

# XMC Digital Power Explorer Kit with XMC4200 and XMC1300

## Quick Start Guide

The XMC Digital Power Explorer Kit is an evaluation board that introduces the user into digital power control with Infineon's XMC4000 and XMC1000 families of ARM® Cortex™-M microcontrollers. It is comprised of a power board featuring a synchronous buck converter. Two different control cards can be connected to the power board:

- › XMC4200 control card with HRPWM peripheral and ARM® Cortex™-M4 core for high performance applications
- › XMC1300 control card with XMC peripherals and ARM® Cortex™-M0 core for cost optimized solution

Both control cards contain an isolated On-Board Debugger (OBD), so no external debugger is needed to flash and debug the main controller on the control card.

XMC Digital Power Explorer Kit is designed to support voltage control mode and current control mode (peak current control with slope compensation). By using the master and slave connectors, it is also possible to control a second XMC digital power explorer with a single control card.

High resolution PWM (150 ps PWM resolution) peripheral in XMC4200 MCU series is a dedicated peripheral to cover the most demanding requirements in digital power control applications. Additionally, this series integrates 3 analog comparators with automatic slope generation (10-bits resolution) and smart post-processing that permits extremely accurate and flexible control with minimum CPU load and lowest system cost.

XMC1300 MCU features most of the peripherals included in XMC4200 like CCU timers, ADC and serial communication, and also adds analog comparators and a MATH co-processor unit which are tailored to fulfill more cost sensitive applications.

Software examples for this kit are available for download on DAVE™ website ([www.infineon.com/dave](http://www.infineon.com/dave)). These examples demonstrate the capabilities of XMC4000 and XMC1000 MCU series in digital power control applications and ease of use and flexibility of DAVE™ software.

## Step by step installation guide for XMC Digital Power Explorer Kit

### STEP 1

#### Install DAVE™

DAVE™ is a free and powerful eclipse-based development platform for automatic code generation. DAVE™ includes a GNU compiler, debugger and the DAVE™ code engine to generate a library based on predefined and tested SW components called DAVE™ APPs and XMC lib low level drivers. To install DAVE™ follow these steps:

- › Start the DAVE™ installation which can be downloaded from [www.infineon.com/dave](http://www.infineon.com/dave). Current version of DAVE™ is version 4. Please make sure you check the website for new versions.
- › Follow the installation guidelines that are included in the download package

### STEP 2

#### Plug in a control card

- › Plug one of the control cards into the power board in such way that the control card “noses” goes through the drillings on the power board (see Figure 1)

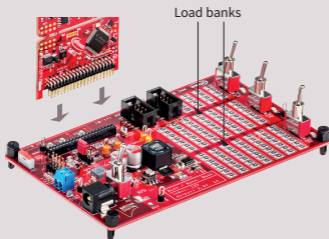


Figure 1



**IMPORTANT NOTE:** The power board contains resistive load banks (Figure 1). These loads are purely resistive and during operation may become hot. To prevent injuries, special care is advised when touching the on-board resistor banks during the operation. Any other kind of load, including other resistors, can be connected to the connector “V<sub>out</sub>” for the purpose of further test or evaluation (Figure 3 blue connector). Using this kit without taking necessary measures for cooling and isolating external loads may cause personal injuries. This evaluation board is intended for use only by qualified and skilled technical staff for laboratory usage. Please read disclaimer page carefully before using this kit.

### STEP 3

#### Connect the control card to the computer and the power supply to the power board

- › Connect the USB cable to your computer and to the control card. Debugger part of the control card is galvanically isolated from the power board.

