XMC™ LED current control explorer kit

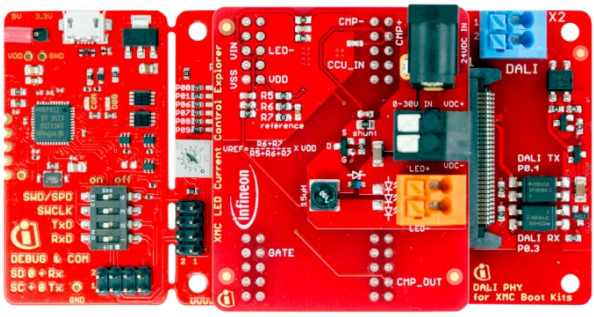
Quick start guide

The XMC™ LED current control explorer kit is an evaluation kit that introduces the user to continuous conduction mode buck LED driving solution with Infineon's XMC1300 family of ARM® Cortex®-M Microcontrollers.

The XMC™ LED current control explorer kit offers a single output channel for flicker-free control of LED light engines. The kit is pre-programmed with software that allows the adoption of different LED light engines and different input voltages (see table 1.) to enable fast prototyping and inexpensive evaluation. The brightness of the LED light engine can be controlled via DALI communication protocol or the on-board potentiometer.

The analog and switching peripherals (ACMP, ERU, CCU4, CCU8 and BCCU) are tightly interconnected in the on-board XMC1302 Microcontroller. This allows flexibility enabling low-cost and compact design for a fast dimmable LED current control loop. The result is very high quality flicker-free LED lighting solution.

Software examples for this kit are available within DAVE™ IDE or downloadable at www.infineon.com/xmc-led-ccexp to demonstrate the capabilities of the XMC1302 MCU series in dimmable continuous conduction mode buck applications for lighting.



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Step by step installation instruction for the XMC™ LED current control 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. To install DAVE™ follow these steps:

- Start the DAVE™ installation which can be downloaded from 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

Assemble the kit and connect the LED light engine

- Plug the XMC™ LED current control explorer card onto the XMC1300 boot kit via the header pins.

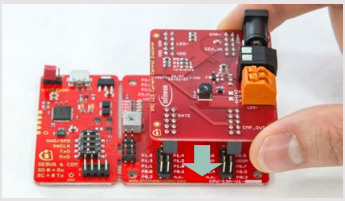

Figure 1

- Connect the DALI PHY for XMC® boot kits card to the XMC1300 boot kit.

Figure 2

- Connect the LED light engine to the XMC™ LED current control explorer card via the orange connectors.

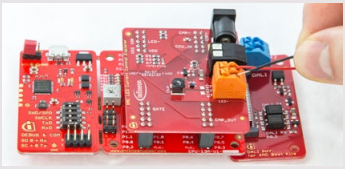

Figure 3

IMPORTANT NOTE:

Ensure that the LED light engine is connected correctly according to the polarity. Wrong connection may cause damage to LED light engine and/or kit.

STEP 3

Connect the kit to PC and power supply

› Connect the USB cable to your computer and to the XMC1300 boot kit. The DBG LED should turn on.

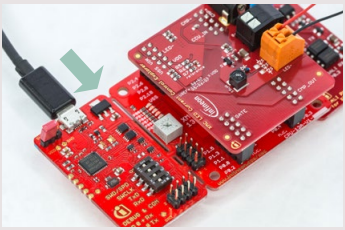

Figure 4

› Connect the power adapter supplied (24 V, 0.65 A) to the XMC™ LED current control explorer card. Turn on the power supply.

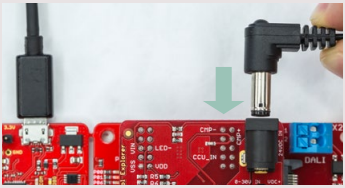

Figure 5

STEP 4a

Option1: Adjust LED light engine brightness via potentiometer

› Using a screwdriver, turn the dial on the on-board potentiometer clockwise to increase brightness level. Turn the dial anti-clockwise to decrease the brightness level.

