XMC1000:
8-bit price for 32-bit power.

International Press Conference
Am Campeon, January 17, 2013

Peter Schäfer, Vice President and General Manager, Microcontrollers
Stephan Zizala, Senior Director, Industrial & Multimarket Microcontrollers



XMC1000:
8-bit price for 32-bit power.

- Infineon's microcontroller solutions
- XMC industrial microcontroller news
- Questions and answers

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Infineon's target markets: Automotive, Industrial, Security

Focus Areas

- Energy Efficiency
- Mobility
- Security







Core Competencies

- Analog/Mixed Signal
- Power
- Embedded Control
- Manufacturing Competence

Our Target Markets

- Automotive
- Industrial Electronics
- Security









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Significant electric energy savings are possible already today

	Electricity consumption	Saving potential	Application examples
Consumer power supply	Others 14%	1% … >90%	
Computing power supply	Information & Comm. 10%	>1%	
EC-Ballast Daylight dimming HID, LED, …	Lighting 21%	>25%	
Factory automation, Process engineering, Heavy industry, Light industry, …	Motors 55%	25% … >40%	
Transportation: Train, bus, car, …			
Home appliances: Fridge, washing machine, air conditioning, …			





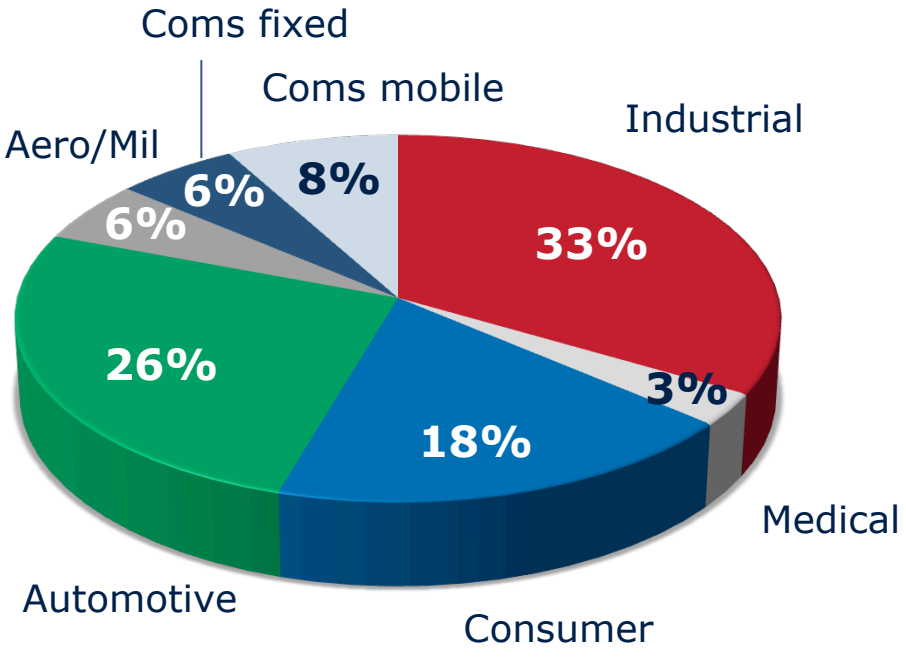


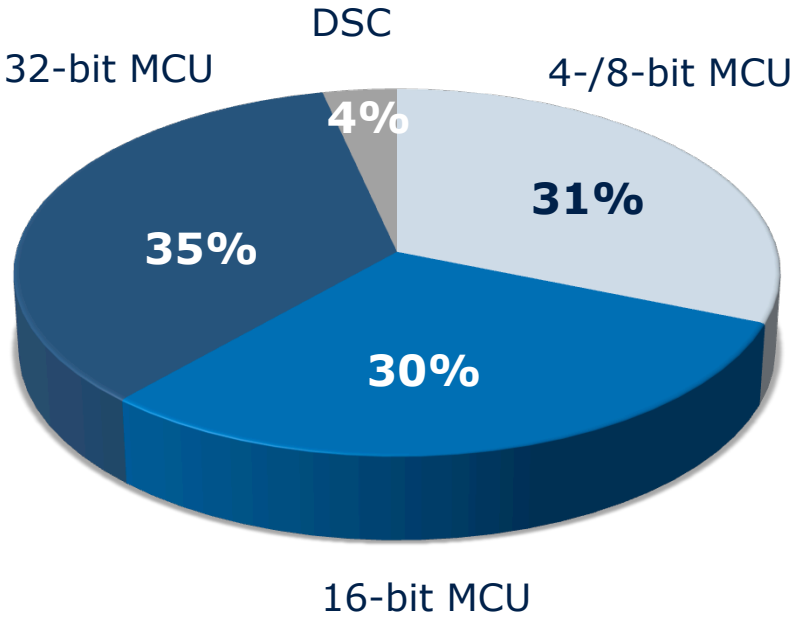
Sources: ZVEI, Infineon

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Infineon focuses on automotive and industrial microcontroller markets

