

# EVAL\_DRIVE\_3PH\_PFD7

## Getting started guide

September 2019



# Agenda

1

Motor drive evaluation board

2

Hardware and software

3

Tools

4

Getting started

5

Resources

# Agenda

1 Motor drive evaluation board

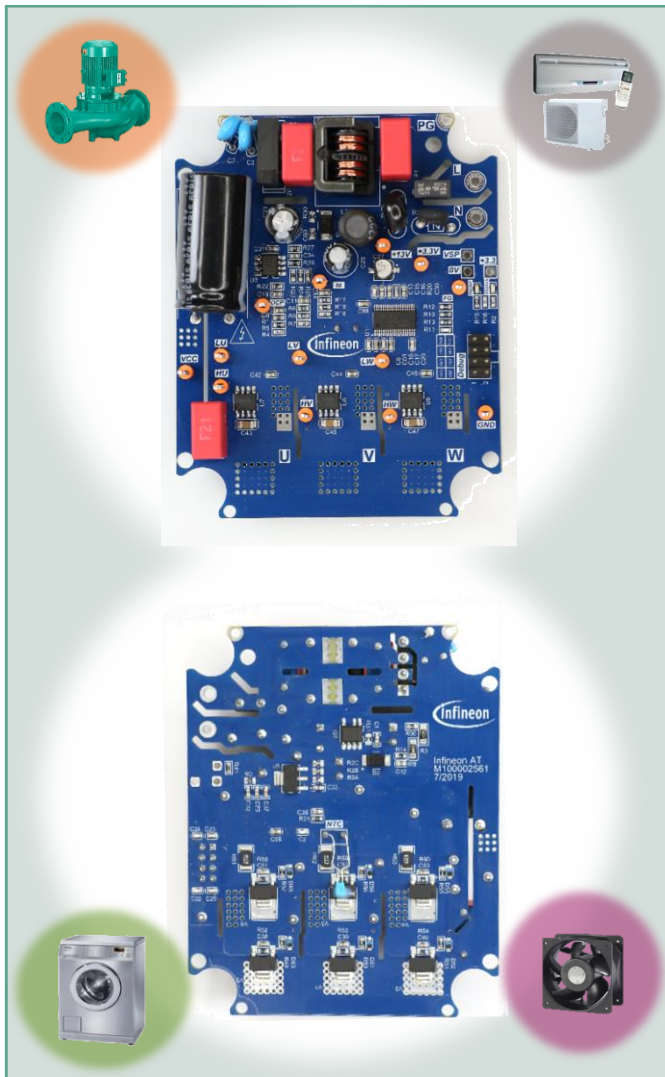
2 Hardware and software

3 Tools

4 Getting started

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# Introduction



**Compact 3-phase motor drive** system solution

Designed for **sensorless** motor control

**Spin your motor** with easy-to-use GUI for tuning of motor

The hardware board and motor control software provides:

→ Sensorless control and direct & smooth startup using inductive sensing

→ 3 PH/ 2 PH modulation FOC

→ Over-current protection

→ Speed controlled using GUI

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# System overview

## Components

### › **IMC101T-T038 Microcontroller**

- iMOTION™ flexible control solution for variable speed drives. It performs sensor less field oriented control (FOC)
- Includes J-Link debug interface by Segger
- MCEDesigner v2.2-based GUI for parametrization and tuning

**Software package** (downloadable from [www.infineon.com/iMOTION™](http://www.infineon.com/iMOTION™))

- MCEDesigner
- MCEWizard
- IMC101T-T038 MCE software package installer

### › **Half bridge gate driver EiceDRIVER™ 2ED28073J06F**

### › **CoolMOS™ IPN60R1K5PFD7S**

# System overview

For example the EVAL\_DRIVE\_3PH\_PFD7 Kit consists of:

## Hardware

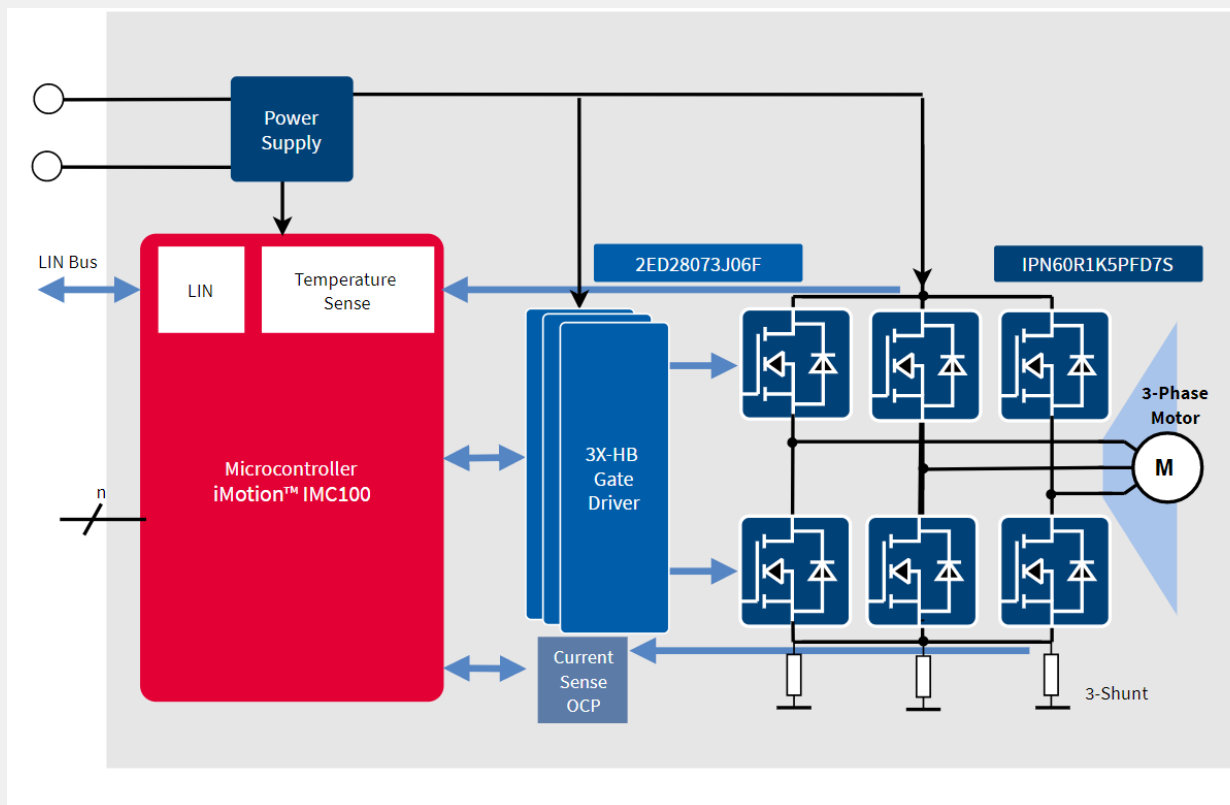
- › EVAL\_DRIVE\_3PH\_PFD7 board
- › KIT\_XMC\_LINK\_SEGGER\_V1
- › Micro-B USB cable

## Software

- › MCEDesigner
- › MCEWizard
- › IMC101T-T038 MCE software package installer  
(downloadable from [www.infineon.com/iMOTION™](http://www.infineon.com/iMOTION™) )

# System overview

## Block diagram description:





# Hardware overview

## Hardware

### › **Kit name**

- EVAL\_DRIVE\_3PH\_PFD7

### › **Kit description**

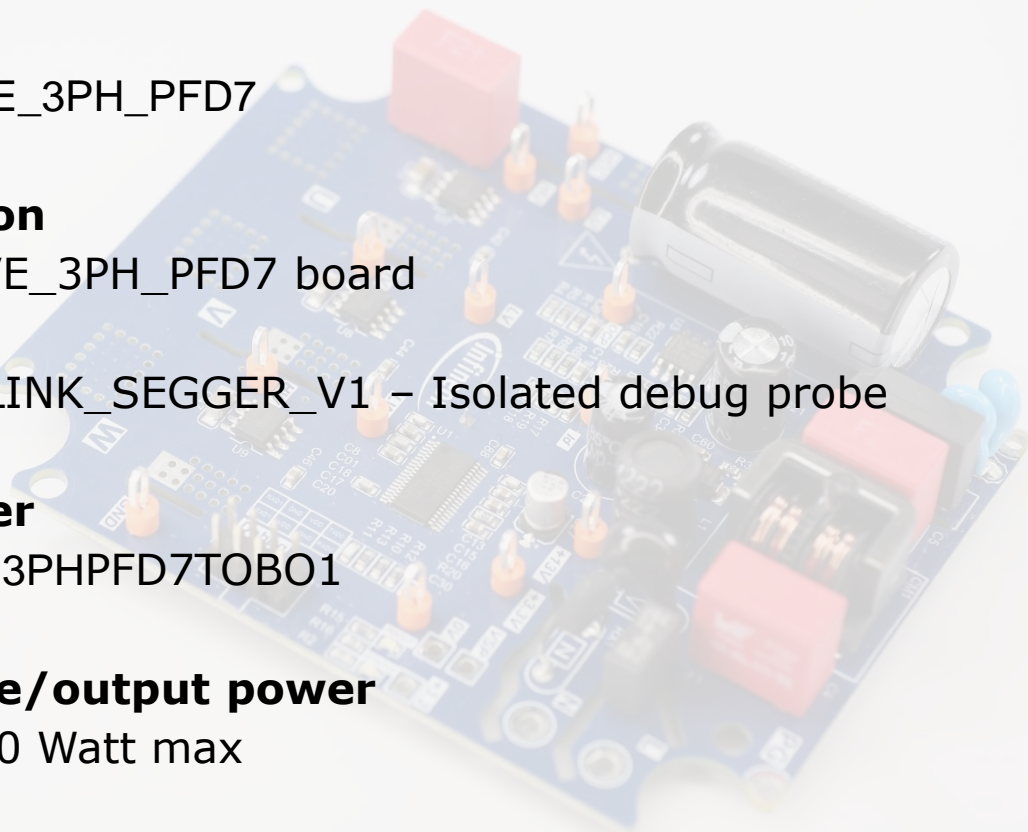
- EVAL\_DRIVE\_3PH\_PFD7 board
- USB cable
- KIT\_XMC\_LINK\_SEGGER\_V1 – Isolated debug probe

