

XMC – 32-Bit Industrial Microcontrollers

One Microcontroller Platform. Countless Solutions.

Factory Automation



Building Automation



Transportation



Power & Energy



Home & Professional



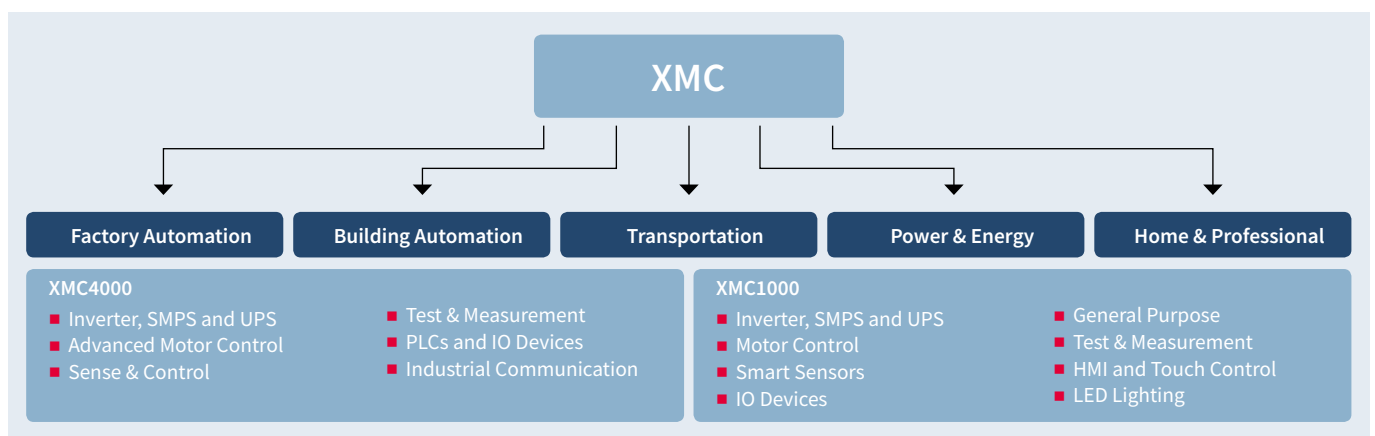
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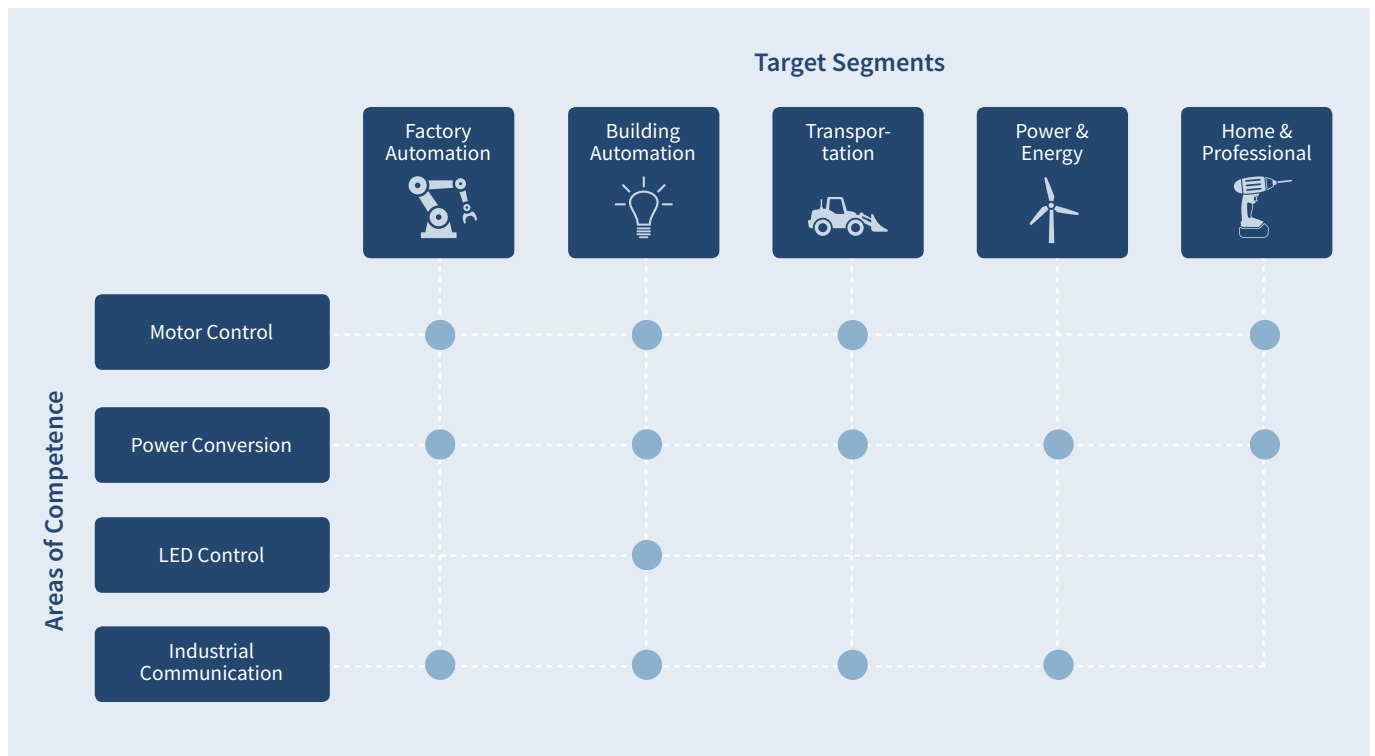
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XMC – Target Markets

Infineon's **XMC 32-bit industrial microcontroller** portfolio is designed for system cost and efficiency for demanding industrial applications. It comes with the most advanced peripheral set in the industry. Fast and largely autonomous peripherals can be configured to support individual needs.

Highlights include Analog-Mixed Signal, Timer/PWM and communication peripherals powered by either an ARM® Cortex™-M0 core (XMC1000 family) or a Cortex™-M4 core with a floating point unit (XMC4000 family).



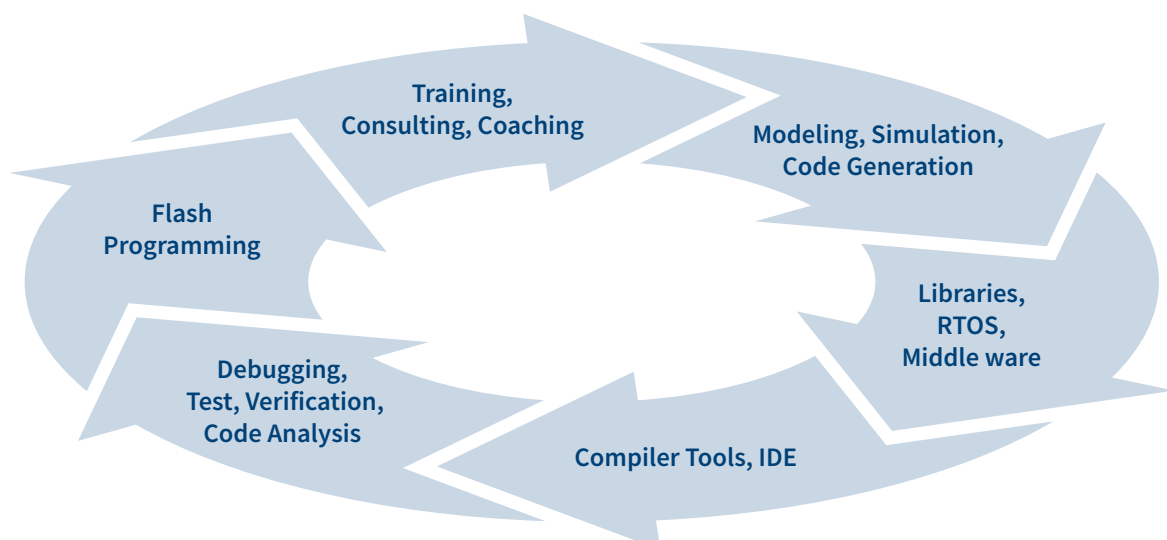


DAVE™ and Ecosystem

DAVE™ – reduce time-to-market

Free application-oriented code repository merged with graphical system design methods and automatic code generator to guide XMC microcontroller designers along the entire process – from evaluation to production (E2P).