World-wide MCU and DSC market in 2013: USD 18bn





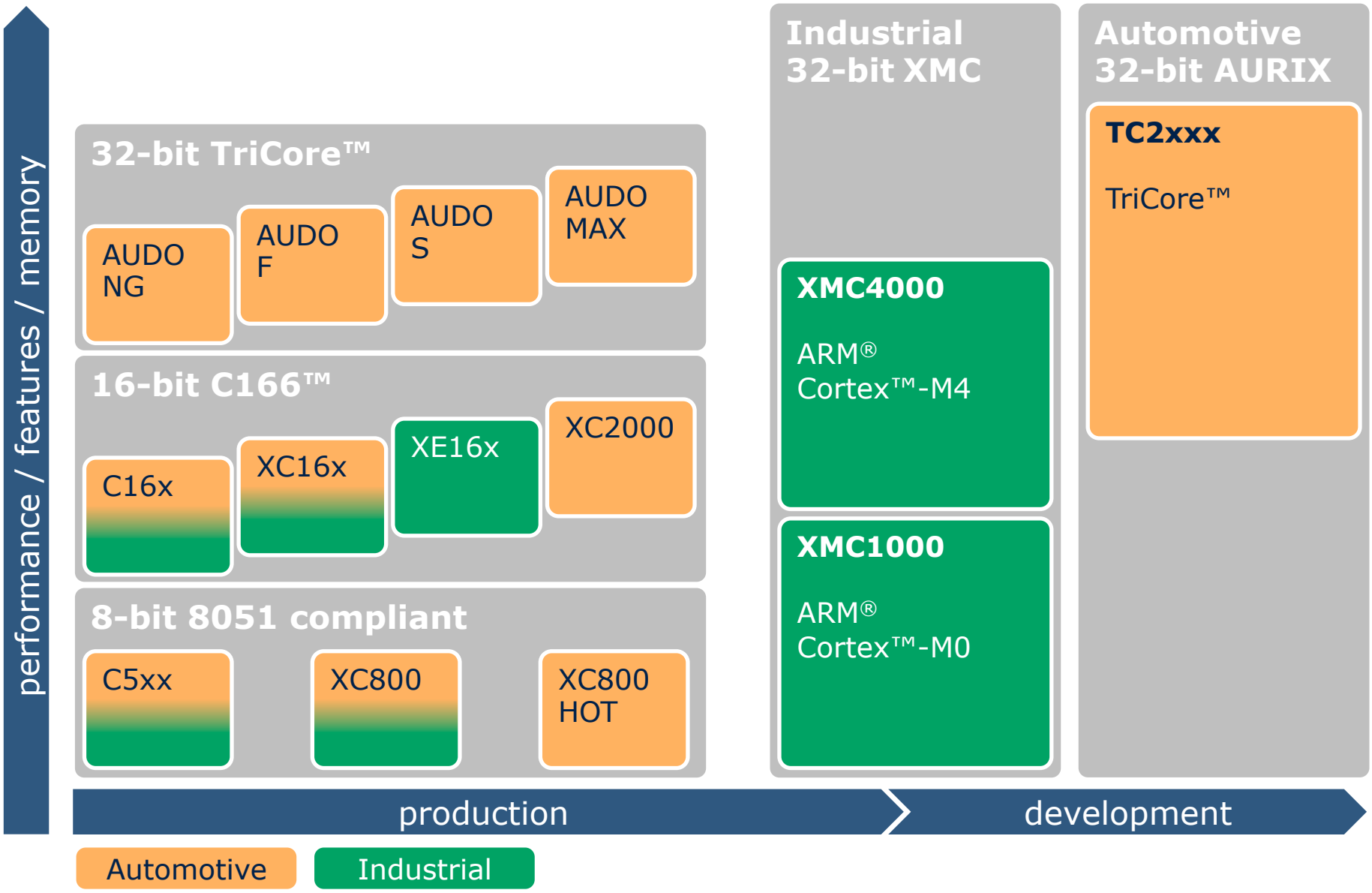
Application split

Architecture split

Source: IMS Research, 2012

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Infineon microcontrollers enable customers to differentiate



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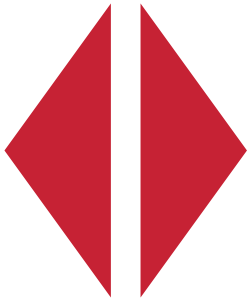
AURIX and XMC: A strong joint basis, clear differentiation, continuous inspiration

Common AURIX and XMC differentiators:

Real-time performance optimization, long life-time, reliability

AURIX differentiators:

- Multicore performance
- Safety
- Security
- Scalability
- Secure supply



Exchange

XMC differentiators:

- Optimized inverter control peripherals
- Configurability
- DAVE™: high-level software development tools

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XMC4000 key applications:
Focus on mid-range/high-end industrial control







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New key application fields for XMC1000: Focus on low-end industrial control



Sensors
Actuators
General purpose



LED Lighting
- Color control
- Brightness control
- Connectivity



Power Conversion
- Power supplies
- Chargers
- Induction cookers



Motor control
- AC Induction motors
- BLDC motors
- PMSM motors

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5 P barrier for low-end microcontrollers: Breakthrough to be achieved

Workaround:
Architecture break

32-bit
microcontrollers

Performance, **P**eripherals, **P**rogram memory, **P**ortfolio scalability, **P**rice