### › **Order number**

- EVALDRIVE3PHPFD7TOBO1

### › **Input voltage/output power**

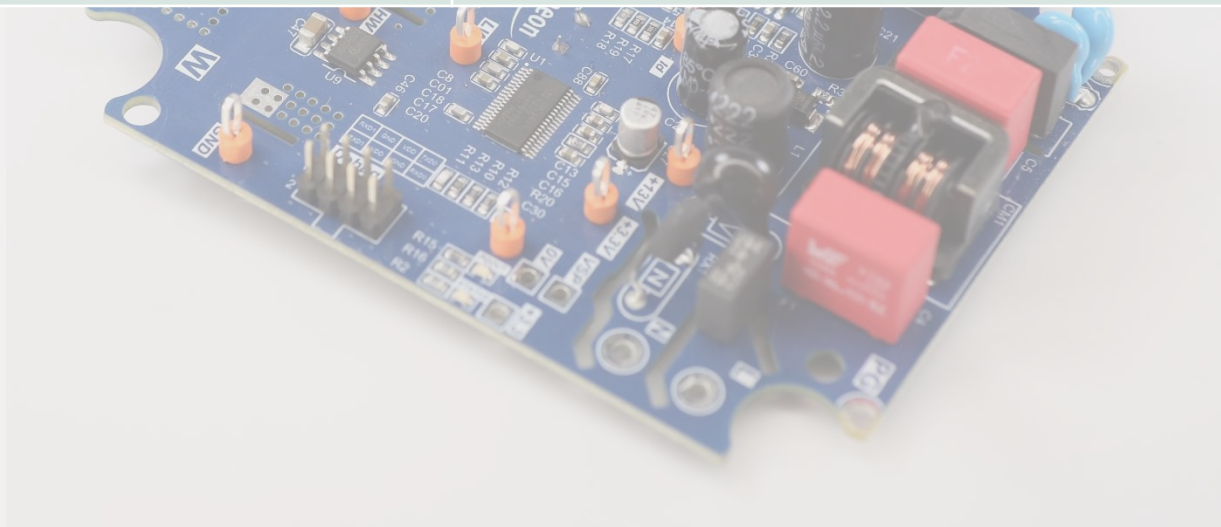
- 230 V<sub>AC</sub>/100 Watt max



# Hardware overview

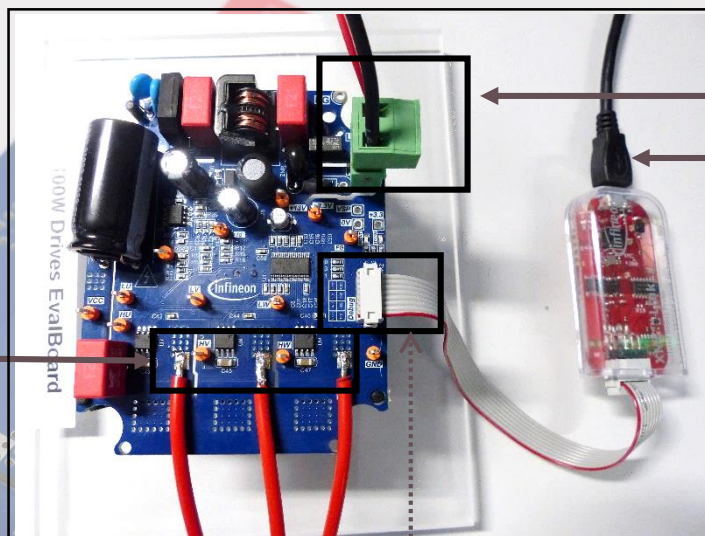
Infineon parts utilized on EVAL\_DRIVE\_3PH\_PFD7 board:

Infineon Parts	Order Number
IMC100 Microcontroller	IMC101T-T038
600 V half bridge gate driver	2ED28073J06F
600 V CoolMOS™	IPN60R1K5PFDS
3.3 V LDO regulator	IFX1117ME V33



# Hardware overview

To properly setup the board, follow these steps:



AC power input 230 V<sub>AC</sub>

4

Connect AC source to EVAL\_DRIVE\_3PH\_PFD7 board

3

Connect to PC via micro-B USB cable

1

Connect 3-phase motor wiring to 'U V W' connector

2

Connect XMCT<sup>™</sup> link's ribbon cable to pin 1 of debug connector

*XMCT<sup>™</sup> link for debugging the source code in MCEDesigner*

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# Software setup

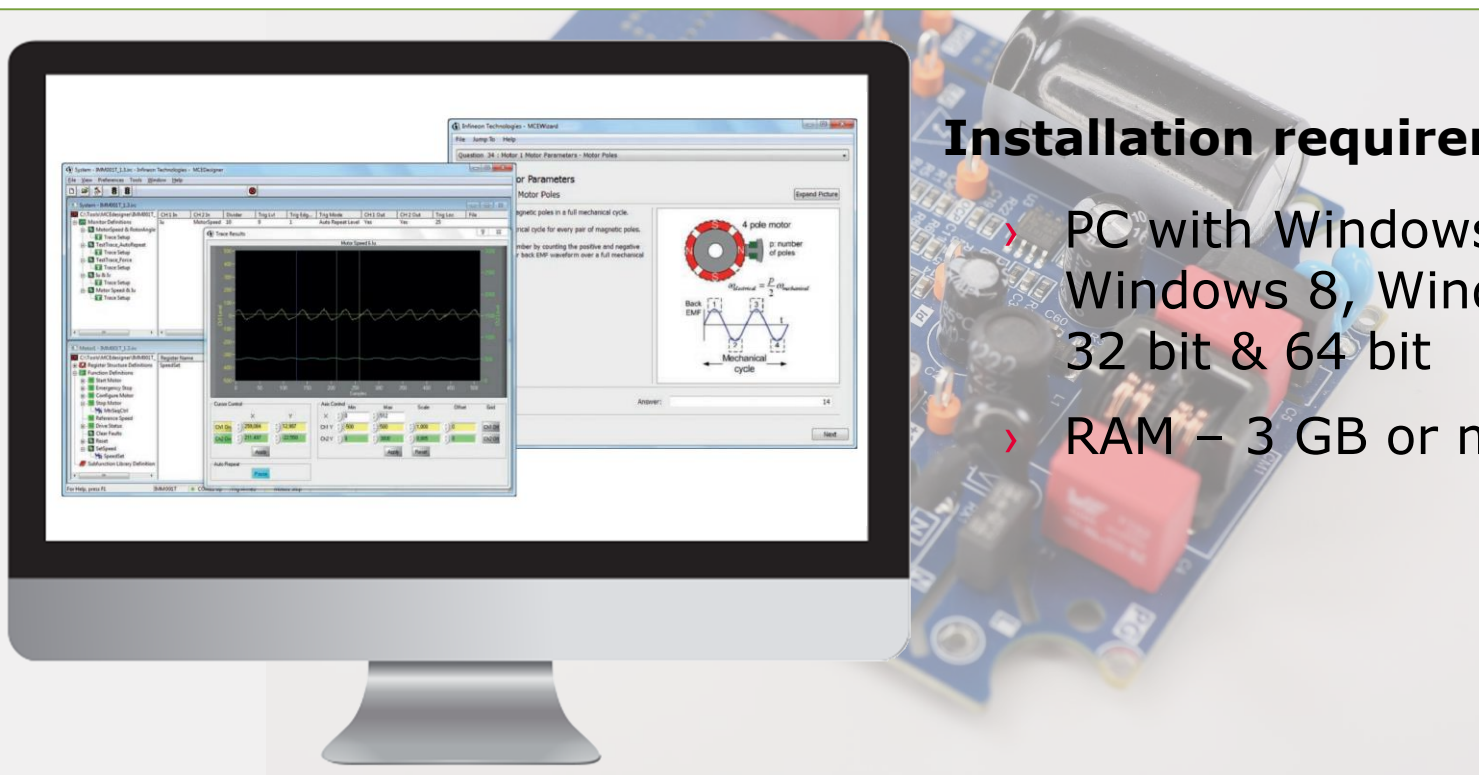


# iMOTION™ MCE\_Wizard and MCE\_Designer

**Run the MCE\_Wizard and MCE\_Designer.exe files and follow the instructions.**

**Download Micrium µC/Probe™ for XMC™ installer package from:**

[www.infineon.com/ucprobeXMC™](http://www.infineon.com/ucprobeXMC™)



## Installation requirements:

- › PC with Windows 7, Windows 8, Windows 10 – 32 bit & 64 bit
- › RAM – 3 GB or more

