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1 Introduction

These release notes are for the motor-control middleware group of applications released together with the MCUXpresso SDK v2.10.0. This document provides a list of application examples, their notable features, supported hardware platforms, changes since the last MCUXpresso release, known issues, and links to further documentation.

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2 Description

This motor-control middleware release contains application examples for the following three-phase electrical machine topologies:

- **AC Induction Motor (ACIM)**

The Field-Oriented Control (FOC) sensorless (machine model-based estimator algorithms are used to replace the position and speed sensor) application examples **mc_acim** were developed for the high-voltage development platform and Kinetis MCUs with a floating-point unit (see [Supported platforms](#) for exact platform support details). All examples integrate the Motor Identification (MID) software module and feature the Motor Control Application Tool (MCAT) to enable quick development.

See the user's guide in the *docs\MC* folder in your *SDK Documentation* package (see [Examples](#)) or the www.nxp.com/motorcontrol_acim web page for more details.

- **Permanent Magnet Synchronous Motor (PMSM)**

These FOC applications support both high- and low-voltage hardware platforms and various MCU types (see [Supported platforms](#) for exact platform support details). The following application types are available in the *mc_pmsm* folder of your SDK archive (see [Examples](#)):

- **pmsm_snsless** - Sensorless FOC examples utilizing both fractional and floating-point arithmetics. The Motor Identification (MID) software module in combination with the Motor Control Application Tool (MCAT) allow for rapid application development.
- **pmsm_snsless_reg_init** - Sensorless FOC examples with same features as **pmsm_snsless**. MCU peripherals are completely initialized using MCUXpresso Config Tools.
- **pmsm_enc** - This PMSM FOC application is identical to the **pmsm_snsless** example, except for the added option of acquiring the rotor position and speed from the encoder sensor.

See the user's guide in the *docs\MC* folder in your SDK Documentation package (see [Examples](#)) or the www.nxp.com/motorcontrol_pmsm web page.

All examples support the FreeMASTER interface for quick and simple application debugging, tuning, control, and monitoring. See www.nxp.com/freemaster and the application user's guide for more information.

3 Examples

The example projects are distributed only in the form of the MCUXpresso SDK Archive and the release documentation is available in the SDK Documentation package. To acquire both packages (specific to your development platform), use the online MCUXpresso SDK Builder tool and perform the following steps:



- Go to www.mcuxpresso.nxp.com.
- Click the **Select Development Board** button.
- Sign in or create the NXP account (if requested).
- Choose one of the supported platforms (see [Supported platforms](#) for the list of boards supported by this release).
- Click the **Build MCUXpresso SDK** button.
- Make sure that the **Motor Control** middleware is selected and click the **Download SDK** button.
- When the SDK Documentation and SDK Archive package build is done (you receive a notification email), it can be downloaded freely.

4 Supported platforms

The motor-control application examples were developed and tested with the following development tools:

- IAR Embedded Workbench IDE version 9.10.2
- Arm[®]-MDK - Keil[®] µVision[®] version 5.34
- MCUXpresso IDE version 11.4.0

FreeMASTER tool version 3.1 was used for application monitoring. See www.nxp.com/freemaster for the latest version.

The hardware platforms supported by this release are listed in the following table.

Table 1. Supported platforms

Board	mc_acim	pmsm_snsless	pmsm_enc
EVKB-MIMXRT1060			✓fp, mid
EVK-MIMXRT1024			✓fp, mid
EVK-MIMXRT1060			✓fp, mid
EVK-MIMXRT1064			✓fp, mid
EVK-MIMXRT1160			✓fp, mid
EVK-MIMXRT1170			✓fp, mid
FRDM-KV11Z		✓fix, mid, reg_init	
FRDM-KV31F		✓fp, mid, reg_init	
HVP-KV11Z75M		✓fix, mid	
HVP-KV31F120M	✓fp, mid	✓fp, mid	
LPCXpresso55S69		✓fp, mid	

^{fix} Fixed-point arithmetics.

^{fp} Floating-point arithmetics.

^{mid} Motor Identification (MID) software module is available.

^{reg_init} MCU peripherals initialized using MCUXpresso Config Tools.

5 What is new

This section describes all notable changes since the last motor-control middleware MCUXpresso SDK release v2.9.0.

1. New boards support

The **pmsm_enc** example was added for the EVK-MIMXRT1060 and EVKB-MIMXRT1060 boards.

The **pmsm_enc** example for the EVK-MIMXRT1160 board updated and moved to SDK release v2.10.0.

2. **pmsm_snsless_reg_init** examples

Added pmsm_snsless examples which use MCUXpresso Config Tools Register Initialization components for MC peripheral initialization. Available for FRDM-KV11Z and FRDM-KV31F examples

3. **MC_PMSM Config Tools Component**

pmsm_snsless examples use MCUXpresso Config Tools' MC_PMSM component for MC low level driver configuration. Available for HVP-KV11Z75M, HVP-KV31F120M, FRDM-KV11Z, and FRDM-KV31F examples

4. **Updated documentation**

The documentation for the **mc_acim**, **pmsm_enc**, **pmsm_snsless**, and **pmsm_snsless_reg_init** examples was updated. Added MC_PMSM component description, pmsm_snsless examples' description and Industrial MCAT description. The documents are available as a part of the SDK Documentation package (see [Examples](#)).

6 Known issues

This chapter contains the description of known issues or non-standard behavior of the released example.

7 Feedback

Your feedback is very important to us. Please feel free to leave a comment [here](#).

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The logo for Arm, consisting of the word "arm" in a lowercase, blue, sans-serif font.