XMC1000

8-bit
microcontrollers

Workaround:
32-bit core,
8-bit or
"no" peripherals

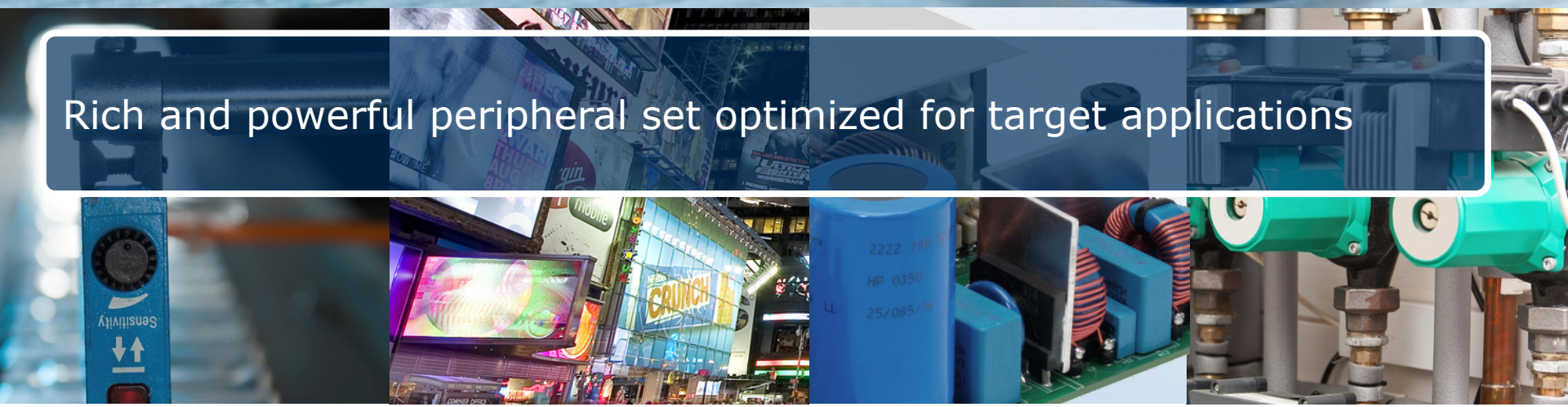
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XMC1000:
8-bit price for 32-bit power

Leading edge 65nm embedded flash technology on 300mm wafers

Industry standard 32-bit ARM® Cortex™-M0 processor

Rich and powerful peripheral set optimized for target applications



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New XMC1000 family
8-bit price for 32-bit power

●●● 23 products ●●● 3 packages TSSOP-16, -28, -38 ●●● 8KB to 200KB Flash ●●●

High volume price range: from Euro 0.25 to Euro 1.25

XMC1300
Control series

- Special-purpose **timers** for **motor control** and digital **power conversion**
- **Motor position interface**

- **MATH coprocessor**
- Temperature range up to **105°C**

XMC1200
Feature series

- LED lighting control peripheral
- Capacitive touch and LED-display control

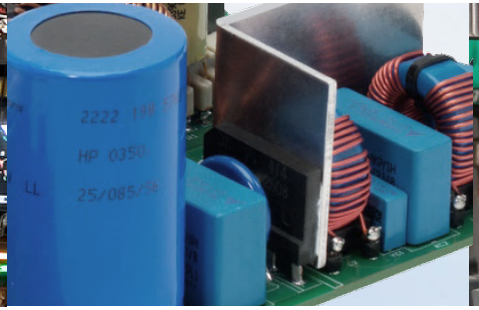
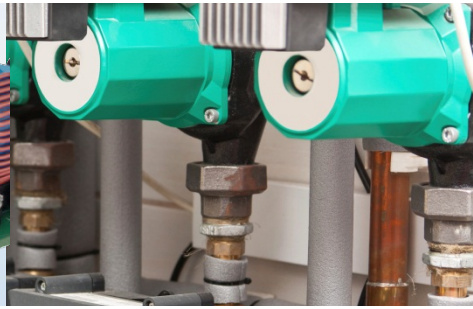
- Temperature range up to **105°C**

XMC1100
Entry series

- Rich low-end feature set
- Wide application range



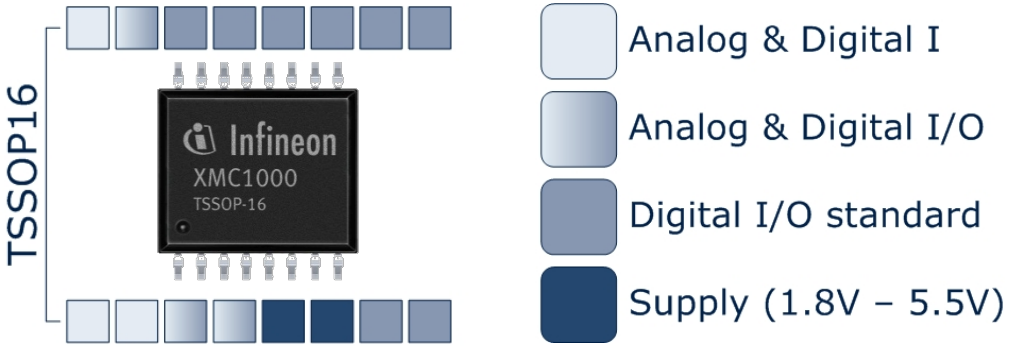


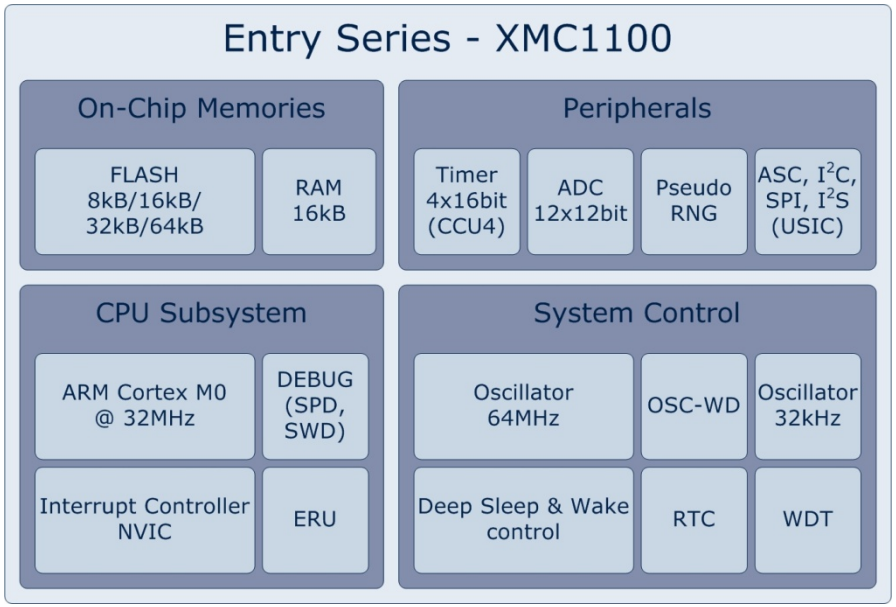



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Applications focus:
Sensors, actuators, general purpose

