

From novice to expert with iMOTION™ 2.0

A structured approach to learning & launching with iMOTION™

Scope and purpose

This document provides a structured, sequential approach to learning iMOTION™. It will serve as a syllabus listing resources available at each stage of working with iMOTION™ products. The document begins with highlights of iMOTION™ products and their features. Resources around evaluating the products and prototyping your system with iMOTION™ follow. The next stage describes the iMOTION™ tools and the final one lists resources describing advanced usage of iMOTION™.

Intended audience

This guide serves every type of engineer who wants to spin a motor with iMOTION™: The power electronics engineer familiar with designing an efficient inverter board but unfamiliar with programming a motor controller; the motor design engineer familiar with optimizing for higher reluctance torque seeking a platform to run her motor; the embedded systems engineer migrating motor functions from an MCU to iMOTION™.

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Introducing iMOTION™ 2.0

iMOTION™ is a family of integrated solutions to control variable speed motors efficiently and flexibly. iMOTION™ 2.0, the latest generation of iMOTION™, integrates production-grade control software for motor and optionally power-factor correction (PFC) along with all the required hardware functions into one of three types of devices: A standalone control chip, a smart gate driver or a smart Intelligent Power Module (IPM). Follow the links below to learn about the various products and features of iMOTION™.

- The iMOTION™ home page: www.infineon.com/imotion
Many of the resources discussed in this guide are linked to in the home page.
- [iMOTION™ Digital Controllers](#) [slides] (requires a myInfineon login)
A high level overview of iMOTION™. Learn about the value proposition of iMOTION™, the various series of products that make the iMOTION™ family: IMC series of motor controllers, IMM series of smart Intelligent Power Modules and the upcoming IMD series of smart gate drivers. Get high level functional block diagrams for each of these series. Catch a glimpse of what's ahead in our roadmap.
- [iMOTION™ – Ready-to-use motor control combined with application flexibility](#) [article]
A two-page article providing an overview of the second generation of iMOTION™
- [Codeless Approach to Variable Speed Control](#) [video]
The video explains the turnkey approach of iMOTION™ that allows anyone to run a motor using advanced algorithms built into the family without writing a single line of code.
- [Datasheets](#)
Datasheets provide detailed specifications for each product. All released datasheets can be downloaded from the Products table on the home page.



Have questions about the fundamentals of iMOTION™?
Ask your question in the iMOTION™ forum: www.infineonforums.com

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Evaluating iMOTION™ with Modular Application Development Kits (MADK)

How do you begin to use iMOTION™? The easiest approach is to order a MADK kit which pairs an iMOTION™ product board with an inverter (and PFC) board to drive motors from 20 W to 1.5 kW. The MADK is ready to use out of the box, and serves as a useful platform for prototyping your application or early stage evaluation of a new motor.

Here are resources to get you going:

- The MADK home page: www.infineon.com/madk

An overview of the MADK offerings including an ability to choose the right set of boards for your application.

- [iMOTION™ MADK evaluation platform](#) [document]

A 2 pager that provides a nice overview of MADK. Note that several MADK boards have been released since the publication of this product brief. Refer to the MADK home page for the most up to date list of MADKs.

- [Perfect Motor Startup with iMOTION™ 2.0](#) [video]

The first 3 minutes give a nice overview of what to expect with a typical MADK board. If just getting started, stop at the 3 minute mark and continue through this document. The remainder of the video discusses the iMOTION™ tools & software, details for which are better introduced in the [next section](#).

- [How to run a motor with the iMotion™ IMM100 Starter Kit](#) [video]

The first 3 minutes give a nice overview of what to expect with the MADK Starter Kit for IMM100 series. This board features the fully integrated iMOTION™ Smart IPM (inverter + motor controller in one) thus presented as one board. Other MADK kits come in pairs – an iMOTION™ motor control board coupled with an inverter board (featuring CIPOS™ IPMs or other power inverter solutions).

- [CIPOS™ IPM Simulation Tool](#)

Looking to verify that the inverter board you selected will work for your application? You can use the CIPOS™ IPM simulation tool to evaluate the performance of the inverter IPM in your application. You will need to know key parameters like the motor RMS current and PWM frequency to properly use the tool. Skip this step if you do not have this information



Have questions about MADK?