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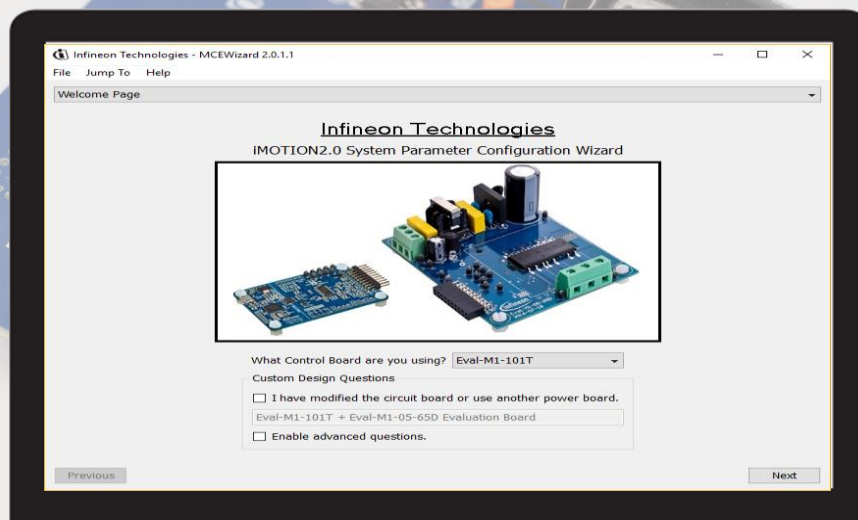
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# MCE Wizard step by step

- 1 After installing the MCEWizard, the shortcut for MCEWizard appears on the Windows desktop.
- 2 Double click the shortcut to open the MCEWizard and configure the parameters for evaluation boards or motor.



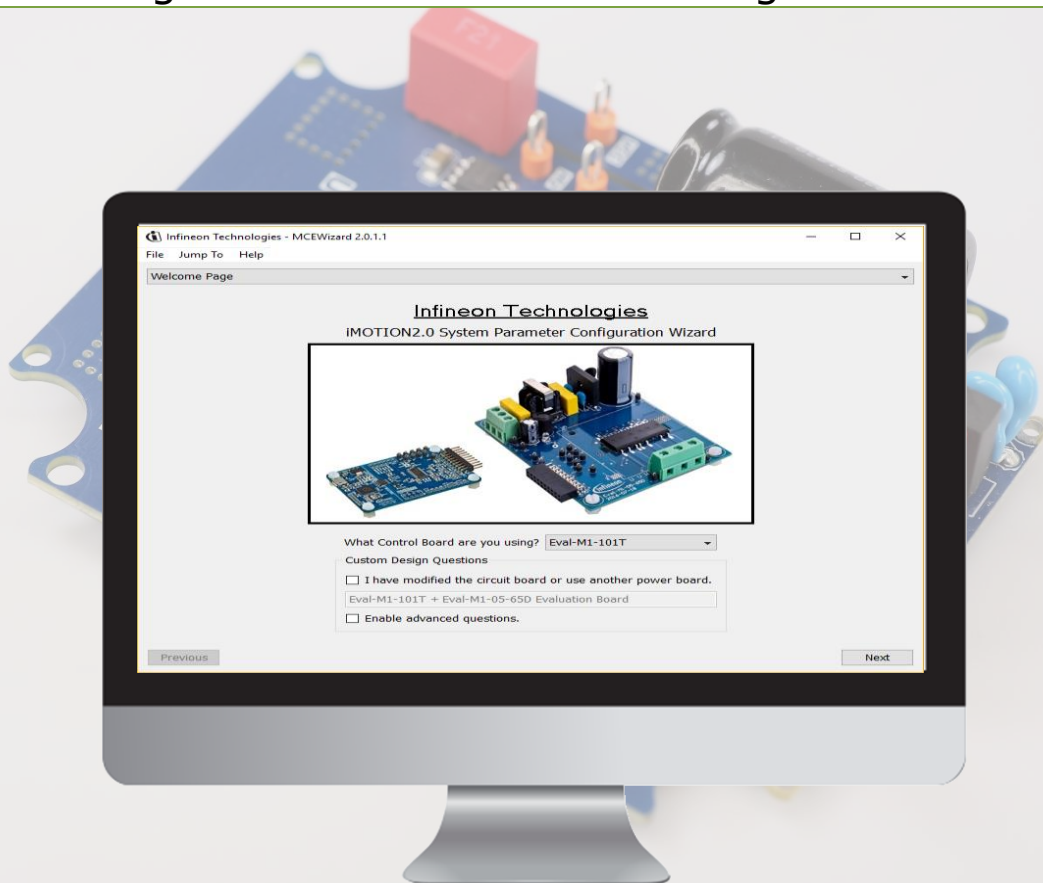
*If both "I have modified the circuit board" and "Enable advanced question" checkmarks are selected. Please refer to the User Manual of the corresponding power board for additional information.*



# MCE Wizard step by step

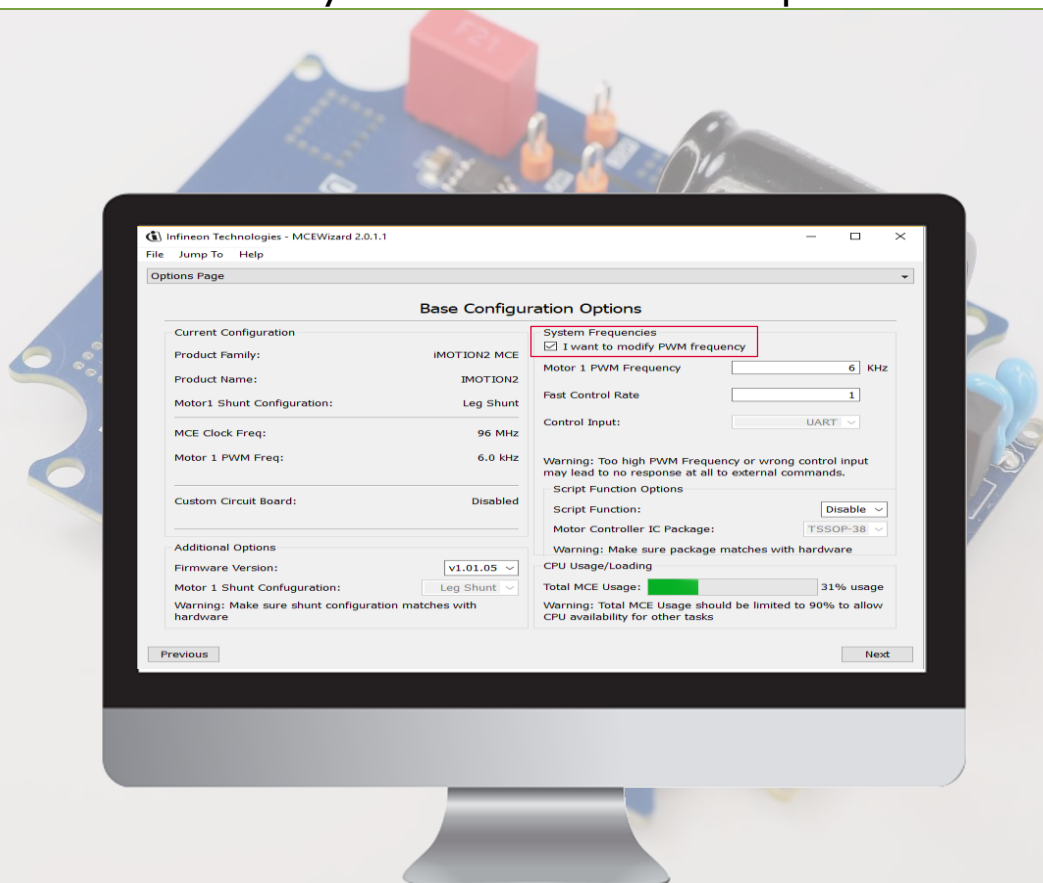
1

Select the control board, Eval-M1-101T start the MCEWizard system setup procedure by clicking the "Next" button in the right bottom corner.