Feature rich, low-end ARM® Cortex™-M0 microcontrollers





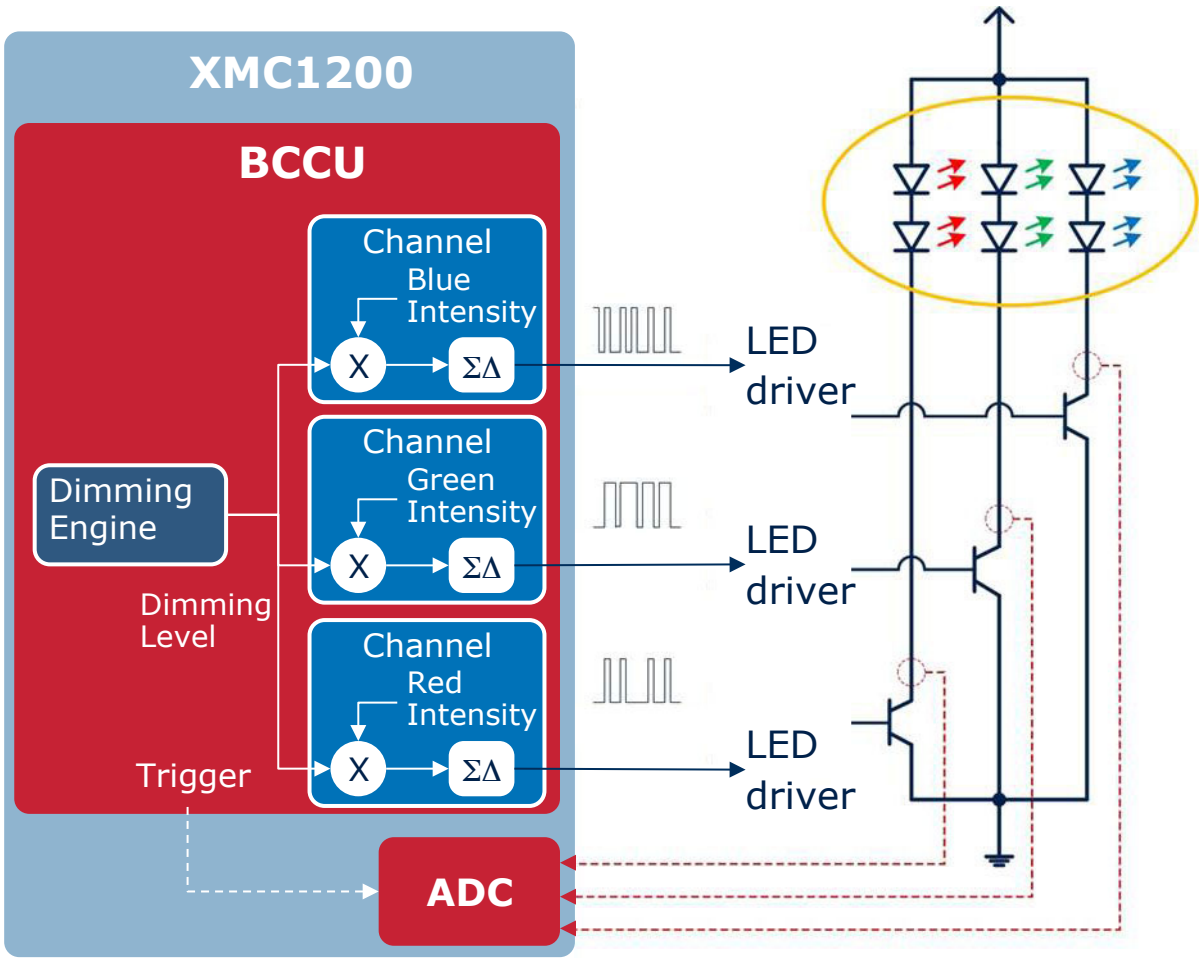
Key features in a 16-pin package

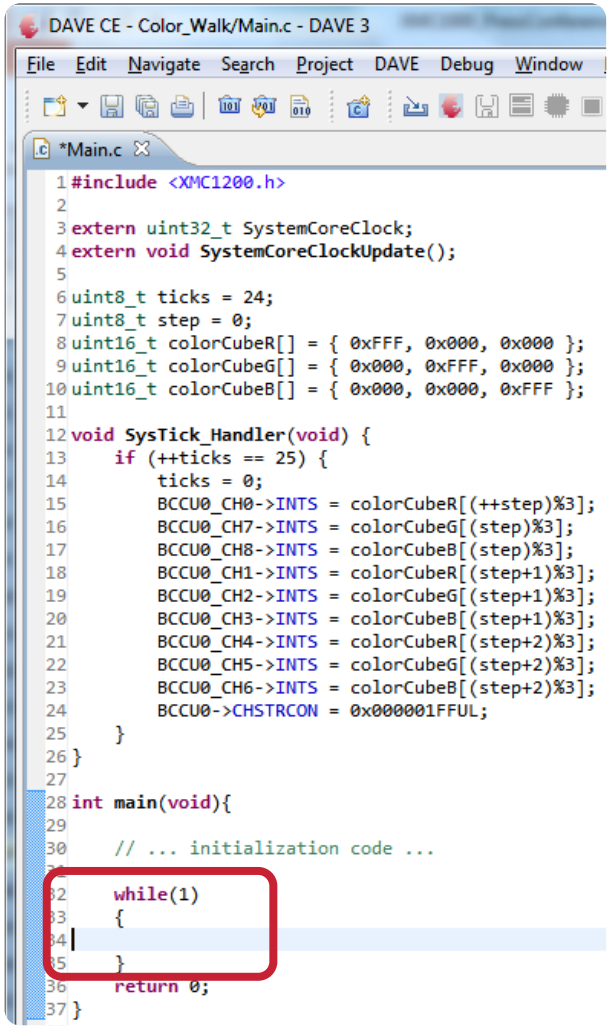
- 14 functional pins
- 1.8V to 5.5V supply
- 6 ADC channels
  - 12-bit resolution
  - 1.88 MSPS @ 12-bit
- 4 flexible 16-bit timers (CCU4)
- Pseudo RNG
- 2 serial interface channels:
  UART, I2C, I2S, SPI
- Class B compliance