Ask your question in the iMOTION™ MADK forum: www.infineonforums.com

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Spinning with iMOTION™ Tools & Software

Now that you have received the MADK evaluation kit, it's time to take your motor for a spin. You will need the iMOTION™ development tools MCEDesigner & MCEWizard, and the iMOTION™ product-specific software packages at this stage. Here are the resources that will help:

- [Getting started with iMOTION™ 2.0](#) [video in English, [Chinese](#) and [slides](#)]
The video and slides offer step by step instructions on getting a motor spinning with the latest editions of *MCEDesigner v2.3* and *MCEWizard v2.3*. The video and slides can be referred to independently, and begin with guiding you through downloading the latest tools, firmware and configuration files (see next bullet below). The material then goes into setting up the tools to run your motor and finally provides basic tuning guidelines for optimizing motor operation.
- [Tools & Software download page](#) (www.infineon.com/imotion-software)
Download the latest iMOTION™ tools (*MCEWizard v2.3*, *MCEDesigner v2.3*) and the appropriate software package (for example, *IMC101T-T038 MCE Software Package v1.3.1* for the EVAL-M1-101T board or the IMC101T-T038 part). Tools are located under the *Tool Brief* section while the latest software packages are located under *Firmware*. If using MADK for prototyping or evaluation, download the *MCEWizard Configuration Files* located under *Development Tools*. Looking for older firmware? Visit the product page for the iMOTION™ part you are using.
- MCE Wizard V2.3.0.0 User Guide [pdf]
This PDF is available, after installing MCEWizard on your PC, in the installation directory or via the iMOTION™ 2.0 Start menu. The document will guide you through the user interface of MCEWizard.
- MCEDesigner V2.3.0.0 Application Guide [pdf]
This PDF is available, after installing MCEWizard on your PC, in the installation directory or via the Start menu. The document will guide you through the user interface of MCEWizard.
- [How to measure motor parameters](#) [video and [slides](#)]
The video and associated slides explain how to measure the critical motor parameters required by iMOTION™ to run your motor.
- [Software Reference Manual](#) [document]
The Software Reference Manual (obtained under the *Documents* → *User Manual* section of the iMOTION™ home page) is an important reference document that gives you details around iMOTION™ including application specific registers, notes on design and testing your control scheme, optimization of application specific hardware, optimizing the motor start-up parameters, verifying motor drive performance and troubleshooting steps. The latest edition, v1.3, covers the latest firmware release.



Have questions about MCEDesigner or MCEWizard?
Ask your question in the iMOTION™ forum: www.infineonforums.com

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Advanced use of iMOTION™

You have your motor spinning, congratulations. Here are resources to take iMOTION™ to the next level whether it is creating housekeeping routines, modifying the control loop or certifying your system to UL 60730-1 standards.

- [Script for MCE 2.0 User Guide \[pdf\]](#)
iMOTION™ Script is a C-like language that can be used to implement housekeeping functions and/or customize the motor control scheme. This PDF, available after installing MCEWizard on your PC in the installation directory or via the iMOTION™ 2.0 Start menu, will guide you through setting up MCEWizard to write a Script routine.
- [How to Use iMOTION™ Script Language \[in English or Chinese\]](#)
A guideline for using the iMOTION™ Script language with examples to realize customization of system start-up behavior, specific speed profile definition, as well as system specific fault handling definition
- [Sample Script code \[.mcs files\]](#)
Sample Script files are installed in *Documents* → *iMOTION 2.0* → *MCEWizard_V2.x.x* directory after installation of MCEWizard.
- [Induction motor control by iMOTION™ \[AN2019-18\]](#)
- [iMOTION™ 2.0 Device Programming Manual \[AN2018-33\]](#)
This document describes the programming and updating the firmware of iMOTION™ devices. This includes the programming of the Motion Control Engine (MCE rev. 2.0) itself as well as the handling of parameter sets and scripts.
- [Interfacing with iMOTION™ products \[AN2020-07\]](#)
This document describes the programming, commanding and configuring of iMOTION™ devices. This includes the programming of the Motion Control Engine (MCE rev. 2.0) itself as well as the handling of parameter sets and scripts.
- [Class B certification of inverterized motor control systems – Benefits of iMOTION™ 2.0 in meeting IEC/UL 60730-1 safety requirements \[white paper\]](#)
A white paper describing the need for safety control functions in motor control systems and how iMOTION™ 2.0 reduces development time and cost by already providing component and system-level Class B safety functions.

Revision history

Document version	Date of release	Description of changes
1.1	June 30, 2020	Added new learning resources including two videos, an article and a white paper

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Edition 2020-06-30

Published by

Infineon Technologies AG

81726 Munich, Germany

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Document reference

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