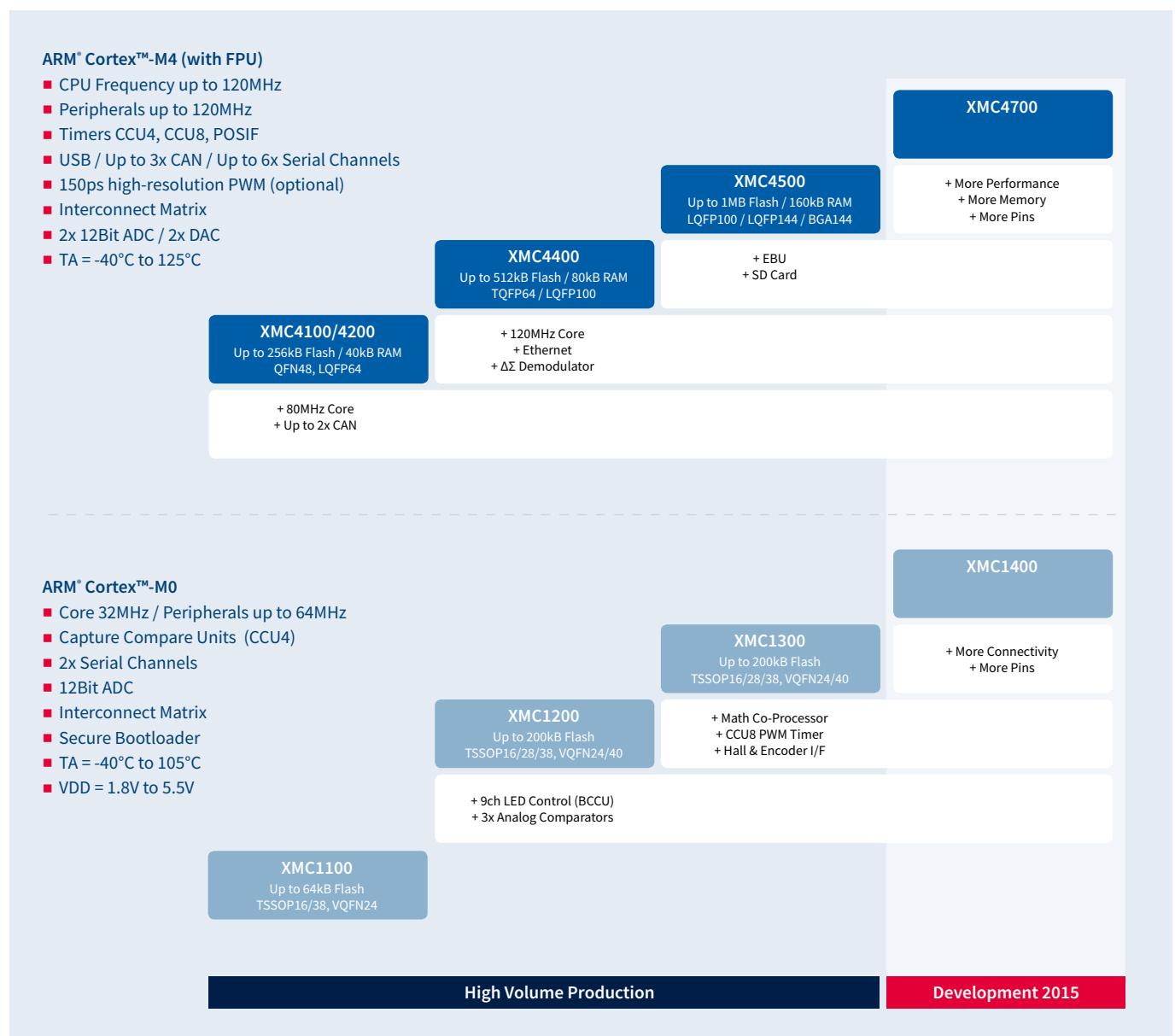
A set of development tools, ready-to-use software solutions and supporting services are available for XMC microcontrollers. These tools and software products support the complete development cycle to ensure efficient, reliable results.



XMC – One Microcontroller Platform. Countless Solutions.

The foundation of Infineon's XMC 32-bit industrial micro-controllers portfolio is built on the XMC4000 family and the XMC1000 family.

Both families comprise more than 100 different devices – arranged in series – offering scalability thanks to common peripherals. These are enriched with application-specific IP plus co-processors and hardware accelerators for deterministic real-time behavior and performance.





XMC1000 – Optimized Peripherals for Real-Time Success.

XMC1000 customers benefit from a comprehensive set of common Analog-Mixed Signal, Timer/PWM and communication peripherals. All powered by ARM® Cortex™-M0, addressing a broad application spectrum from typical 8-bit applications up to digital power conversion and even field oriented motor control.

The XMC1000 family is available in three series: XMC1100 (Basic series), XMC1200 (Feature series) and XMC1300 (Control series), with more than 60 products in TS-SOP-16/-28/-38 and VQFN-24/-40 packages.

The **XMC1100** Basic series – 32MHz, 8kB to 64kB flash, 16kB RAM, programmable hardware interconnect matrix, Timer/PWM, 12-bit ADC, 2ch serial communication interface incl. Quad-SPI, peripheral clock up to 64MHz, operating voltage from 1.8 to 5.5V and up to 105°C ambient temperature.

The **XMC1200** Feature series is specifically optimized for LED lighting. It incorporates additional application-specific features such as analog comparators, Brightness and Color Control Unit (BCCU), hardware engine for flicker-free dimming and color control of LEDs with up to 200kB flash.

The **XMC1300** Control series is optimized for motor control and digital power conversion applications. It comes with a 64MHz MATH co-processor (DIV, COS, SIN), position interface (POSIF) and precise Timer/PWM (CCU8) peripheral with a 64-bit resolution, asymmetric PWM, dead-time insertion, fractional clock divider, shadow transfer and external event trigger. This is a very cost-efficient solution for sensorless FOC (Field Oriented Control) for electric motors.

XMC4000 – Advanced Industrial Control & Connectivity.

All XMC4000 devices are powered by ARM® Cortex™-M4 with a built-in DSP instruction set. The Single Precision Floating Point Unit, Direct Memory Access (DMA) feature and Memory Protection Unit (MPU) are state-of-the-art for all devices – even the smallest XMC4000 runs with up to 80MHz in core and peripherals. It comes with comprehensive set of common, fast and precise analog/mixed signal, Timer/PWM and communication peripherals. XMC4000 is the promising successor to traditional DSP/DSC and 32-bit MCU solutions. The XMC4000 family addresses industrial market needs and is ideal in particular for digital power conversion, motor control, sense & control, and IO applications. The XMC4000 family is available in four series: XMC41000, XMC4200, XMC4400 and XMC4500, with more than 45 devices in VQFN, LQFP and LFBGA packages scaling from 48 to 144 pins.

The **XMC4100/XMC4200** series features 80MHz, 64kB to 256kB flash with ECC, 40kB RAM, 1kB cache and a programmable hardware interconnect matrix. Features include up to 3x Timer/PWM modules with 64-bit resolution, asymmetric PWM, Dead-Time insertion, fractional clock divider, shadow transfer and external event trigger, high resolution PWM (150ps) and programmable comparators, Position Interface (POSIF), 2x 12-bit ADC, 2x 12-bit DAC, 4ch serial communication interface, incl. Quad-SPI and FIFOs, 2x CAN 2.0B with 64 message buffer, USB FS device, 80MHz peripheral clock and an ambient operating temperature of up to 125°C.

The **XMC4400** series offers a 120MHz core and peripheral clock with 256kB to 512kB flash, 80kB RAM and 4kB cache. Up to 6x Timer/PWM modules, 2x POSIF, 4x 12-bit ADC and 4ch $\Delta\Sigma$ demodulator together with RMII/MII Ethernet Interface and USB FS OTG.

The **XMC4500** series provides 512kB to 1MB flash, 128kB to 160kB RAM, additional CAN nodes (up to 3), SDIO/SD/MMC interface as well as external memory interface (EBU) to directly interface with memories, LCDs and proprietary systems such as FPGAs or ASIC.