# MCE Wizard step by step

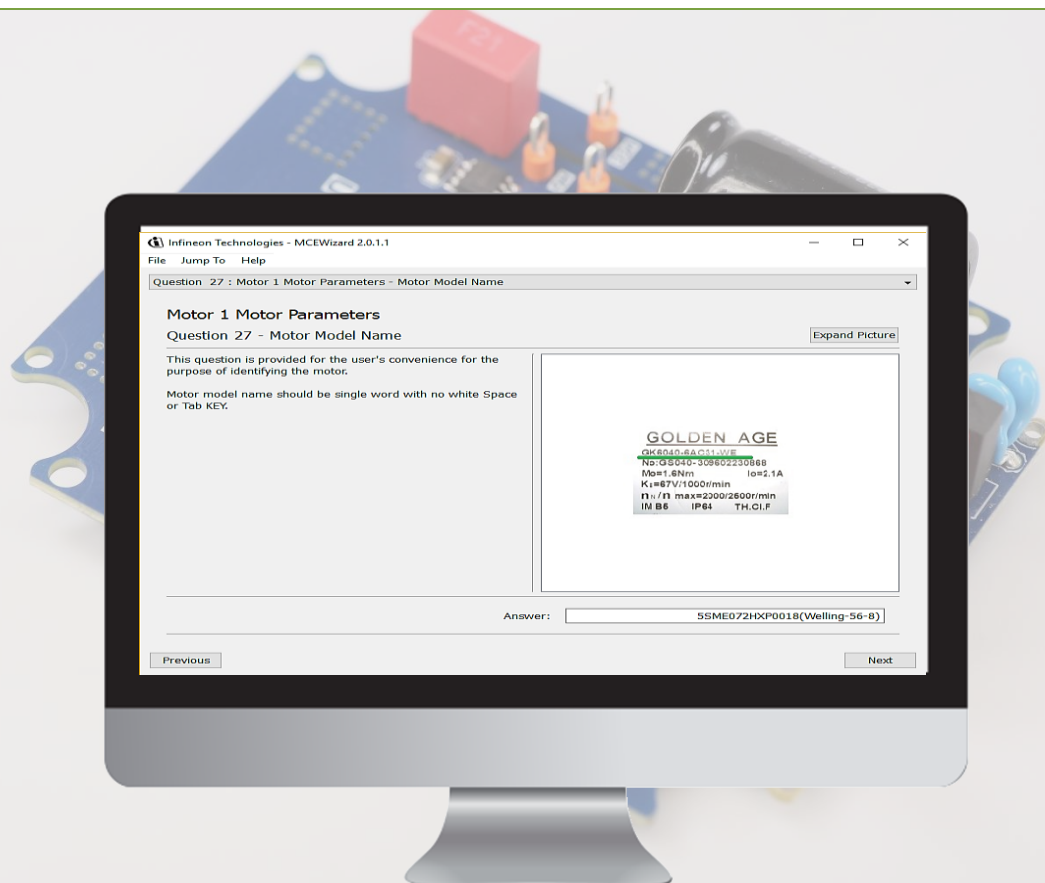
- 1 Make sure that "I want to modify the PWM frequency" checkmark is selected to be able to modify the motor PWM freq.



# MCE Wizard step by step

1

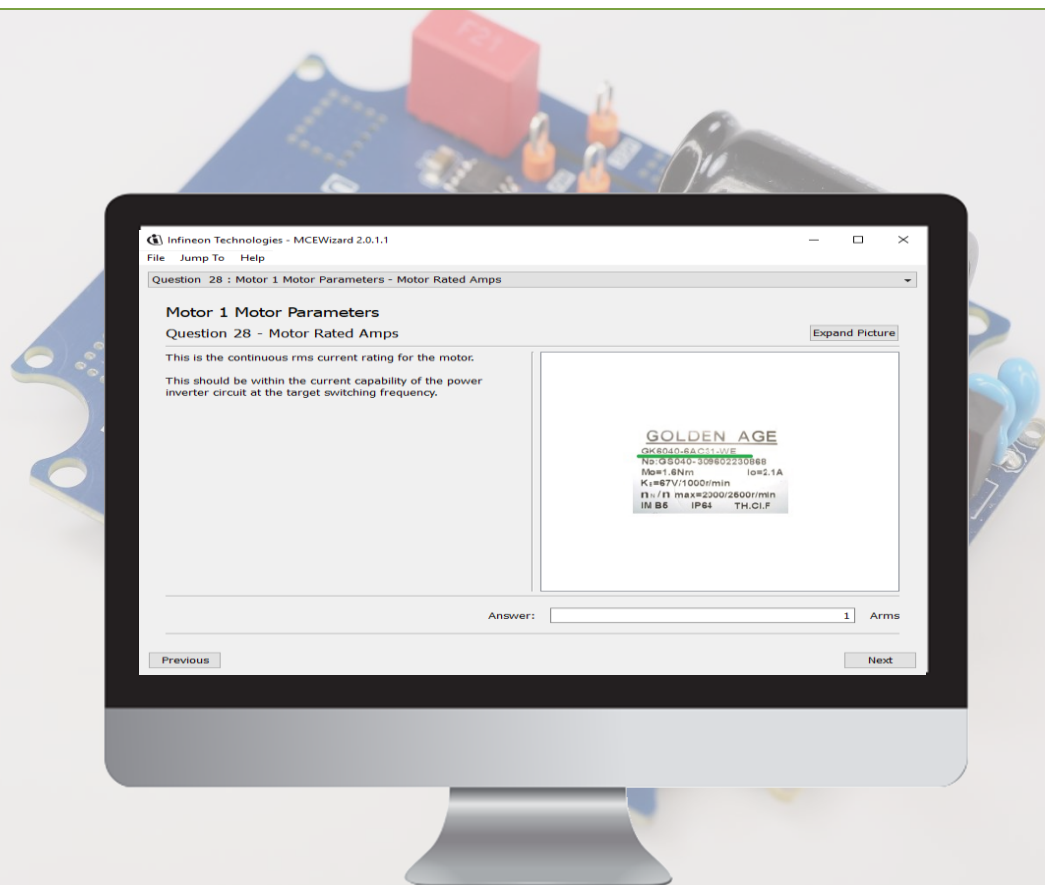
Please insert the motor model name.



# MCE Wizard step by step

1

Please insert the motor rated continuous current.



# MCE Wizard step by step

1

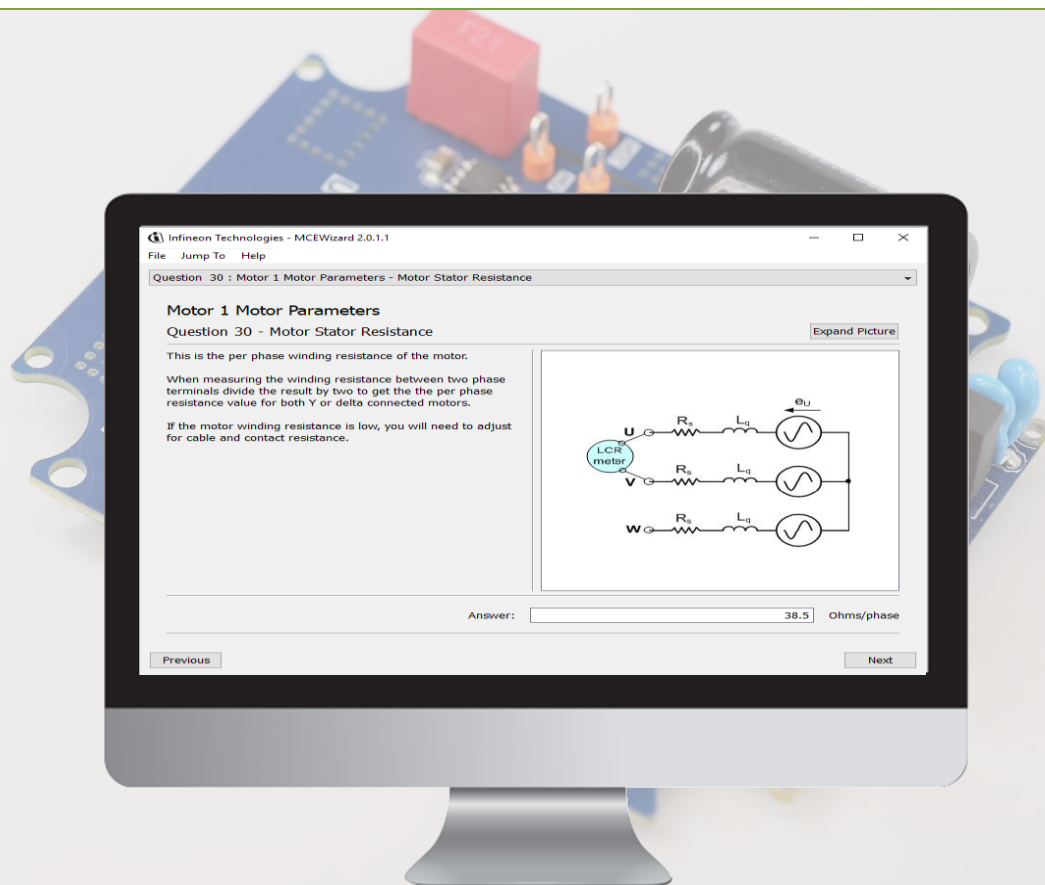
Please insert the motor number of magnetic poles.



# MCE Wizard step by step

1

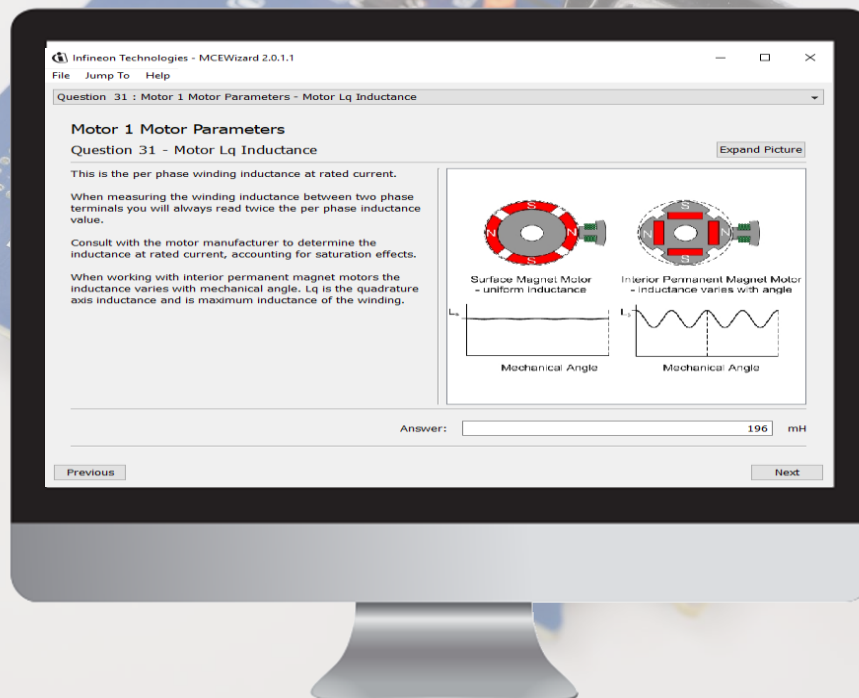
Please insert the motor phase winding resistance.