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Application focus: LED Lighting

Flicker-free dimming and color control with close to 0 processor load. Enough headroom to run DALI or DMX.

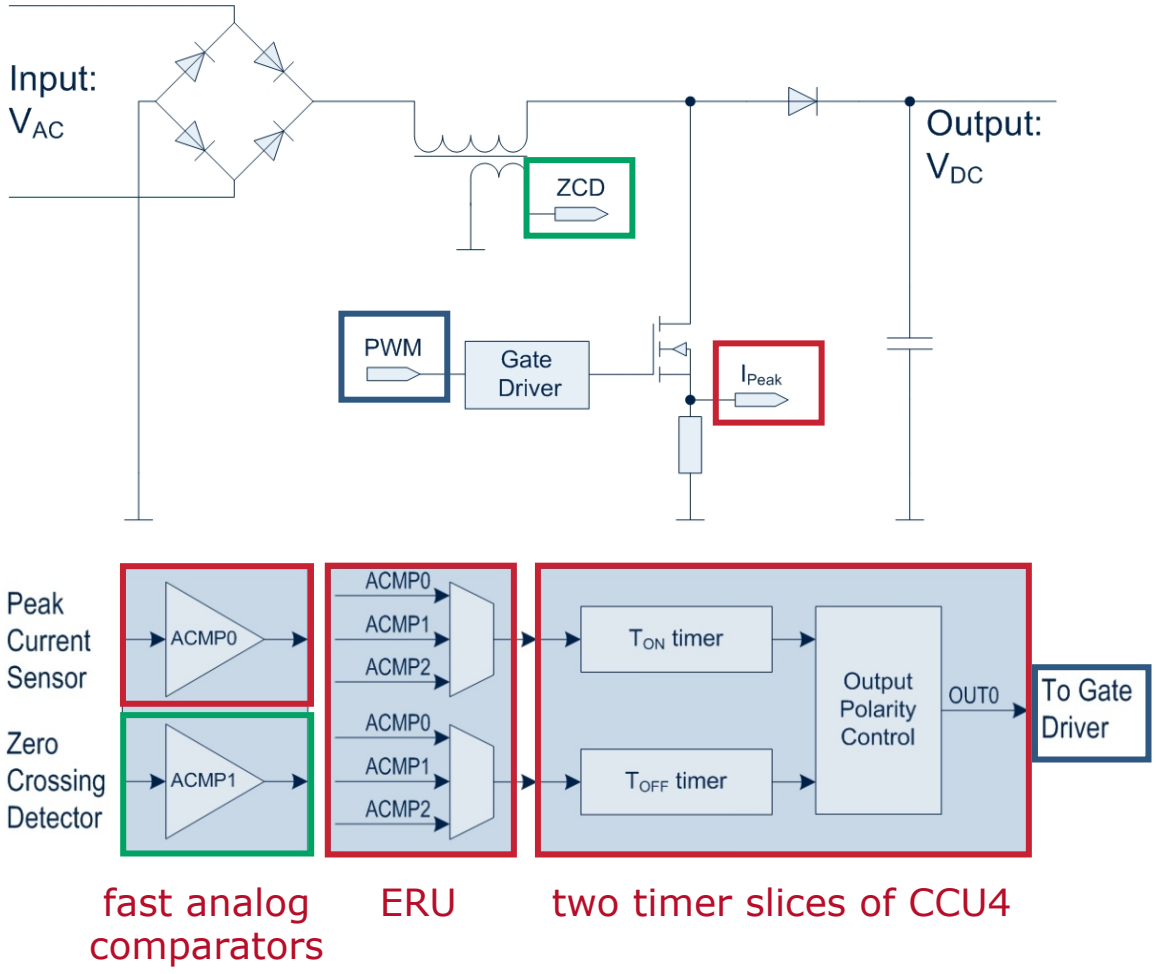




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Application focus: Digital Power Conversion

Example Power Factor Correction (PFC)

