2021. All rights reserved.

For more information, please visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 30. September 2021
Document identifier: IEC60730BCM33L42RN