# MCE Wizard step by step

1

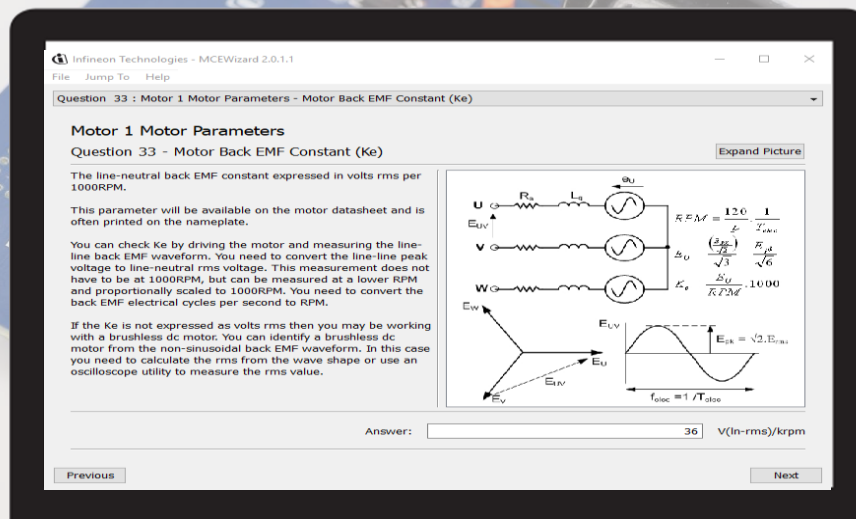
Please insert the motor phase winding inductance.



# MCE Wizard step by step

1

Please insert the motor back EMF constant (Ke).



*for additional information on how to measure the back emf please follow the "How to measure motor parameters" document .*



# MCE Wizard step by step

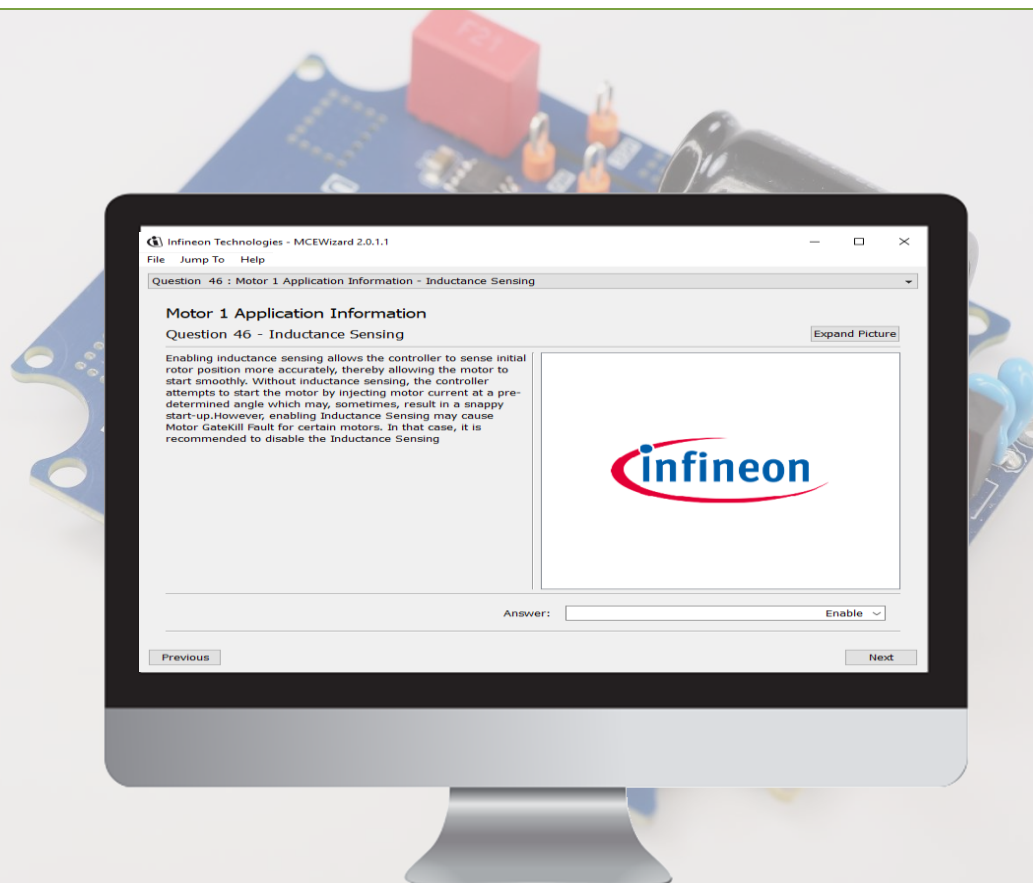
1

Please insert the motor maximum speed RPM.



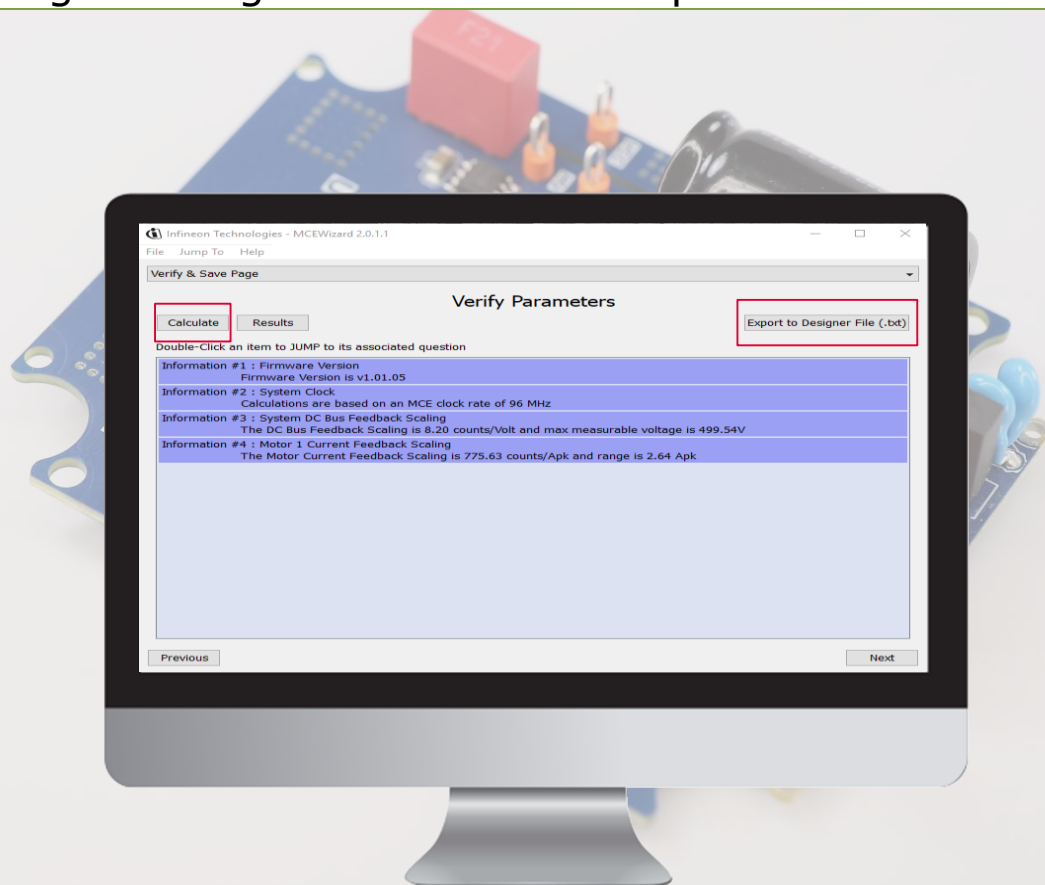
# MCE Wizard step by step

- 1 Please enable the inductive sensing for smooth motor startup.