	Infineon XMC MCUs	XMC1000			XMC4000			
	Parameter	XMC1100	XMC1200	XMC1300	XMC4100	XMC4200	XMC4400	XMC4500
System	Core	ARM® Cortex™-M0			ARM® Cortex™-M4			
	Frequency	32 MHz			80 MHz		120MHz	
	MATH Co-processor	–		64 MHz	–			
	DSP instruction set	–			●			
	Floating point unit	–			●			
	Peripherals clock speed	up to 64 MHz			up to 80 MHz		up to 120 MHz	
	Programmable hardware interconnect matrix	1 x			2 x			
	DMA	–			8 ch		12 ch	
	MPU	Primitive Memory Protection (PAU)			Memory Protection Unit (8 Regions)			
	Watchdog	●			●			
	Real-time clock	●			●			
	Hibernate domain	–			●			
	Number of I/Os	14 / 22 / 26 / 34 / 35			34 / 49		45 / 79 / 123	
	Supply voltage	1.8 – 5.5V			3.13 – 3.63V			
	Operating temperature	–40°C – 85°C / 105°C			–40°C – 85°C / 105°C / 125°C			
Memory	Flash	8 – 64 kB	16 – 200 kB	8 – 200 kB	64 – 128 kB	256 kB	256 – 512 kB	512 kB – 1 MB
	Error Correction Code (ECC)	●			●			
	RAM	16 kB			20 kB	40 kB	80 kB	128 kB – 160 kB
	Cache	–			1 kB		4 kB	
	Ext memory interface	–			–			●
Timer/ PWM	SysTick	●			●			
	CCU4 (4 ch)	1 x 4ch			2 x 4ch		4 x 4ch	
	CCU8 (8 ch)	–	–	1 x 4ch	1 x 8ch		2 x 8ch	
Analog	12-bit ADC	up to 12 ch, 1 x ADC (1Msps)	up to 12ch, 2 x ADC (1Msps)		up to 9 ch, 2 x ADC (2Msps)		up to 26ch, 4 x ADC (2Msps)	
	12-bit DAC	–			2 x			
	Comparator	–	up to 3 x		Programmable CMPs built in HRPWM			–
Communication	IEEE 1588 Ethernet MAC	–			–		1 x RMII & MII	
	USB	–			up to FS DEV		FS OTG	
	SDIO/SD/MMC	–			–			●
	USIC (UART, SPI, QSPI, I2C, I2S)	2 ch, FIFO (64 word)			4 ch, 2x FIFO (64 word)			6 ch, 2x FIFO (64 word)
	Ext Memory interface	–			–			●
	CAN 2.0 B	–			up to 2 Nodes, 64 Message Objects			3 Nodes, 64 Message Objects
Application	HRPWM (150 ps)	–			4 ch			–
	ΔΣ demodulator	–			–		4 ch	
	POSIF	–	–	1x	1x		2x	
	Capacitive touch control	–	up to 16 ch	–	up to 7 ch			up to 8ch
	LED matrix control	–	up to 128 LEDs	–	up to 28 LEDs			up to 40 LEDs
	Brightness color control unit	–	up to 9 ch		–			
	DAVE™ Apps	Code library with basic system, peripherals and advanced application-oriented components for Motor Control, Power Conversion, Lighting, Communication, and many more.						
IDEs	Debug and trace	SWD, SPD			SWD, JTAG, Trace			
	Ecosystem (IDEs, compiler, debugger)	Infineon DAVE™ (free) and Partner ARM®/KEIL™, Atollic, IAR Systems, Rowley Associates, TASKING						
Other	Packages	VQFN-24/40 TSSOP-16/38	VQFN-24/40 TSSOP-16/28/38	VQFN-24/40 TSSOP-16/38	VQFN-48 LQFP-64	VQFN-48 LQFP-64	LQFP-64/100	LQFP-100/144 LFBGA-144

XMC1000 Family Key Features

$$x = \cos(\beta)$$

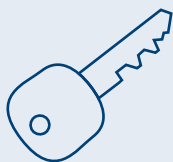
The MATH co-processor adds additional functionality, like trigonometric operations or divisions, to the standard Cortex™-M0 instruction set, enabling field oriented motor control. It runs up to 64MHz. Offering 7 times faster division, 38 times faster cosine calculations and enable high-resolution PARK transformation with 24bit.



The BCCU (Brightness and Color Control Unit) automatically runs light control algorithms for optimized dimming and color mixing. This significantly reduces SW development effort for LED lighting applications.



AC/DC power factor correction can be efficiently realized with high-performance and configurable analog comparators. With only 30ns propagation delay and peripheral interconnection to the PWM timer, zero current crossing in the coil is detected and a fast and deterministic control loop executed with very little CPU load.



With the secure boot loader mode, embedded code can be programmed to flash memory in a protected way using AES 128-bit cryptography. This helps to protect IP if manufacturing is outsourced for instance.

XMC4000 Family Key Features

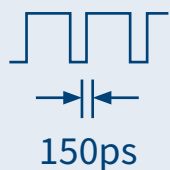


Ta = 125°C

125°C ambient temperature for highest robustness in harsh environments.

Timers
ADC
Position I/F

A comprehensive set of most flexible Timers/PWMs, fast and accurate ADCs and position interfaces in combination with a programmable hardware interconnect matrix enable deterministic behavior and full application control.



150ps high-resolution PWM and smart analog comparator to achieve the highest energy efficiency class for digital power conversion.

$\Delta\Sigma$
Demodulator

Delta Sigma demodulator with integrated filters for cost- and size-efficient galvanic isolated current measurement.

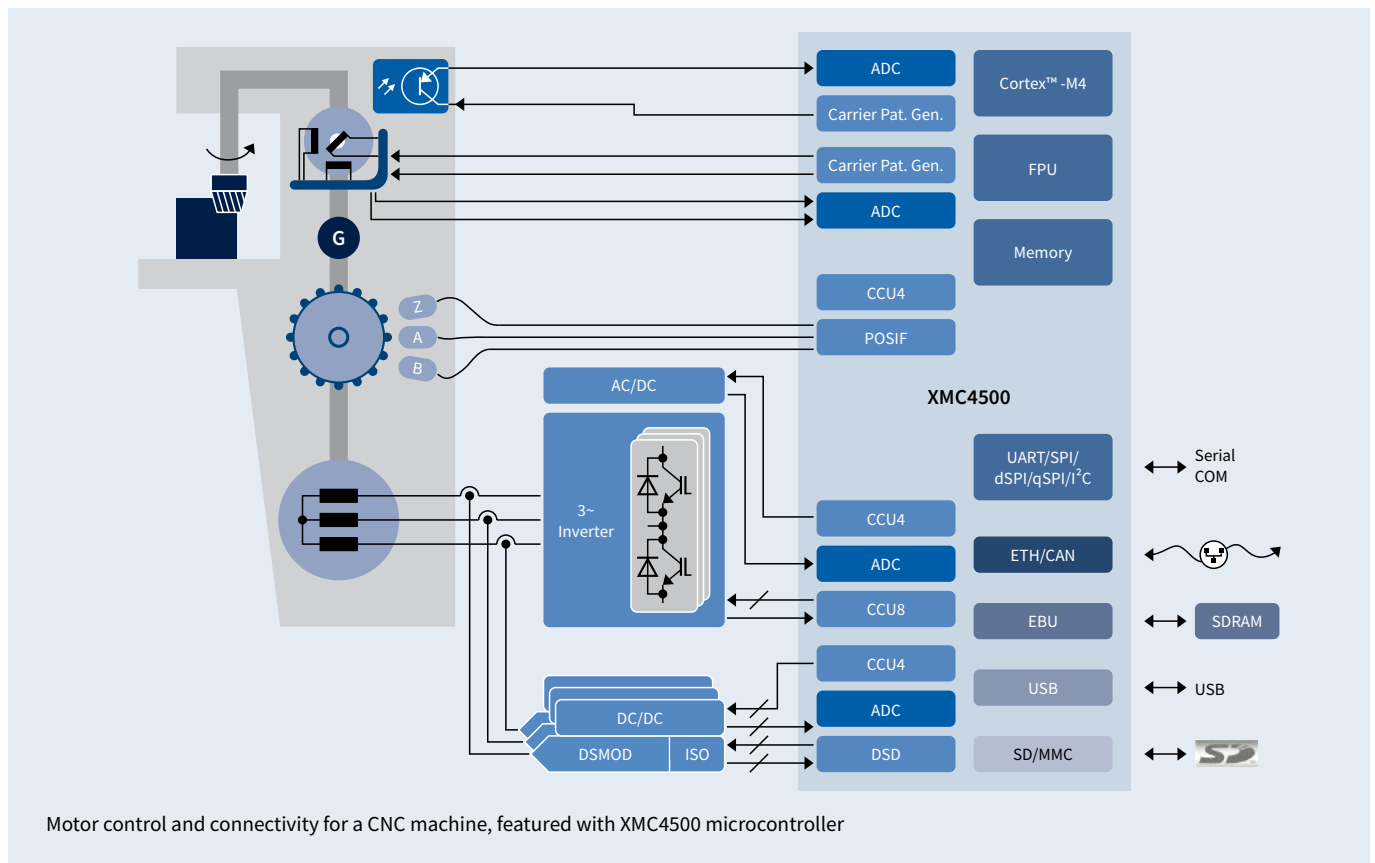
Industrial Motor Control

In today's competitive and very dynamic environment, manufacturers are under constant pressure to find new ways of increasing energy efficiency, mobility and security – in all motor control applications. At the same time, software's increasingly important role in embedded systems directly contributes to their complexity – and increases overall costs. From power tools through low- and high-voltage motors to industrial automation, Infineon's XMC microcontrollers and other semiconductor products enable our customers to design the most innovative, efficient, reliable and energy-friendly motor control and drive systems.

Infineon's XMC microcontroller family is perfectly suited as a controller for various types of motors, like Permanent Magnet Synchronous Motors (PMSM), Brushless DC Motors (BLDC), AC Induction Motors (ACIM), Servo Motors and Brushed DC Motors. Our free and easy-to-use DAVE™ Inte-

grated Development Environment (IDE) comes with a large number of pre-defined, configurable and tested software blocks (DAVE™ APPs) targeting specific applications, which allow rapid application development and prototyping by engineers. For all major motor control schemes there are ready-made motor control example projects available in the form of DAVE™ APPs.

Infineon XMC4000 microcontroller family are best suited to industrial motor control applications such as AC and servo drives as shown in below figure in a CNC machine. The ARM Cortex™-M4 with FPU offers the computing performance to run cascade control for the electrical drive as well as communication stacks to the field level, to PLCs and other drives. Ready-to-use software for this example application is provided with the DAVE™ APP libraries for motor control and communication.