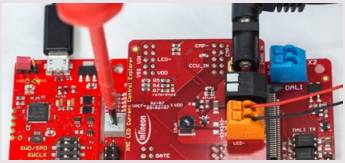

Figure 6

or

STEP 4b

Option 2: Adjust LED light engine brightness via DALI communication

› Attach the DALI bus wires from your DALI control device to the DALI PHY for XMC™ boot kits card via the grey connector.

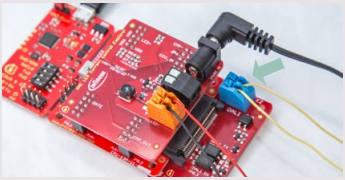

Figure 7

› Switch on the DALI bus power supply and start communicating.

Step by step installation instruction for the XMC™ LED current control explorer kit

STEP 5

1 Start DAVE™ version 4 IDE. You can find the icon on your desktop once you complete the installation described in STEP 1.
2 Define a workspace or use an existing one.
3 Download an XMC™ LED current control explorer kit project to your workspace by one of these 2 means:
- Download the example directly from DAVE™ version 4 through the "Help" menu->"**Install DAVE APP/Example/Device Library**"
  - Select "**Work with: DAVE Project Library Manager**"
  - Click "**Next**"
- You can alternatively download the project from from www.infineon.com/dave or www.infineon.com/xmc-led-ccexp
  - Extract .zip file into your new or existing workspace directory (for example C:\DAVE4_workspace\ws4.1.4)
  - Import the project into DAVE™ version 4 through the "**File**"**->** "**Import**", select "**Infineon**" -> "**DAVE Project**" and point to the workspace directory

4 Check the example you want to load and click "**Finish**"

STEP 6

Load an example project into DAVE™

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 **„GDB SEGGER J-Link Debugging"**
4 In the "Debugger" tab,
- Select connection "**USB**"
- Select interface "**SWD**".

5 Start Debug session by clicking "**Debug**"

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

6 Click **"Resume"** to restart the code execution
7 The XMC™ LED current control explorer kit is now running

Useful links

www.infineon.com/dave
www.infineon.com/xmc
www.infineon.com/xmc-dev
www.infineon.com/xmc-led-ccexp

RoHS

Features

Modular kit consisting of:

- XMC1300 boot kit
- Single-channel dimmable continuous conduction mode buck add-on board
- Isolated DALI interface plug-in card for LED brightness control

Control scheme and software:

- Peak LED current control with constant off-time
- Pre-programmed with basic DALI communication software
- Pre-loaded with automatic LED current ripple tuning software that adapts to changes in input voltage and LED forward voltage to maintain the ~700 mA average LED current

Applications

- LED lighting

Benefits

- Fast prototyping of LED lighting
- Flicker-free light thanks to high-speed pulse-density modulation
- Easy-to-use exponential dimming control
- Very efficient dimmable LED current control
- Low cost compact design
- Programmable on-board Microcontroller

Table 1: Recommended LED system overview

Max. DC supply $V_{in(max.)}$	I_{LED} Peak	$I_{Average}$	$V_{Forward}$ LED
30 V	1 A	< 800 mA	≤ V_{in}

Table 2: Infineon product summary

Type	Description	Ordering code (OPN)
XMC1302-T038X0200 AB	32 MHz ARM® Cortex®-M0 with MATH Co-processor, brightness color control unit (BCCU), 200 kB flash, 16 kB RAM, rich analog mixed signal, timer/PWM and communication peripherals in TSSOP-38 package.	XMC1302T038X0200ABXUMA1
BAS3010A-03W	Medium power AF Schottky Diode, forward current: 1 A. Reverse voltage: 30 V, very low forward voltage (typ. 0.41 V @ IF = 1 A), Qualified according to AEC Q101.	BAS3010A03WE6327HTSA1
BSS306N	OptiMOS™ 2 Small-Signal-Channel Transistor, N-Channel with max. 57 mΩ $R_{DS(on)}$ at V_{GS} = 10 V. Qualified according to AEC Q101, logic level (4.5 V rated).	BSS306NH6327XTSA1

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