# Generate the motor parameters file

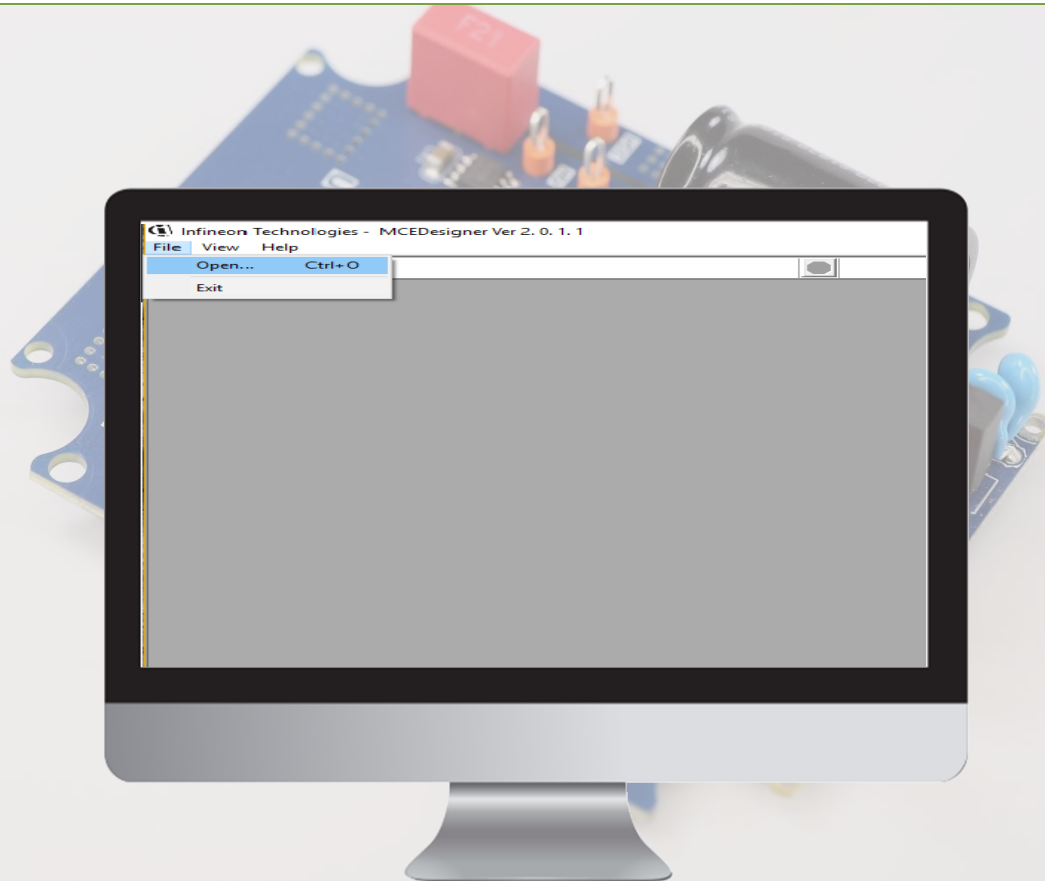
- 1 In the verify parameters window press "Calculate" and then press on "Export to Designer" to generate the motor parameter file.



# Load the m/c files

1

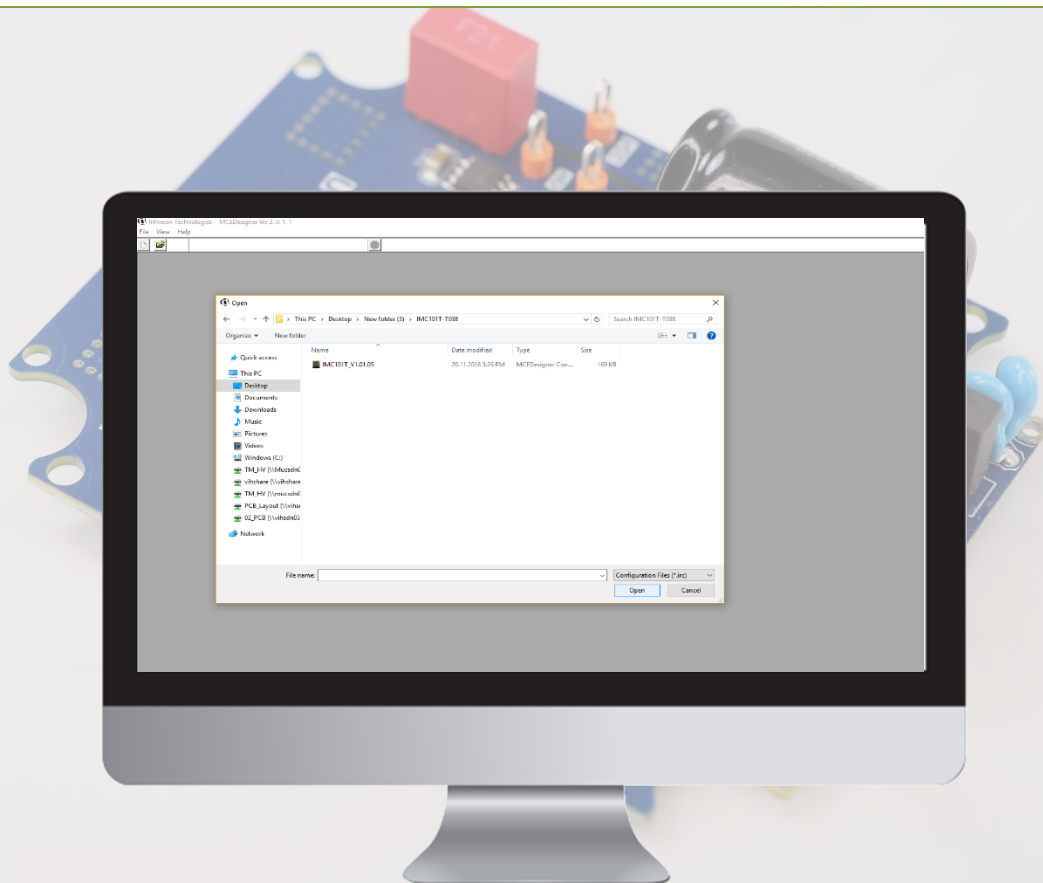
Open the "MCE Designer" go to File -> Open



# Load the m/c files

1

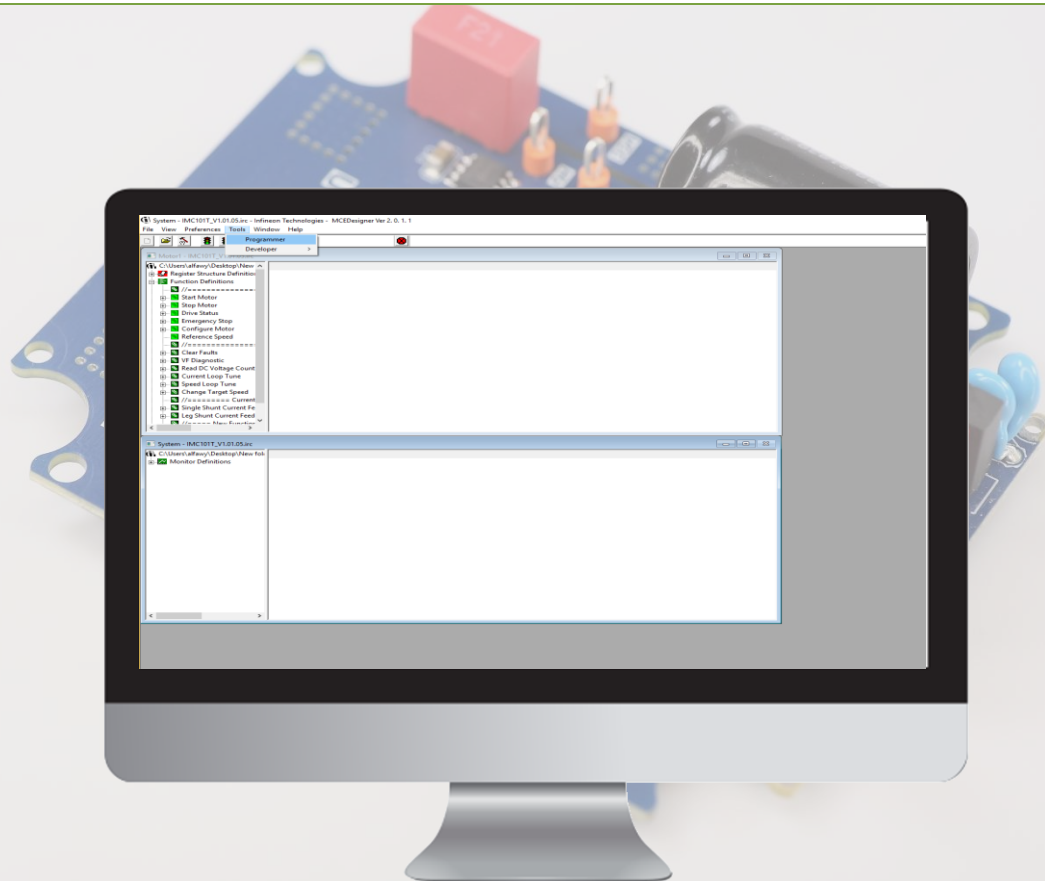
Go to Desktop-> IMC101T-T038 -> IMC101T\_V1.01.05 and open