The following functionalities help to realize high performance industrial drives with the XMC4000 microcontroller family:

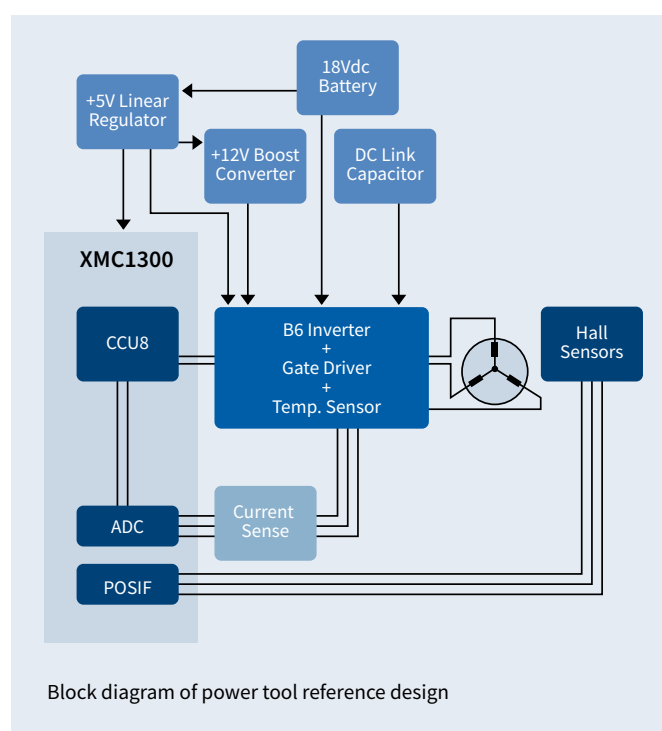
- Hardware interconnect matrix – peripheral interconnection and process parallelization with no or low CPU involvement
- POSIF interface to direct connect hall sensors, incremental encoder
- Resolvers can be direct connected with $\Delta\Sigma$ Demodulator
- In-phase current measurement via galvanic isolated $\Delta\Sigma$ Demodulator
- Easy 3-phase inverter implementation with CCU8
- Sensor calibration, offset and gain adjustment with fast 12-bit DAC
- Overcurrent and -voltage protection with fast reaction time using ADC fast compare mode
- Active PFC implementation with CCU4 and ADC
- Support for fieldbus communication with IEEE1588 time stamping Ethernet MAC and CAN
- External Bus Unit (EBU) enabling communication with external memories and devices
- Up to 125°C ambient operating temperature
- Free IEC60730 LIB approved by VDE

The XMC1000 family is engineered to offer the best-in-class cost/performance ratio. XMC1000 microcontrollers are best suited to fans, pumps and electrical drives in power tools and white goods. The ARM Cortex™-M0 core together with the dedicated MATH co-processor set a new benchmark for CPU power in this price/performance class of microcontrollers. Even very sophisticated motor control schemes including sensor and sensorless Field Oriented Control can be realized easily with enough headroom for serial communication with a network of other control devices and a human machine interface.

The following functionalities help to realize power tools with the XMC1000 microcontroller family:

- POSIF interface to direct connect hall sensors, incremental encoder
- 3-phase inverter implementation with CCU8
- Hardware interconnect matrix for active PFC - enabling hardware trigger between CCU4 and ADC and/or analog comparator
- Flexibility for serial communication, thanks to programmable universal serial interface channels (USIC)
- Fast control loops and precise control with advanced Timer/PWM modules (CCU4/CCU8) offering shadow register transfer, external input for fault control, binary and floating pre-scaler, 16-bit to 64-bit width using concatenation option

Below is a block diagram of the power tool reference design featuring the XMC1302 microcontroller, OptiMOS™ BSC010N04N, 40V/1.05mOhm $R_{DS(on)}$ 3-phase inverter, and EiceDRIVER™ 2EDL05M06.

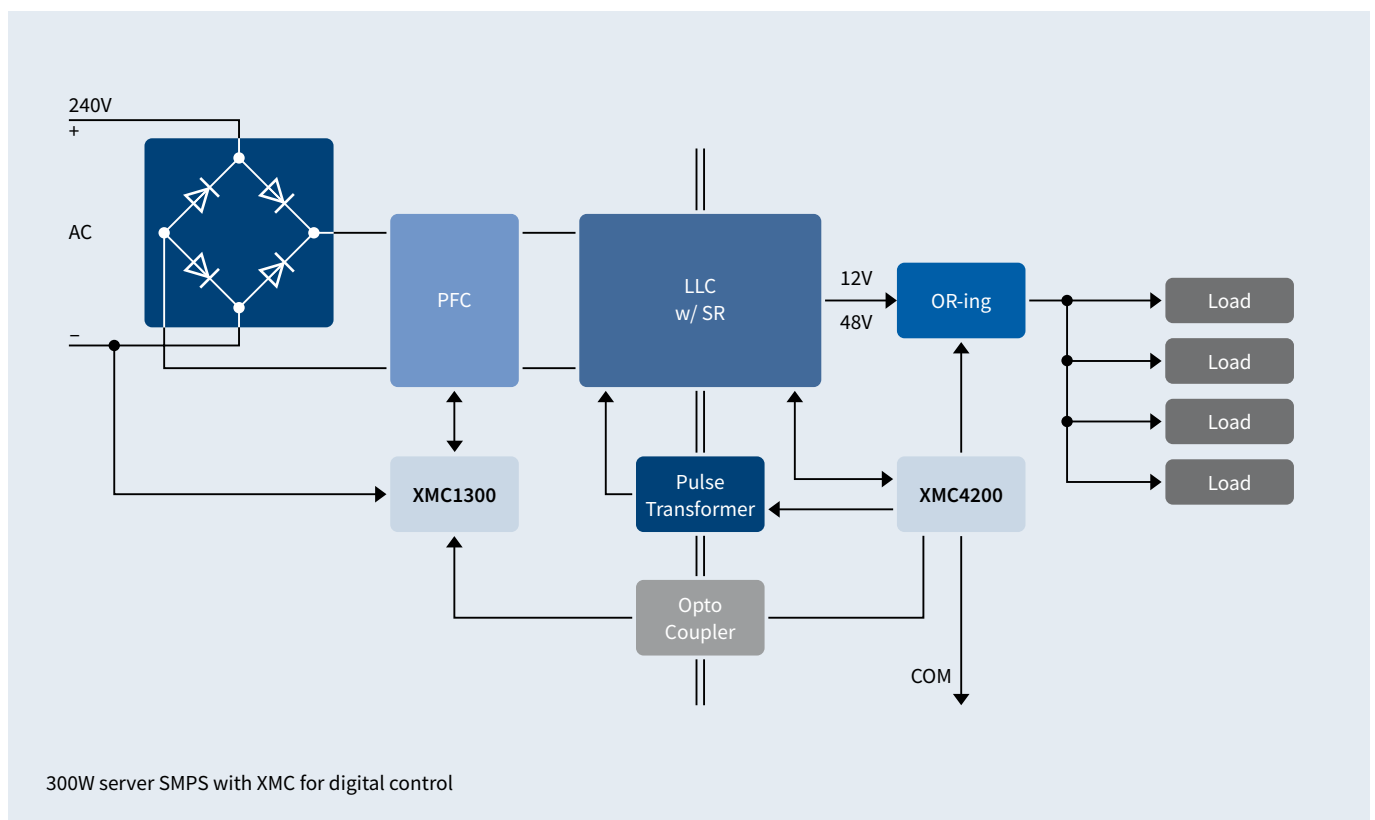


Digital Power Conversion

There are ever increasing requirements on power supply designs. Some of these are fuelled by consumer demands or industry association guidelines (like higher power density, higher integration, modularity, or 80 Plus Titanium efficiency standard). And some are driven by the regulators (like the EN 61000-3-2 PFC standard). These new or more stringent requirements are paving the way for increased use of digitally controlled power supply systems, simply because sometimes it is not feasible to design a traditional control system with analog circuitry and meet all the requirements. On the other hand, semiconductor technology advances have allowed MCU manufacturers to develop a new class of MCUs, optimized for digital power conversion applications in terms of features and price. This new market development has attracted even more power supply designers towards digital control. Digital designs have the same or similar system BOM cost, and offer all the benefits of digital power conversion like:

- Advanced and adaptive control algorithms (multiple loops, non-linear), more compact designs enabling high efficiency across a broad range of loads (Titanium standard) and operating conditions (input voltage, temperature, aging)
- Greater flexibility, enabling more cost-efficient platform solutions (e.g. one design for multiple power supplies, commissioning and field updates, regional specifics, etc.)
- System monitoring and network connectivity/maintenance (e.g. hot swap or load balancing, PMBus communication, failure prediction)

The application example below shows a digitally controlled power supply used for server racks with typical power ratings between 300W and 3KW. XMC microcontrollers are used for PFC and LLC control with variable output, load balancing and system status monitoring and reporting.



