# MC2120RN

## Motor Control Release Notes v2.12.0

Rev. 0 — 13 July 2022 Release Notes

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Contents



## 1 Introduction

These release notes are for the motor-control middleware group of applications released together with the MCUXpresso SDK v2.12.0. 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. The latest documentation for the motor control SDK is available on http://www.nxp.com/motorcontrol_pmsm.

## 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_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 9.30.1
- Arm®-MDK - Keil® µVision® version 5.37
- MCUxpresso IDE version 11.6.0

FreeMASTER tool version 3.1.4 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 |
|---|---|---|---|
| EVK-MIMXRT1170 | | | ✓fp, mid |
| EVK-MIMXRT1160 | | | ✓fp, mid |
| EVK-MIMXRT1064 | | | ✓fp, mid |
| EVK-MIMXRT1060 | | | ✓fp, mid |
| EVKB-MIMXRT1050 | | | ✓fp, mid |
| EVK-MIMXRT1024 | | | ✓fp, mid |
| EVK-MIMXRT1020 | | | ✓fp, mid |
| EVK-MIMXRT1010 | | ✓fp, mid | |
| HVP-KV31F120M | ✓fp, mid | ✓fp, mid | |
| LPC55S69-EVK | | ✓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 v2.11.0.

1. **New Motor Identification (MID)**

   Floating-point version of the **mc_pmsm** and **mc_pmsm_enc** examples features enhanced electrical parameters estimation algorithm which doesn't require characterized power stage and achieves higher estimation accuracy at motors with lower

electrical parameters. New MID was implemented to the devices, which were not supported in the MCUXpresso SDK release v2.11.0.

2. **File management system add to the MCAT tool**

   Using file management system can be easily tuned and controlled motors with different parameters without any code recompilation. User has to choose required configuration file for the specific motor and load data to the target MCU using MCAT tool.

3. **Updated documentation**

   Added chapter with step by step instructions how to replace TSA table with ELF file.

   Equations for the calculation MCAT parameters and macros added to the documentation.

# 6 Known issues

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

1. **User inputs are not generated in MCAT**

   After save mX_pmsm_appconfig.h file, macros defined by user are not generated or copied to the user section in the mX_pmsm_appconfig.h (marked by */* USER INPUT START *\/* and */* USER INPUT END *\/* comments).

# 7 Feedback

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