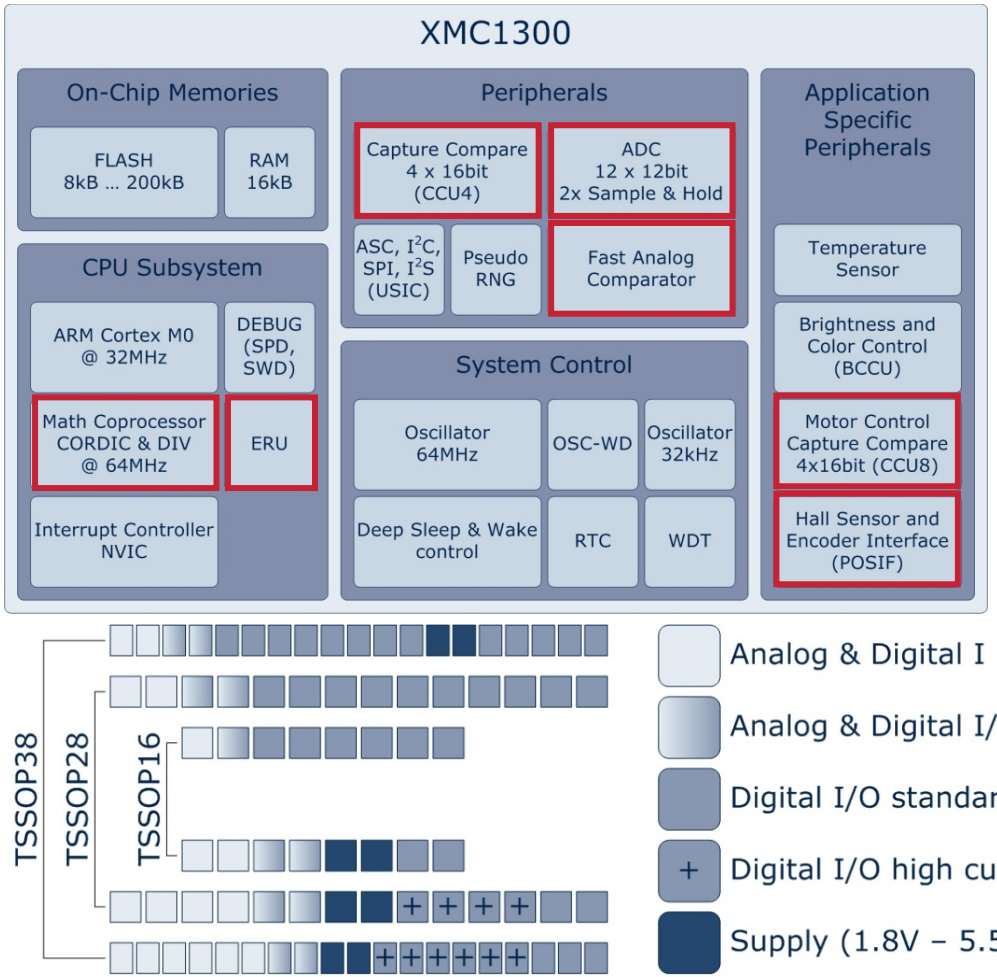


- PWM generation by
  - fast analog comparators
  - Event Request Unit enables adaptation of peripherals interconnection
  - Flexible use of CCU4 as power converter control timer
- ARM® Cortex™-M0 with single cycle multiply for fast calculation of compensator loop

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Application focus: Low-end motor control up to sensorless field oriented control

All kinds of low-end motors: fans, pumps, appliances, e-bikes, …



- Co-processor for vector rotations and hardware divide
- Dedicated inverter control timers (CCU8)
- Hall-sensor and encoder interface
- 12 x 12-bit ADC channels with 2 sample and hold stages
- 3 analog fast comparators
- Programmable hardware trigger signals

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New challenge solved by XMC1000: Protecting software IP

The problem: protect software IP, e.g. of design-houses

- Prevent "perfect" software copies in a long value chain
- Enable royalty based business model

Solution idea: link software to a limited number of chips

1 Infineon

- Generates keys
- Stores keys in chip in hidden memory
- Provides key to SW house

2 SW house

- Encrypts software
- Sends encrypted software to EMS/ODM

3 EMS/ODM

- Loads encrypted software on chip

4 XMC1000

- On-chip AES-128 decrypts software and stores it in memory
- Chip becomes read protected

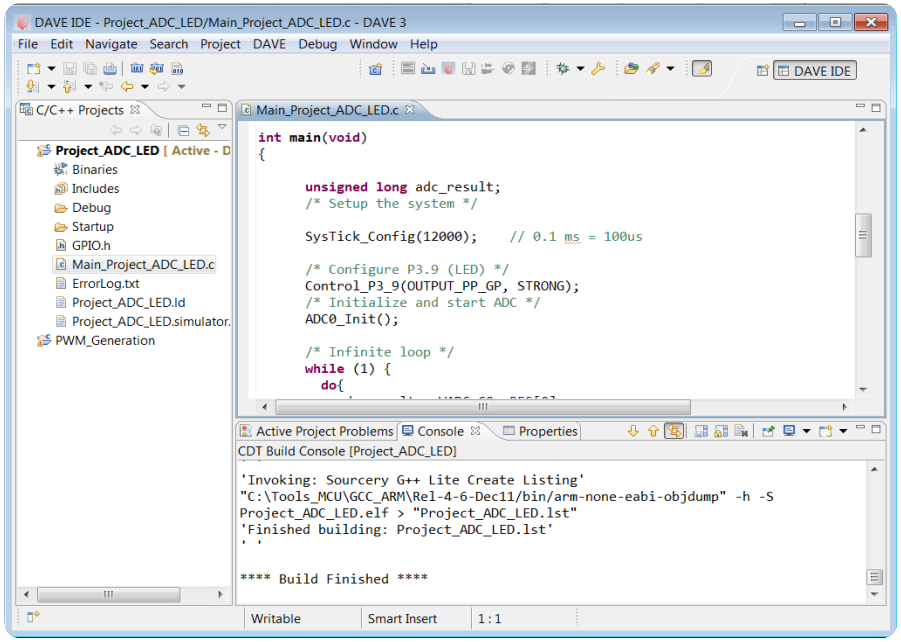
Chip functionality available,
IP protection market introduction planned for 2H/2013

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XMC1000 is fully integrated in DAVE™