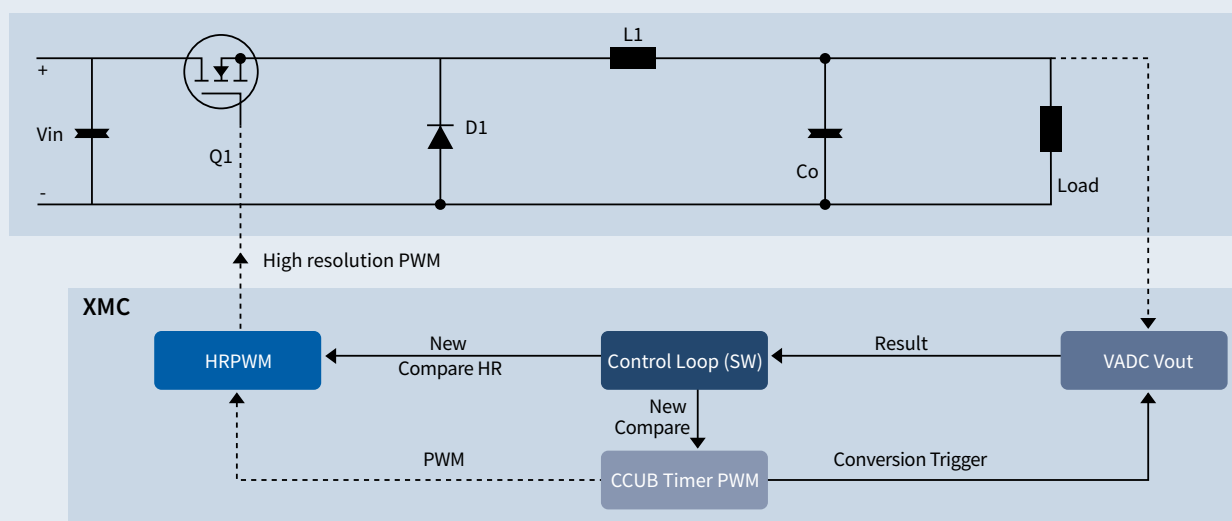


XMC microcontrollers are particularly well positioned for use in digital power applications thanks to the following application-tailored features:

- 4-channel 150ps HRPWM timer (XMC4100/4200/4400 series)
- Rich connectivity: 2x CAN nodes, 4-channel serial COM (configurable to SPI, I²C, I²S, UART), USB FS
- Up to 4x 12-bit ADC with 70ns sample time ensures fast reaction times and tighter control loops
- Extended temperature range up to 125°C ambient temperature (XMC4000 family)
- Analog comparators with only 3mV input offset voltage and 30ns propagation delay (XMC1000 family)

This implementation with XMC4200 as well as the implementation with XMC1200 is part of the buck converter training kit (KIT_XMC_BUCKCONVERT_01). Consisting of a power board with 2 synchronous buck converters and 2 control cards (XMC4200 series and XMC1200 series), this kit allows engineers to simply experiment with buck converter topology digitally controlled by XMC microcontrollers. It is very easy to test and compare different buck converter control mechanisms (voltage control vs. current control, with slope compensation), and explore the benefits of dedicated power conversion peripherals, such as a high-resolution PWM or slope compensation module.

Below is an example of a buck converter realized with an XMC4000 microcontroller.



Block diagram of Buck converter with XMC4000 microcontroller

Smart Lighting

The term “smart lighting” covers everything from energy-efficient and high-endurance LED technology through network or wireless connectivity to light quality and color mixing. With the Brightness and Color Control Unit (BCCU), XMC1200/XMC1300 series products offer an industry-unique module to automatically control the dimming level and color of multi-channel LED lamps. Users can quickly configure their ideal solution without the need for expert knowledge in lighting. Besides LED control functions, XMC1200/XMC1300 series microcontrollers can also be used as DALI or DMX controllers and offer advanced single-chip smart lighting solutions.

Programming and configuring DALI or DMX communication is made easy by DAVE™ APPs.

XMC1000 family key features for smart lighting applications:

- Automatic brightness control (using high-frequency pulse density modulation) based on the $\Sigma\Delta$ principle enables completely flicker-free dimming through 9 output channels
- Automatic exponential dimming and linear intensity changes make brightness or color changes appear smooth and natural to the human eye
- An integrated packer function ensures controlled switching rates for a wide range of high-power LED drivers
- Hardware interconnect matrix (ERU) allows BCCU to trigger the ADC for synchronized feedback loops

The following pictures illustrate the effects of superior flicker control thanks to the BCCU integrated in the XMC1200 and XMC1300 series:



2 kHz flicker with a commercial stand-alone ballast detected by an HD camera. Although not visible, it affects the brain (below 3 kHz threshold).

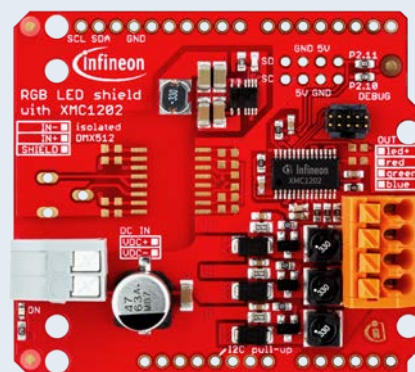


Infineon solution with XMC1200/XMC1300 series. Flickering (40–50 kHz) is neither visible nor perceptible and only barely detectable by HD cameras.

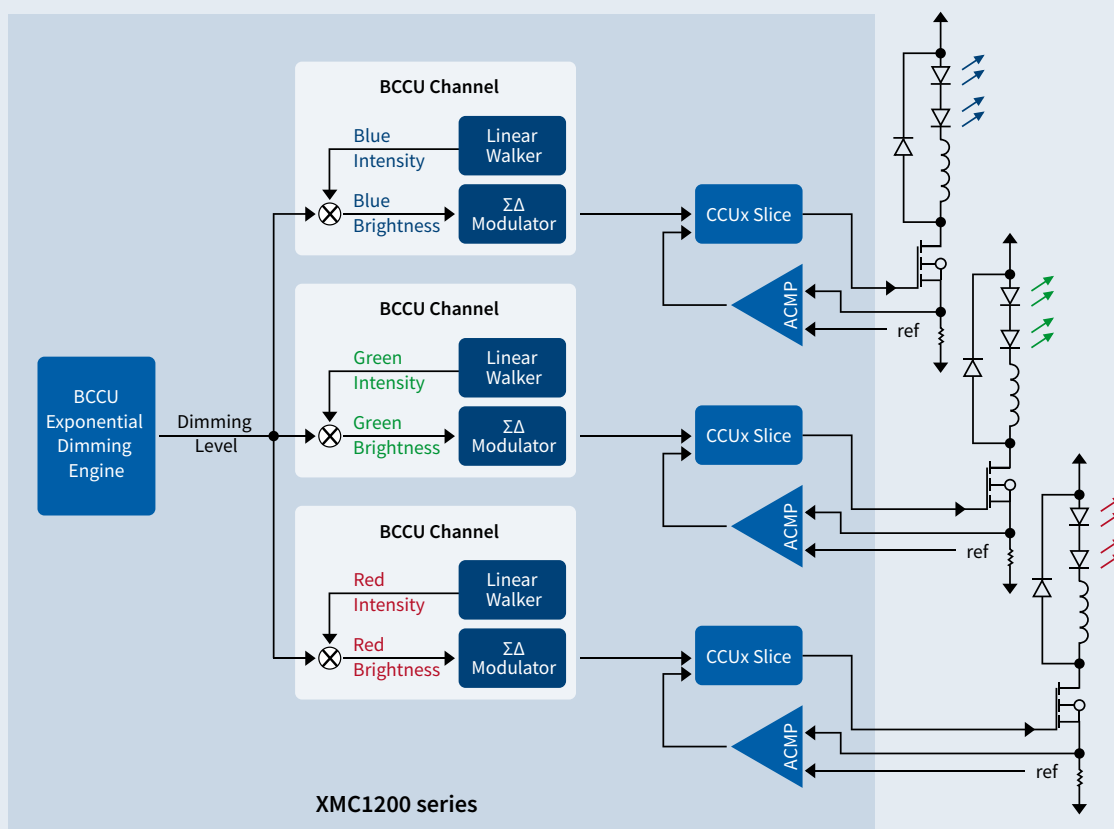


The block diagram below shows an example of an XMC1000 family microcontroller in a smart lighting application. An XMC1202 microcontroller is used here for direct constant current control of a 3-channel RGB LED lighting system, and is also handling DMX communication.

This type of lighting system is realized in the new RGB LED lighting shield with XMC1202 (picture to the right) which can be used either with XMC1100 Boot Kit or with Arduino Uno R3 as a master board. DMX512 control is supported with a mounting option for the interface chip. More information can be found at www.infineon.com/arduino.



RGB LED Lighting Shield with XMC1202 for Arduino.
(For more information see next page.)



Block diagram of 3-channel RGB LED smart lighting system using the XMC1200 series microcontroller



XMC Kits and Evaluation Boards

A wide range, from low cost to advanced kits and evaluation boards for XMC microcontroller evaluation and prototyping is made available for developers.