# Load the m/c files

1

Go to Tools -> Programmer

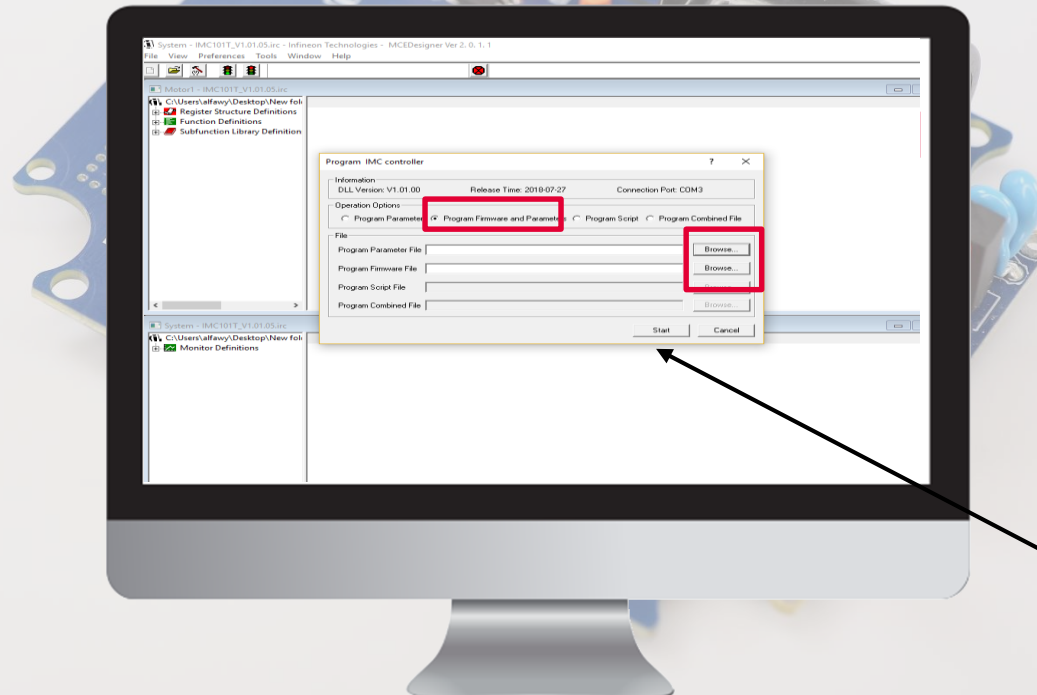


# Load the parameters

1

Chose "Program firmware and parameters" PFD7 test.txt and PFD7test

Chose for Parameter "PFD7 test.txt" and for firmware "PFD7 test.idf"

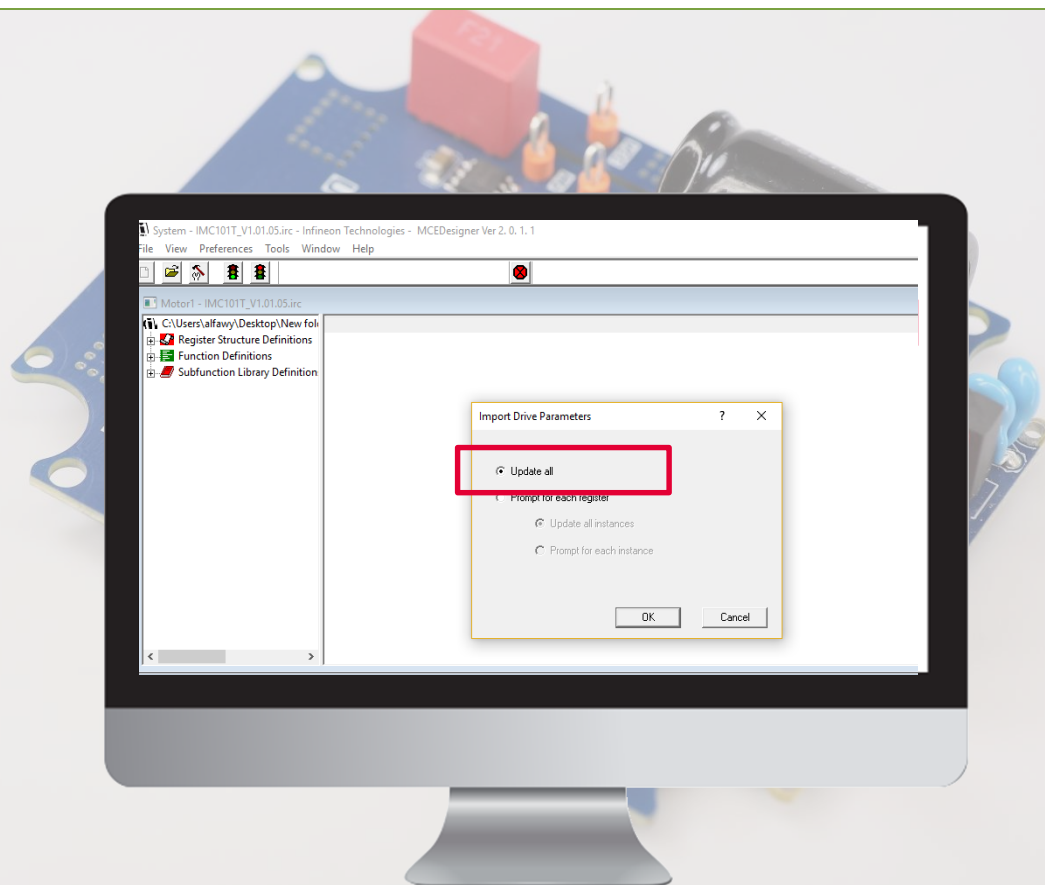


Press Start

# Load the parameters

1

Import drive parameters -> Select "Update all"