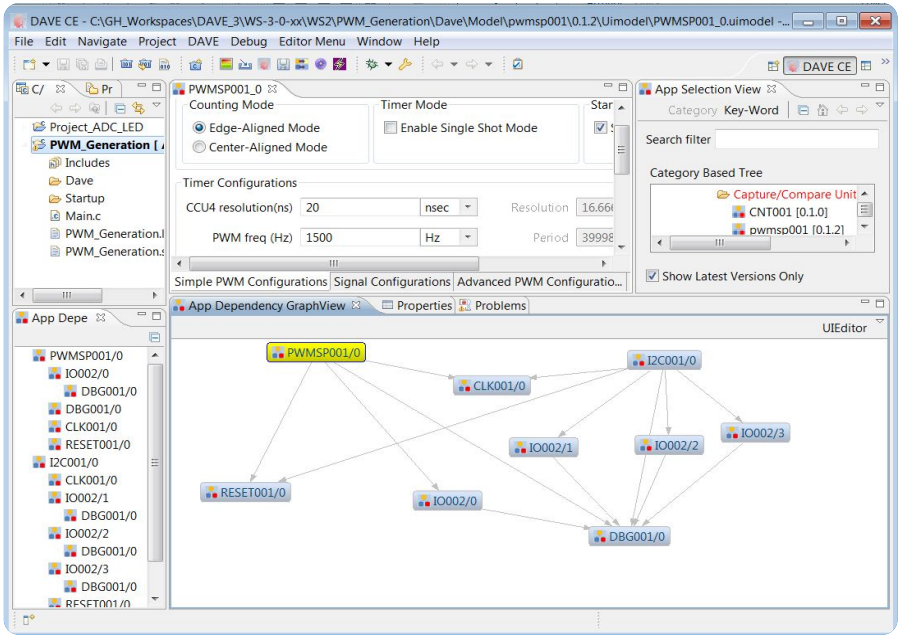
Integrated Development Environment (IDE)

- Eclipse based
- Free GNU compiler, debugger, loader
- 3rd party tool integration (e.g. compiler, debugger)



Component based programming with DAVE™ Apps

- Selection, configuration and combination of DAVE™ Apps via a graphical user interface
- Automatic hardware mapping of DAVE™ Apps
- Automatic C code generation and documentation
- 3rd party software integration (e.g. OS)



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DAVE™ enables seamless scalability between XMC1000 and XMC4000

1 DAVE™

- Common graphical programming development environment
- Common DAVE™ Apps library
- Seamless integration of specific peripherals via DAVE™ Apps

2 Common peripherals

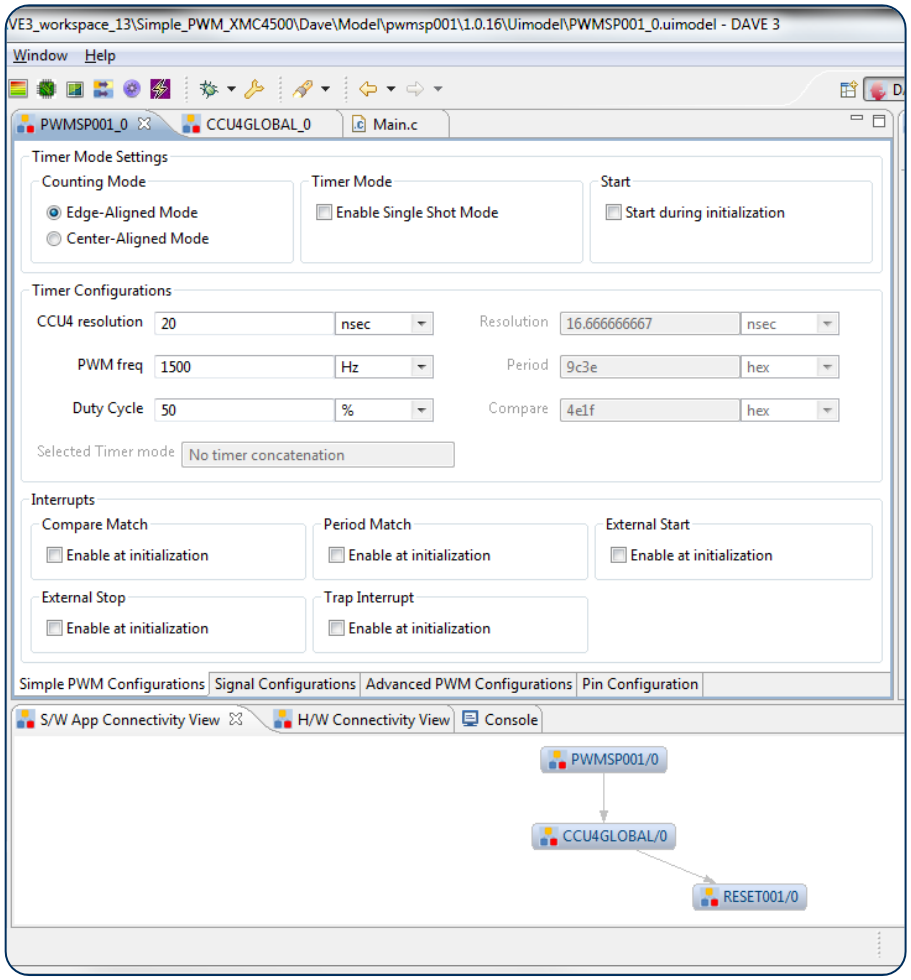
- Timers: CCU4, CCU8
- Position interface: POSIF
- 12-bit ADC
- LED, touch sensing control
- USIC
- …