The available kits and boards support different evaluation purposes and requirements - from getting started to complete application-specific solutions.

Together with a wide range of DAVE™ APPs and provided examples a fast-track access to embedded programming with XMC microcontroller.

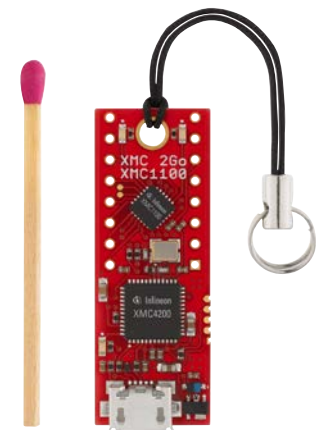
For more information and free downloads, visit www.infineon.com/xmc-dev

Getting started

XMC 2 Go

Order No.: KIT_XMC_2GO_XMC1100_V1

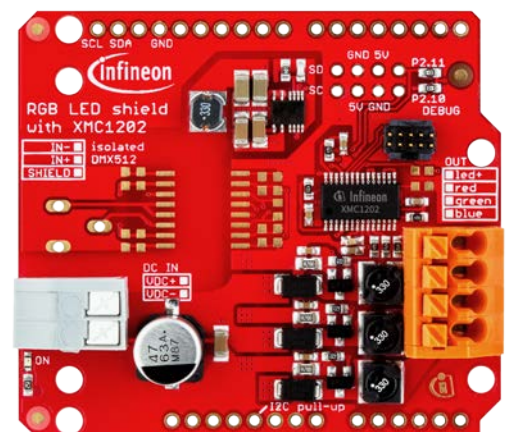
- XMC1100 MCU series, ARM® Cortex™-M0
- On-board J-Link Lite debugger (realized with XMC4200 microcontroller)
- Power over USB (Micro USB)
- ESD and reverse current protection
- 2 x user LED
- Pin header 2x8 pins suitable for breadboard



RGB LED Lighting Shield with XMC1202 for Arduino

Order No.: KIT_LED_XMC1202_AS_01

- XMC1200 MCU series, ARM® Cortex™-M0 with Brightness and Color Control Unit (BCCU)
- 3 independent output channels for flicker-free, high-quality LED lighting solutions
- Compatible with Arduino Uno R3 and XMC1100 Boot Kit [Order No.: KIT_XMC11_BOOT_001]
- Expandable design (e.g. DAM512)

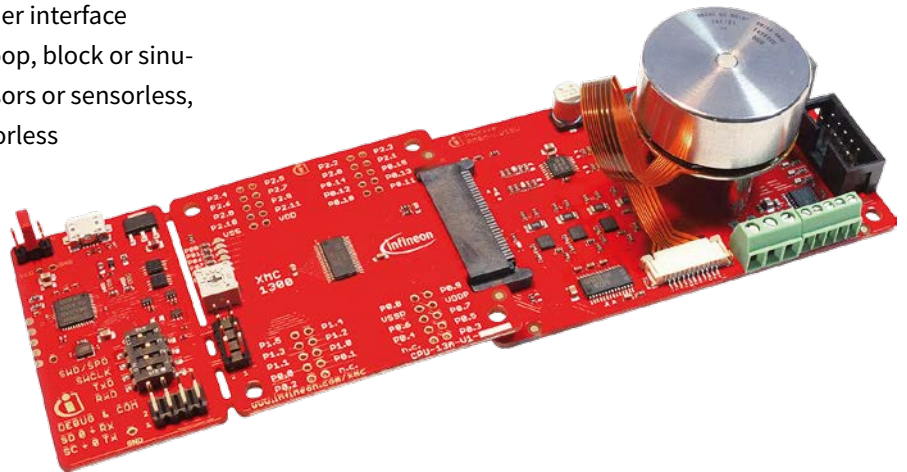


Application-specific

XMC1000 Motor Control Application Kit

Order No.: KIT_XMC1x_AK_Motor_001

- XMC1300 MCU series, ARM® Cortex™-M0 with MATH co-processor
- Detachable SEGGER J-Link debug interface
- Motor board: 12 – 24V, up to 3A, on-board 3-phase motor (24V, 15W) with Hall sensors, and encoder interface
- Supported control schemes: V/f open loop, block or sinusoidal commutation with(out) Hall sensors or sensorless, FOC with Hall sensors, encoder or sensorless



Example: XMC1000 motor control application kit with 3-phase brushless DC motor from Maxon. Featuring XMC1300 microcontroller series, EiceDRIVER™ gate driver, and N-Channel OptiMOS™ power transistors from Infineon

Advanced

XMC 750 Watt Motor Control Kit

Order No.: KIT_XMC750WATT_MC_AK_V1

- XMC1300 drive card with galvanic isolation
- XMC4400 drive card with galvanic isolation
- Power board:
 - 110–230V / 750W
 - Input filter and active PFC
 - 3-phase inverter by reverse conduction IGBT

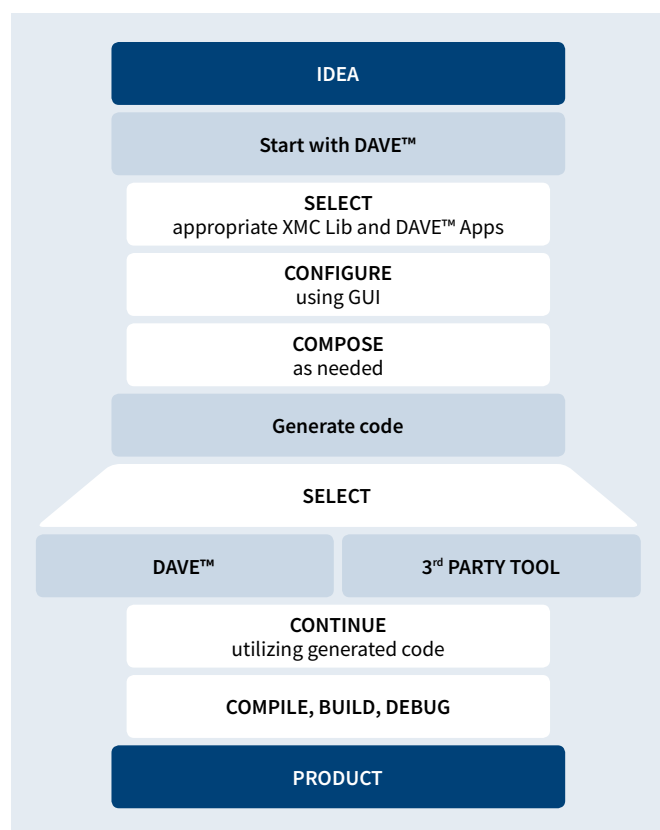




Efficient Tools, Software and Services for the Complete Development Cycle

A complete set of development tools, code repository with ready-to-use software, and supporting services are available for XMC microcontrollers from Infineon and various third-parties.

These tools and software products support the entire development cycle to ensure efficient and high-quality results.



Training and consultant services

A complete offering encompassing documentation, tutorials, training, coaching and consulting

Model-based development

Model-based development methodologies for efficient designs, complex control loops and best utilization

Extensive code repository

XMC Lib (low level driver library), DAVE™ APPs with DAVE™ SDK, and additional examples with graphical configuration and advanced design methods

RTOS and standard middleware

Real-Time Operating Systems (RTOS), middleware software solutions like file systems, graphic libraries, or communication stacks are provided by a wide partner landscape including open source solutions.

C-compiler tools and IDE

The XMC portfolio is supported by all major vendors including CMSIS support packages for header files, startup code, linker script and debugger register view. XMC Lib and DAVE™ APPs are tested with GCC compiler, ARM® compiler and TASKING compiler and released for Altium, ARM/KEIL, Atollic, IAR Systems and Rowley.