# Start the motor

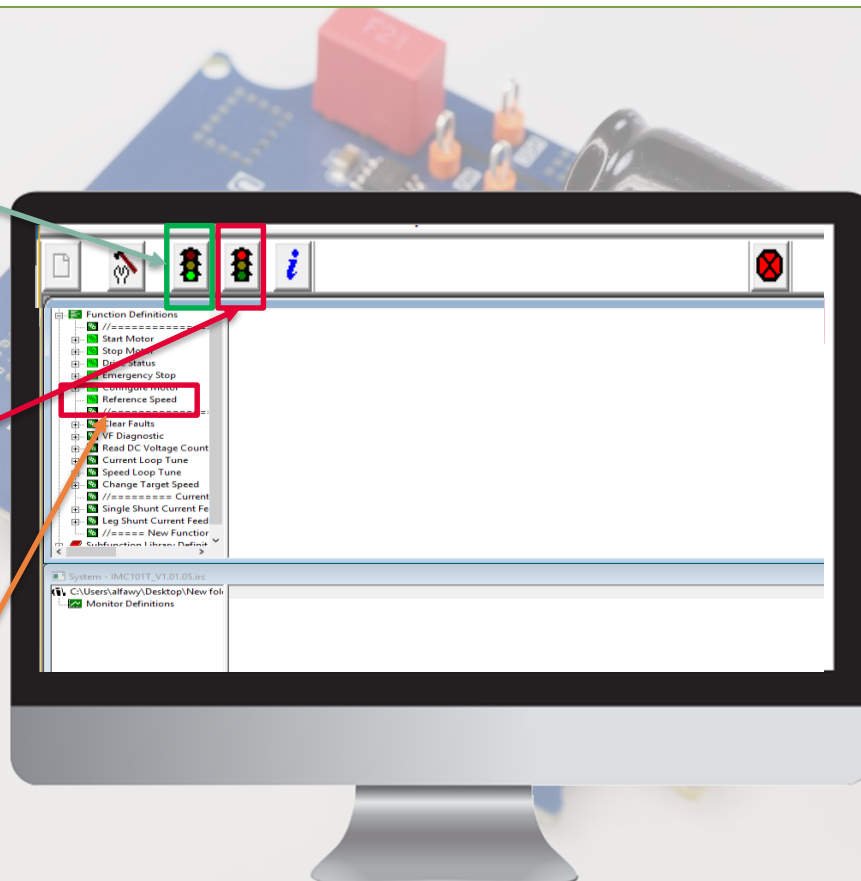
1

Motor now is ready to run

To start motor

To stop motor

Double click on Ref speed to change speed



# Agenda

1 100 W motor drive evaluation board

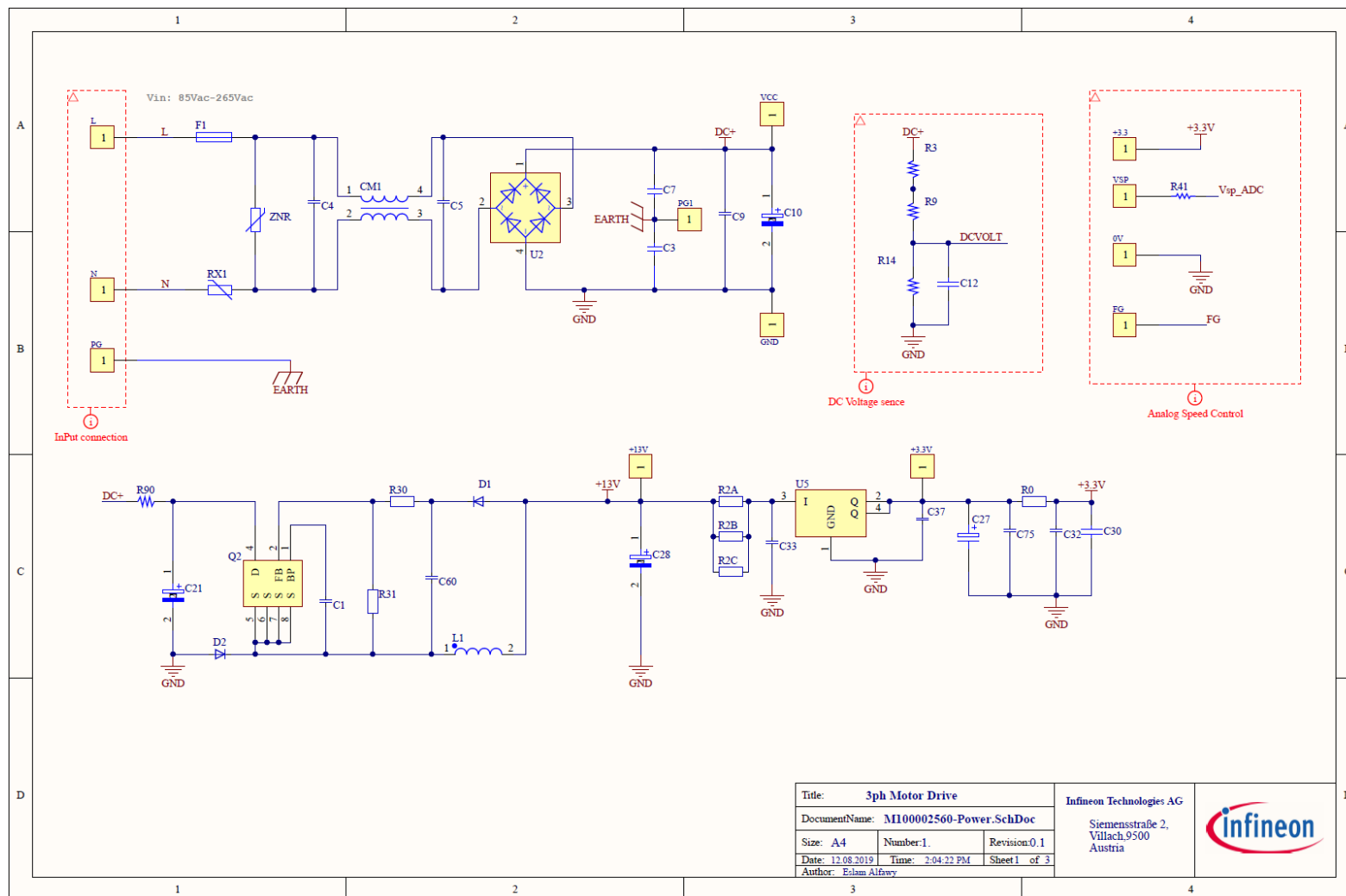
2 Hardware and software

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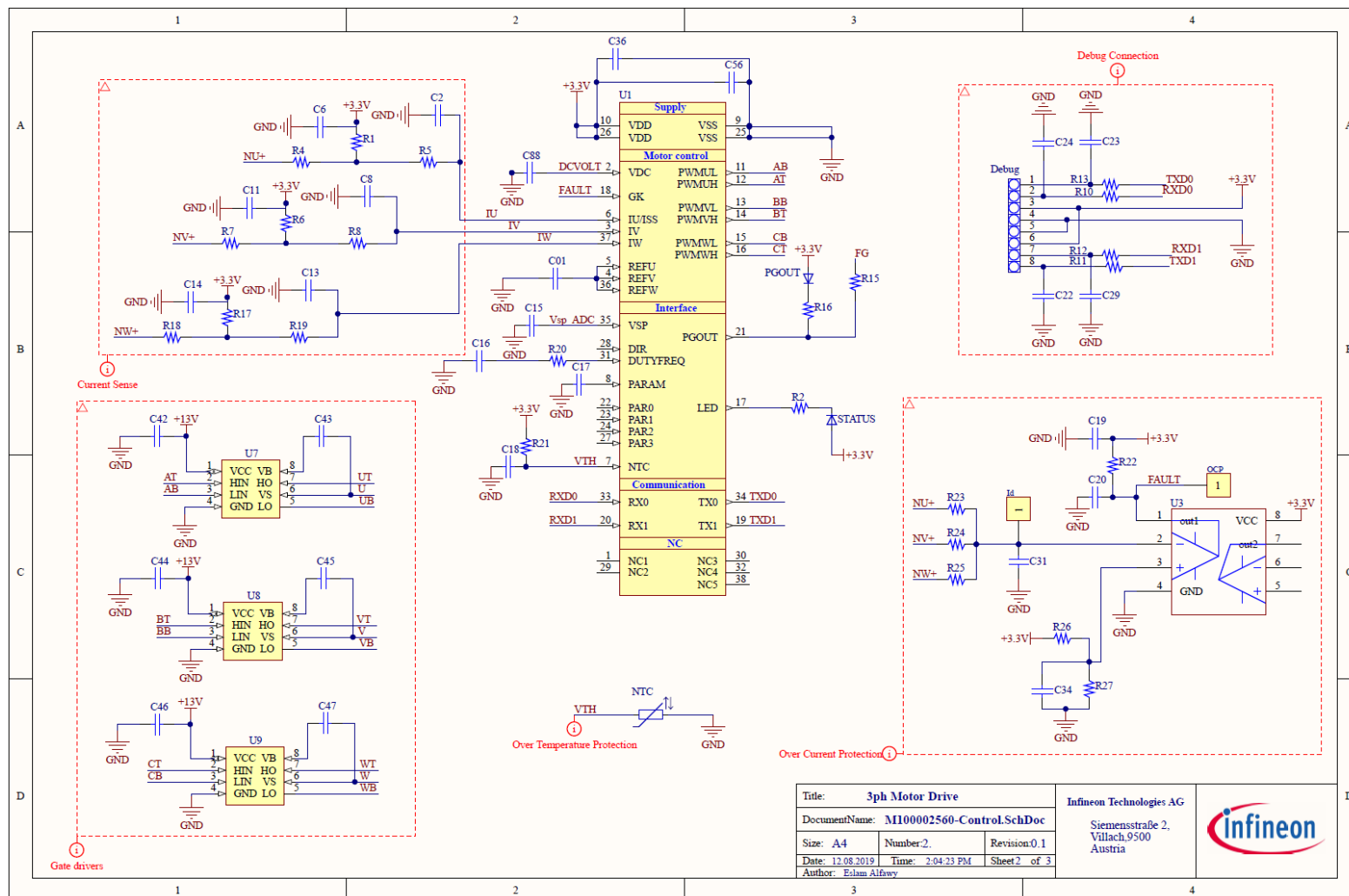
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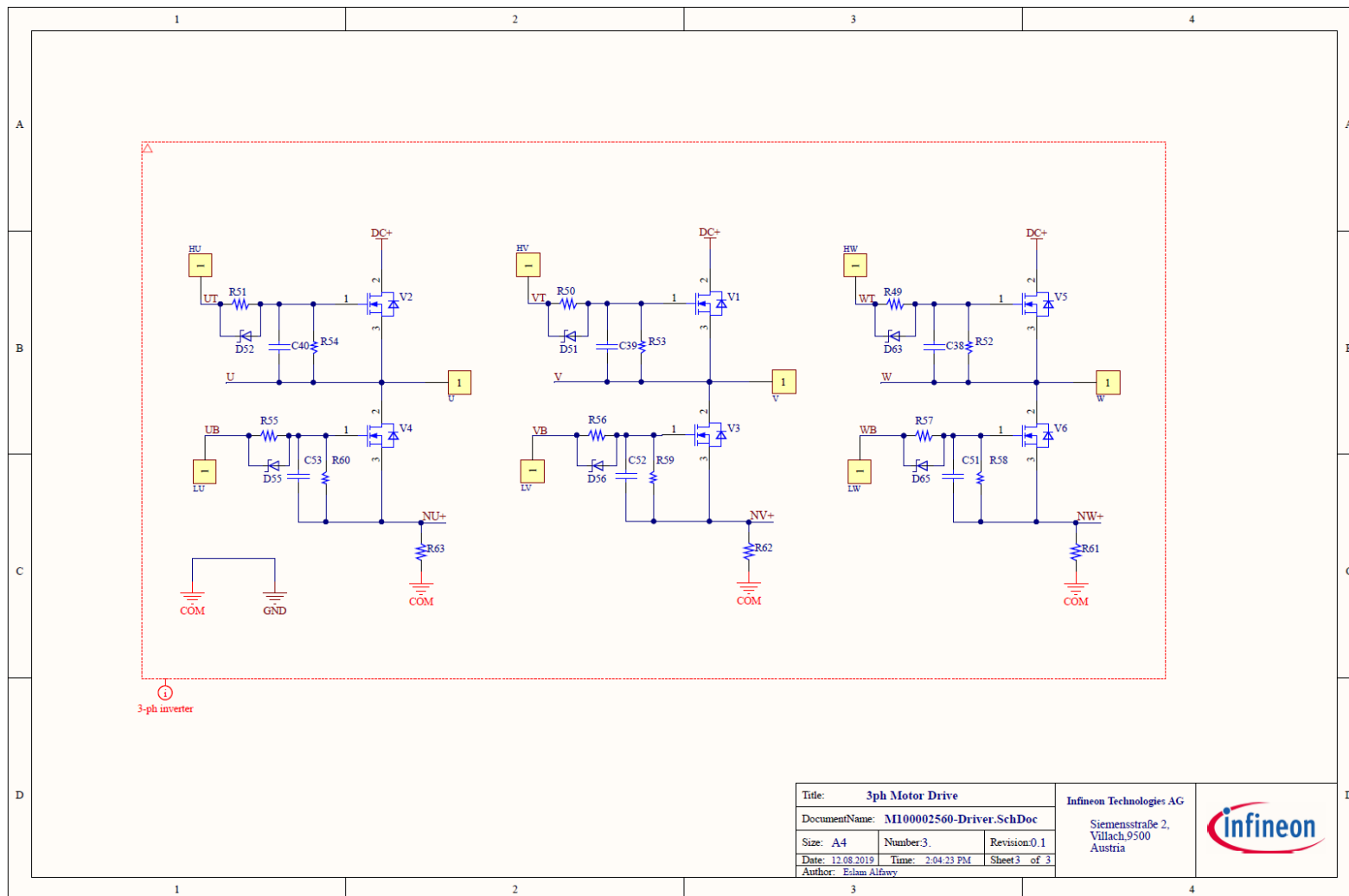
# Schematic of EVAL\_DRIVE\_3PH\_PFD7 board



# Schematic of EVAL\_DRIVE\_3PH\_PFD7 board



# Schematic of EVAL\_DRIVE\_3PH\_PFD7 board





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