3 ARM® Cortex™ processor family and ecosystem

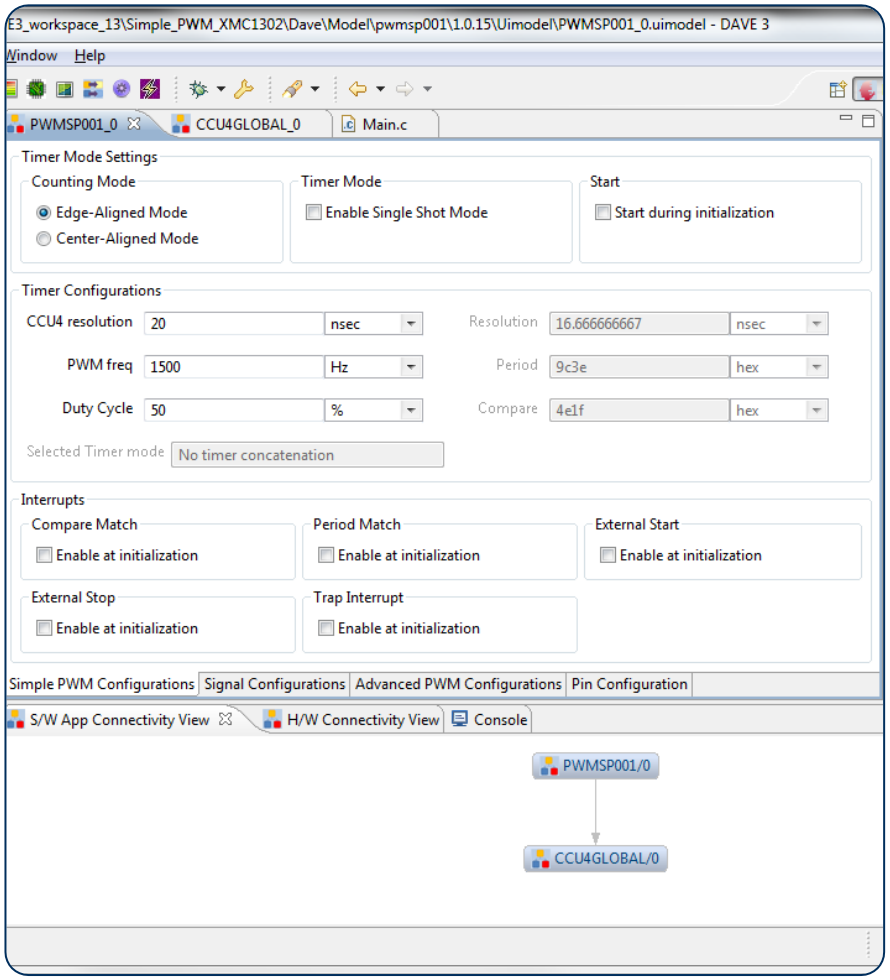
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DAVE™ provides the same user interface for all XMC products and eases scalability

XMC4500



XMC1300

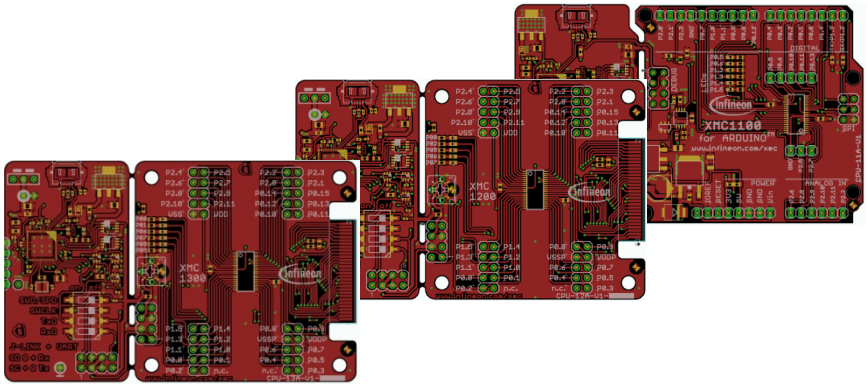


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Wide range of XMC1000 Boot Kits and Application Kits available in March 2013

Boot Kits

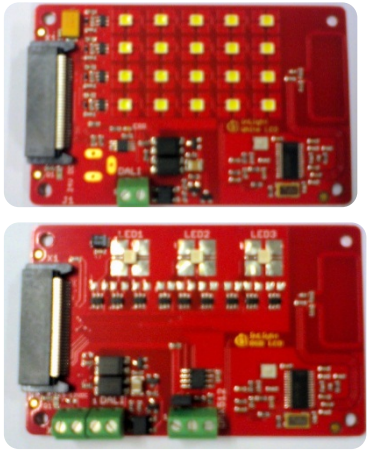
- Easy device evaluation
- Debugger (Wiggler) included
- Extendable with application cards
- Integrated in DAVE™



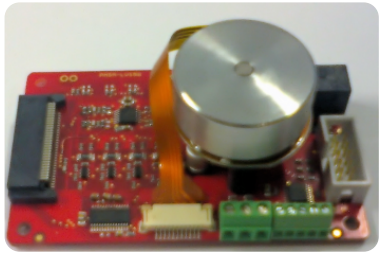
- XMC1100, XMC1200 and XMC1300 Boot Kits available in March 2013

Application Kits

- Showcasing application performance
- Application code included
- Integrated in DAVE™



- Dimming/color mixing, DALI/DMX Application Kits available in March 2013



- Motor control Application Kit available in May 2013

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XMC1000: 8-bit price for 32-bit power

XMC1000 is the new ARM® Cortex™-M0 32-bit low-end industrial microcontroller family targeted **as 8-bit replacement**

XMC1000 is the first ARM® Cortex™-M0 microcontroller in a **65nm embedded flash technology** on **300mm wafers**

XMC1000 is optimized for **sensors/actuators, LED lighting, power conversion, low-end motor control**, and fits also for **general purpose low-end applications**

Scalability to the ARM® Cortex™-M4 **XMC4000** industrial microcontroller family is given by common peripherals and the free Apps based development environment **DAVE™**

Samples of the **XMC1100, XMC1200 and XMC1300 series** with flash ranges from 8KB to 200KB will be **available in March 2013**

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One microcontroller platform. Countless solutions. XMC.



XMC1000:
8-bit price for 32-bit power

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