Debug, verification and analysis

Professional debuggers with trace, RTOS awareness and data analysis capabilities are available for unit testing and code quality analysis

Flash programming

Multiple options from free-of-charge solutions to professional solutions are available

Board design

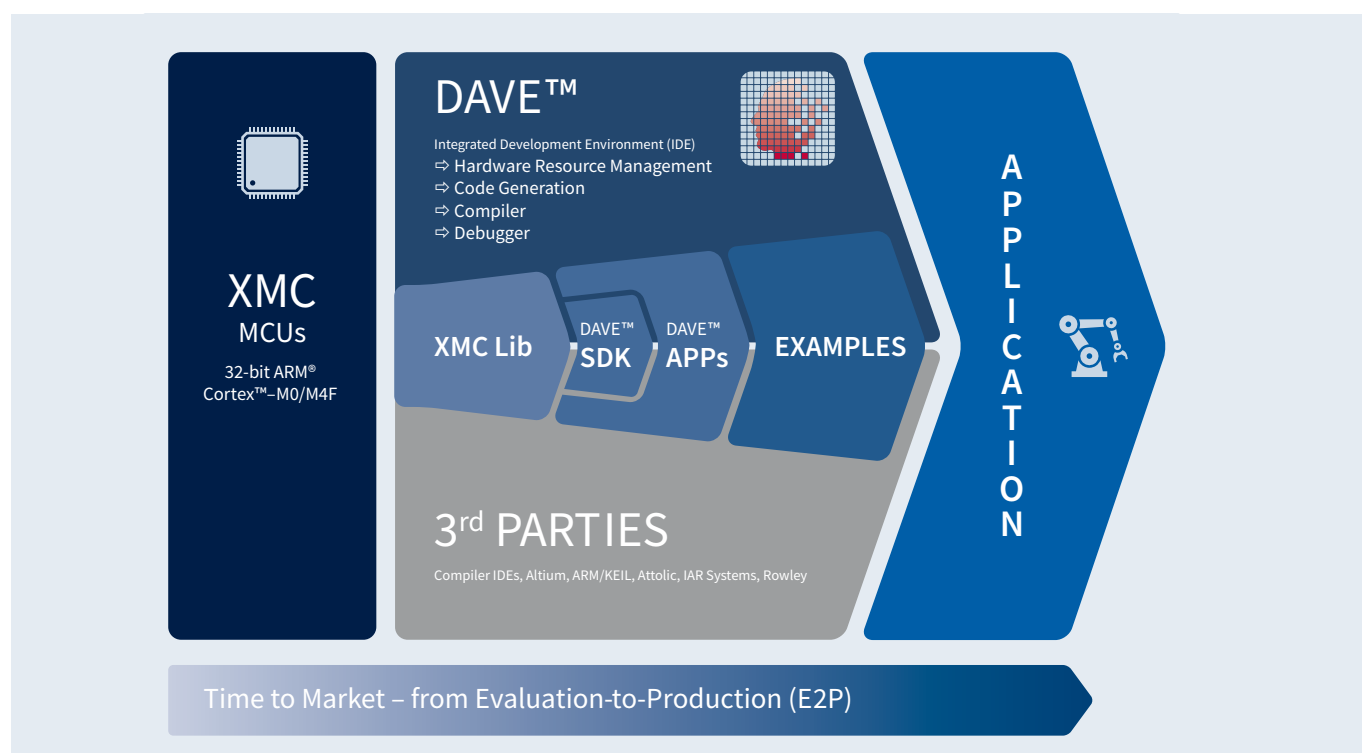
XMC-specific package libraries for PCB design tools, board tests based on boundary scan descriptions, and IBIS models are available for standard design tools

		Modeling, Simulation, Code Generation	RTOS, Middleware, Libraries	Compiler Tools, IDE	Debugging, Test, Verifica- tion	Flash Programming	Training, Consulting	PCB Design and Test	Evaluation Boards
A	ARM/KEIL		•	•	•				
	Altium			•	•			•	
	Atollic			•	•				
B	Bluewind						•		
C	CadSoft							•	
	CMX Systems		•						
	Codesys		•						
E	emtas		•						
	Expresslogic		•						
F	FreeRTOS		•						
G	Goepel							•	
H	HCC embedded		•						
	HI-LO Systems					•			
	HITEX				•	•	•		•
I	IAR System			•	•				
	Interneiche		•						
	Infineon	•	•	•				•	•
	iSystem				•				
L	Lauterbach				•				
M	Mathworks	•							
	Micrium		•						
	MicroConsult						•		
P	Parasoft				•				
	port		•						
	PLS Develop- ment Tools				•				
R	Rowley			•	•				
S	SEGGER			•	•	•			
	SiSy	•		•	•				
	SevenStax		•						
T	Thesycon		•						
W	Willert	•					•		
V	Verifysoft				•				
X	XELTEK					•			

DAVE™ Teams Up With Well-Established ARM® Ecosystem

Application-oriented code repository merged with graphical system design methods and automatic code generator to guide XMC microcontroller customers along the entire process – from evaluation to production (E2P).

XMC Lib and DAVE™ APPs provide a reusable code library. Generated code can be used with other third-party tools.



DAVE™	Free Eclipse-based integrated development environment (IDE) including GNU C-compiler, debugger and code generation plug-in
XMC Lib	CMSIS / MISRA 2004-compliant low level driver library for peripherals (APIs)
DAVE™ Apps	GUI-configurable application-oriented software components using XMC Lib; arranged in a library (APIs)
DAVE™ SDK	Software development kit to modify, enhance, and develop new DAVE™ APPs

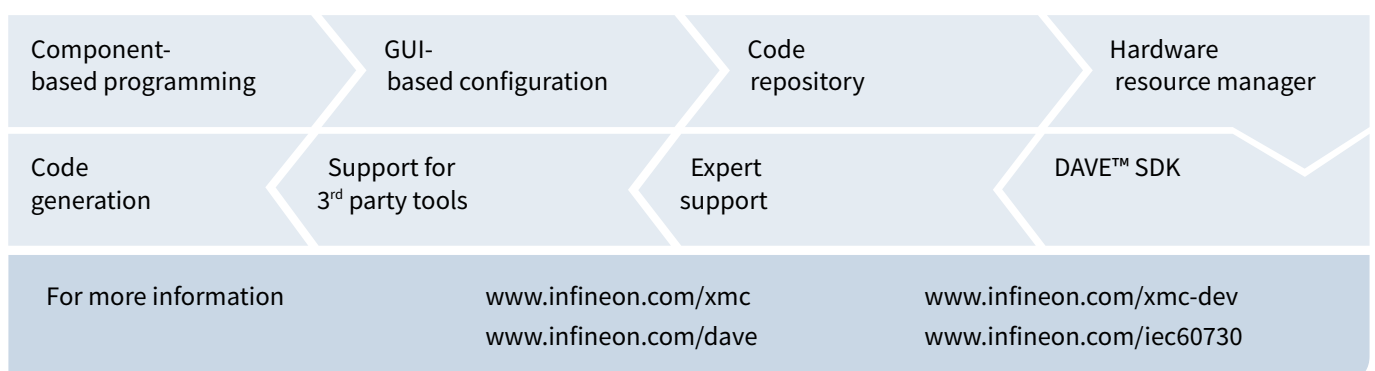
EXAMPLES	XMC Lib and DAVE™ APPs composed to create applications
3rd PARTIES	XMC Lib and DAVE™ APPs are tested with GCC, ARM® and TASKING compilers; released for Altium, Atollic, ARM/KEIL, IAR, Rowley compiler IDEs

www.infineon.com/dave

Overview of XMC Lib and DAVE™ APPs which will be provided as components to either used separately and independent or combined to more complex task/system.

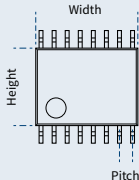
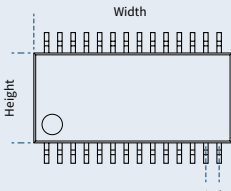
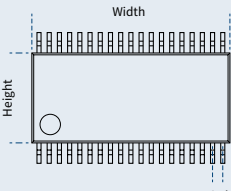
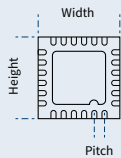
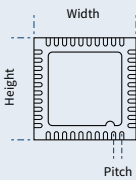
XMC LIB	CMSIS / MISRA 2004-compliant low level driver libraries for XMC peripherals (APIs)				
	System <ul style="list-style-type: none">DMAERUFCEFLASHGPIOMATH	<ul style="list-style-type: none">PAUPRNGRTCSCUWDT	Timer/PWM <ul style="list-style-type: none">CCU4CCU8HRPWMPOSIF	Analog/Mixed Signal <ul style="list-style-type: none">ACMPADCDAC	Communication <ul style="list-style-type: none">CANI2CSPIUARTUSBUSIC
DAVE™ APPs	Graphical User Interface (GUI)-configurable application-oriented software components using XMC Lib (Low Level Driver); arranged in a library (APIs)				
	General Purpose <ul style="list-style-type: none">ADC_MEASUREMENTADC_QUEUEADC_SCANCAN_NODECAPTURECLOCKCOUNTERCRC_HWCRC_SWCRYPTO_AESDACDAC_BCCUDAC_LUTDAC_SWEEPDBG_PINDMA_CHE_EEPROMEVENT_DETECT		<ul style="list-style-type: none">EVENT_GENEXT_INTERRUPTGPIOINTERRUPTIO_PORTPRNG_HWPWMPWM_BCPWM_CCU4PWM_CCU8PWM_SVMRTCSYSTIMERTEMPERATURETIMERWATCHDOG	Application-specific <p>Motor Control</p> <ul style="list-style-type: none">ACIM_FOCACIM_FREQ_CTRLBLDC_SCALAR_CTRLMOTOR_LIBPMSM_FOCPMSM_SCALAR_CTRLQUAD_ENC_POSIFRESOLVER <p>Power Conversion</p> <ul style="list-style-type: none">BUCK_CONVERTERCURRENTCTRLHRPWMPOWER_MGMT <p>Lighting</p> <ul style="list-style-type: none">PDM_BCCU	General Purpose <ul style="list-style-type: none">ADALI_CDDALI.CGDISPLAY_14SEGDISPLAY_7SEGFTPGUI_KeyBoardGUI_LCDGUI_MouseGUI_SeggerLibHALL_POSIFHTTPI2C_MASTERI2C_SLAVELED_LAMPLED_MATRIXMANCHESTER_SWMODBUSRTOSSNMP
EXAMPLES	XMC Lib (Low Level Driver for XMC MCUs) and DAVE™ Apps composed to create applications				