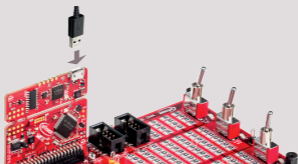


Figure 2

- › Plug in the power adapter supplied with the kit (12 V, 2 A), into the input jack (J2) on the power board

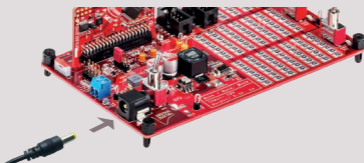


Figure 3



### STEP 4

#### Load an example project into DAVE™

- › Start DAVE™ 4 IDE. You can find the DAVE™ icon on your desktop once you complete the installation described in STEP 1.
- › Define a new workspace or use existing one
- › Download a XMC Digital Power Explorer Kit project to your workspace by one of these 2 means:
  - Download the example directly from DAVE™ 4 through the “**Help**” menu → “**Install Dave App/Example Library**”
    - Select “**Work with: Dave Project Library Manager**”
    - Click “**Next**”
  - You can alternatively download projects from [www.infineon.com/DAVE](http://www.infineon.com/DAVE)
    - Extract .zip file into your new or existing workspace directory
    - Import the project into DAVE™ through the “**File**” → “**Import**”, select “**Infineon**” → “**Dave Project**” and point to the workspace directory
- › Check the example you want to load and click “**Finish**”

## STEP 5


### Compile and run the examples on XMC microcontroller

- 1 Compile the project by clicking  icon
- 2 Click „Debug/Debug Configurations...“ or  icon

Step 3 – 6 must be done only when starting a new project.

- 3 To create a new debug configuration double-click „Tasking C/C++ Debugger“
- 4 Select target „Boot Kit“ for XMC1300 or “Hexagon Kit” for XMC4200
- 5 Select „J-Link over USB (SWD)”
- 6 Start debug session by clicking „Debug”

The debugger starts code download and switches from „DAVE IDE” perspective to the „TASKING Debug” perspective.

- 7 Click “Resume“  to restart the code execution
- 8 The buck converter is now running

## Product summary

Type	Description	Ordering code (OPN)
XMC4200-F64X256	80 MHz ARM® Cortex™-M4F with DSP instructions and Floating Point Unit (FPU), 256 kB flash, 40 kB RAM, 1 kB cash, rich analog mixed signal, advanced timer/PWM unit and communication peripherals in PG-LQFP-64 package	XMC4200F64K256ABXQSA1
XMC1302-T038X0200	32 MHz ARM® Cortex™-M0 with MATH co-processor, 200 kB flash, 16 kB RAM, rich analog mixed signal, timer/PWM and communication peripherals in PG-TSSOP-38 package	XMC1302T038X0200AAXUMA1
XMC4200-Q48X256	XMC4200 with 256 kB flash, 40 kB RAM, 1 kB cash in PG-VQFN-48 package, used as on-board debugger controller	XMC4200Q48K256ABXUMA1
BSC0924NDI	Dual N-channel (high-side and low-side) OptiMOS™ MOSFET	BSC0924NDI
IRS2011SPBF	High-side and low-side MOSFETs gate driver IC	IRS2011SPBF
IFX1763XEJ V33	Wide range input voltage, low dropout voltage regulator supplying up to 500 mA	IFX1763XEJV33XUMA1

## Features

- > Input voltage 12 V DC and max output current 2 A. Target output voltage: 3.3 V
- > Power board comprised of a synchronous buck converter (12 V to 3.3 V max 2 A), controlled by either XMC1300 or XMC4200 microcontroller
- > Switchable loads on board for easy performance test including option for network analyzers test
- > Supports voltage control mode and peak current control mode (with slope compensation)
- > Optional PMBus connection

## Applications

- > Switched mode power supplies
- > Lighting power supplies

## Benefits

- > Fast prototyping of SMPS in synchronous buck topology with different control modes
- > Full BOM list, design files and easy-to-use reference software available

## Useful links

- [www.infineon.com/dave](http://www.infineon.com/dave)
- [www.infineon.com/xmc](http://www.infineon.com/xmc)
- [www.infineon.com/xmc-dev](http://www.infineon.com/xmc-dev)
- [www.infineon.com/digital-power-is-calling](http://www.infineon.com/digital-power-is-calling)



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