DAVE™ – Simplify Your Software Design Process

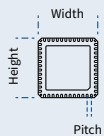
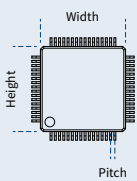
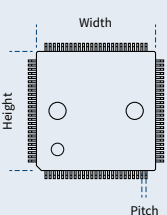
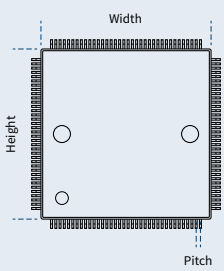
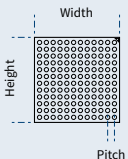


XMC Package Overview

XMC1000

				
PG-TSSOP-16-8	PG-TSSOP-28-16	PG-TSSOP-38-9	PG-VQFN-24-19	PG-VQFN-40-13
Body 4.4 x 5 mm (H x W)	Body 4.4 x 9.7 mm (H x W)	Body 4.4 x 9.7 mm (H x W)	Body 4 x 4 mm (H x W)	Body 5 x 5 mm (H x W)
Pitch 0.65 mm	Pitch 0.65 mm	Pitch 0.5 mm	Pitch 0.5 mm	Pitch 0.4 mm

XMC4000

				
PG-VQFN-48-53	PG-LQFP-64-19	PG-LQFP-100-11	PG-LQFP-144-18	PG-LFBGA-144-10
Body 7 x 7 mm (H x W)	Body 10 x 10 mm (H x W)	Body 14 x 14 mm (H x W)	Body 20 x 20 mm (H x W)	Body 10 x 10 mm (H x W)
Pitch 0.5 mm	Pitch 0.5 mm	Pitch 0.5 mm	Pitch 0.5 mm	Pitch 0.8 mm

For more information see: www.infineon.com/package

XMC Portfolio Overview

		PIN-Count / Package									
		TSSOP-16 4.4 x 5 mm 0.65mm pitch	VQFN-24 4 x 4 mm 0.5mm pitch	TSSOP-28 4.4 x 9.7 mm 0.65mm pitch	TSSOP-38 4.4 x 9.7 mm 0.5mm pitch	VQFN-40 5 x 5 mm 0.4mm pitch	VQFN-48 7 x 7 mm 0.5mm pitch	LQFP-64 10 x 10 mm 0.5mm pitch	LQFP-100 14 x 14 mm 0.5mm pitch	LFBGA-144 10 x 10 mm 0.8mm pitch	LQFP-144 20 x 20 mm 0.5mm pitch
Memory (Flash, RAM and Cache)	1MB								XMC4500-F100_1024	XMC4500-E144_1024	XMC4500-F144_1024
	768KB								XMC4500-F100_768 XMC4502-F100_768		XMC4500-F144_768
	512KB								XMC4504-F100_512 XMC4400-F100_512		XMC4504-F144_512
	256KB							XMC4400-F64_512 XMC4400-F64_256 XMC4402-F64_256	XMC4400-F100_512 XMC4402-F100_256 XMC4400-F100_256		
	200KB				XMC1302-T038_0200 XMC1201-T038_0200	XMC1201-Q040_0200					
	128KB				XMC1302-T038_0128 XMC1201-T038_0128	XMC1302-Q040_128 XMC1201-Q040_128	XMC4100-Q48_128 XMC4104-Q48_128	XMC4100-F64_128 XMC4104-F64_128			
	64KB	XMC1100-T016F0064	XMC1302-Q024_0064 XMC1100-Q024_0064		XMC1302-T038_0064 XMC1201-T038_0064 XMC1100-T038_0064	XMC1302-Q040_0064 XMC1201-Q040_0064 XMC1100-Q040_0064	XMC4104-Q48_64 XMC4108-Q48_64	XMC4104-F64_64			
	32KB	XMC1302-T016X0032 XMC1202-T016X0032 XMC1100-T016F0032	XMC1302-Q024_0032 XMC1302-Q024_0032 XMC1100-Q024_0032	XMC1202-T028_0032	XMC1302-T038_0032 XMC1301-T038_0032 XMC1201-T038_0032 XMC1100-T038_0032	XMC1302-Q040_0032 XMC1301-Q040_0032 XMC1202-Q040_0032 XMC1201-Q040_0032 XMC1100-Q040_0032					
	16KB	XMC1301-T016X0016 XMC1302-T016X0016 XMC1202-T016X0016 XMC1100-T016F0016	XMC1301-Q024_0016 XMC1302-Q024_0016 XMC1202-Q024_0016 XMC1100-Q024_0016	XMC1202-T028_0016	XMC1302-T038_0016 XMC1201-T038_0016 XMC1100-T038F0016	XMC1301-Q040_0016 XMC1302-Q040_0016 XMC1201-Q040_0016 XMC1100-Q040F0016					
	8KB	XMC1301-T016_0008 XMC1302-T016_0008 XMC1100-T016_0008	XMC1301-Q024_0008 XMC1100-Q024_0008		XMC1301-T038_0008	XMC1301-Q040_0008					



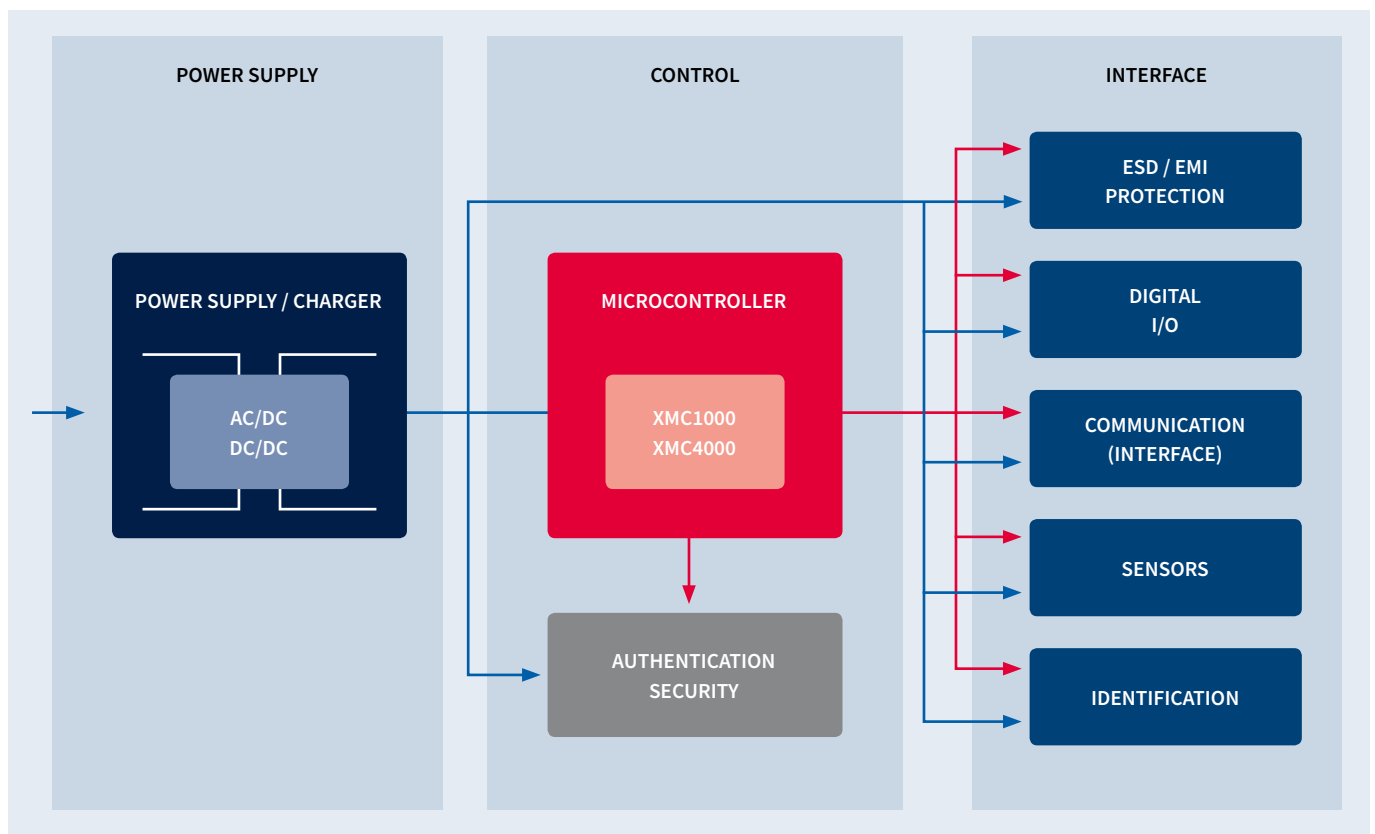
XMC1000 Family = ARM® Cortex™-M0



XMC4000 Family = ARM® Cortex™-M4 with built-in DSP and FPU



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