Infineon XC800 8-bit Microcontrollers

The XC800 microcontroller family combines a high-performance 8051 core, on-chip Flash and RAM, and a powerful mix of peripherals like CAN, LIN, A/D Converter, and enhanced Compare/Capture. These devices reduce system costs because of their highly-integrated features and ability to operate at 3.3V or 5V. XC800 applications are easily migrated to the more powerful XC166 devices.

**XC800 Device Overview**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>CPU Clock (MHz)</th>
<th>Timers</th>
<th>Flash (bytes)</th>
<th>E' - Prom (bytes)</th>
<th>RAM (bytes)</th>
<th>ADC</th>
<th>GPIO (max)</th>
<th>CAP</th>
<th>COM</th>
<th>MDU</th>
<th>Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>XC866L</td>
<td>26.67</td>
<td>3</td>
<td>8/16K</td>
<td>Up to 4K</td>
<td>768</td>
<td>8</td>
<td>27</td>
<td>3+1</td>
<td>UART, SSC, LIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XC886CLM</td>
<td>24</td>
<td>4</td>
<td>24/32K</td>
<td>Up to 8K</td>
<td>1792</td>
<td>8</td>
<td>34</td>
<td>3+1</td>
<td>✔ 2xUART, SSC, CAN, LIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XC888CLM</td>
<td>24</td>
<td>4</td>
<td>24/32K</td>
<td>Up to 8K</td>
<td>1792</td>
<td>8</td>
<td>48</td>
<td>3+1</td>
<td>✔ 2xUART, SSC, CAN, LIN</td>
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<td></td>
</tr>
</tbody>
</table>

For a complete list of XC800 devices, refer to www.keil.com/infineon

Infineon XC166 16-bit Microcontrollers

The XC166 microcontroller family extends the popular C166 family to include a wide range of products scalable in performance, memory, and peripherals. It is easy to migrate existing applications to the XC166 and improve performance as XC166 devices are speed-optimized and include a Multiply and Accumulate Unit (MAC) that may be used for sophisticated DSP algorithms.

**XC166 Device Overview**

<table>
<thead>
<tr>
<th>Family</th>
<th>Part Number</th>
<th>CPU Clock (MHz)</th>
<th>ROM/Flash (bytes)</th>
<th>RAM (bytes)</th>
<th>GPIO (max)</th>
<th>ADC</th>
<th>CAP</th>
<th>COM</th>
<th>Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>XC161</td>
<td>XC161CJ-16F20F/-16F40F</td>
<td>20/40</td>
<td>128K Flash</td>
<td>8K</td>
<td>99</td>
<td>12</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, I2C, 2xCAN, J1850</td>
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</tr>
<tr>
<td></td>
<td>XC161CS-32F20F/-32F40F</td>
<td>20/40</td>
<td>256K Flash</td>
<td>12K</td>
<td>99</td>
<td>12</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, I2C, 2xCAN</td>
<td></td>
</tr>
<tr>
<td>XC164CM</td>
<td>XC164CM-4F20F/-4F40F</td>
<td>20/40</td>
<td>32K Flash</td>
<td>4K</td>
<td>47</td>
<td>14</td>
<td>16+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XC164CM-8F20F/-8F40F</td>
<td>20/40</td>
<td>64K Flash</td>
<td>6K</td>
<td>47</td>
<td>14</td>
<td>16+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
<td></td>
</tr>
<tr>
<td>XC164CS</td>
<td>XC164CS-8F20F/-8F40F</td>
<td>20/40</td>
<td>64K Flash</td>
<td>8K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
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<tr>
<td></td>
<td>XC164CS-8R20F/-8R40F</td>
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<td>64K ROM</td>
<td>8K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
<td></td>
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<tr>
<td></td>
<td>XC164CS-16F20F/-16F40F</td>
<td>20/40</td>
<td>128K Flash</td>
<td>8K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
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<tr>
<td></td>
<td>XC164CS-16R20F/-16R40F</td>
<td>20/40</td>
<td>128K ROM</td>
<td>8K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
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<tr>
<td></td>
<td>XC164CS-32F20F/-32F40F</td>
<td>20/40</td>
<td>256K Flash</td>
<td>12K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
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<tr>
<td></td>
<td>XC164CS-32R20F/-32R40F</td>
<td>20/40</td>
<td>256K ROM</td>
<td>12K</td>
<td>79</td>
<td>14</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, 2xCAN</td>
<td></td>
</tr>
<tr>
<td>XC167</td>
<td>XC167CI-16F20F/-16F40F</td>
<td>20/40</td>
<td>128K Flash</td>
<td>8K</td>
<td>103</td>
<td>16</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, I2C, 2xCAN</td>
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<tr>
<td></td>
<td>XC167CI-32F20F/-32F40F</td>
<td>20/40</td>
<td>256K Flash</td>
<td>12K</td>
<td>103</td>
<td>16</td>
<td>32+3+1</td>
<td>2xUART, 2xSSC, I2C, 2xCAN</td>
<td></td>
</tr>
</tbody>
</table>

For a complete list of XC166 devices, refer to www.keil.com/infineon
Creating XC800 & XC166 Projects

**Step 1. Setup Device/Peripherals**

DAvE is an Expert Wizard for Infineon microcontrollers that automatically configures your system and helps you get started. It provides menu driven templates that generate driver code for all on-chip peripherals. DAvE shortens the learning curve and helps you rapidly get started developing working source code.

DAvE is freely available from the Infineon web site. For more information, refer to www.infineon.com/DAvE

**Step 2. Import Into µVision®**

Once you have used DAvE to generate CPU and peripheral settings, import the DAvE project into the Keil µVision IDE and create the remaining application code.

The µVision IDE integrates the most efficient C compilers for the Infineon XC800 and XC166 devices with all the tools required to create executable programs. Program examples are found at www.keil.com/download and www.keil.com/appnotes

- Application Note 182 shows how to create µVision projects using DAvE.
- Application Note 178 shows how to use the MAC Unit on the XC166 devices to implement DSP algorithms for signal processing.

µVision ensures easy and consistent project management. A single project file saves all configuration information and the Device Database® automatically sets all tool options and customizes dialogs.
Step 3. Test Application with µVision

Once you have created your application program you need to debug it. The µVision Debugger may be configured as a simulator (where programs run on your PC) or as a target debugger (where programs run on your target hardware), on the Debug tab of the Options for Target dialog. The simulator is a software-only product that simulates most features of Infineon devices without actually having target hardware. µVision simulates a wide variety of peripherals including the serial port, external I/O, timers, and interrupts. The actual peripherals simulated are dependant on the chip. Simulated capabilities are based on the MCU selected from the device database for your project target.

- **The toolbox contains buttons you define to run commands or debug functions.**
- **Peripheral dialogs display status information and aid in driver development.**
- **The logic analyzer shows changes to variables and signals over time.**
- **You may drag and drop symbol names to other debugger windows.**
- **The performance analyzer displays execution times for program blocks.**
- **Memory and watch windows display important program variables.**

µVision provides a single environment for editing, simulating, Flash programming, and testing target hardware. Most editor and debugger functions are accessible from the toolbar.

Step 4. Run on Target Hardware

Infineon microcontrollers integrate an On-Chip Debugging system (OCDS). To interactively test and debug programs, you can use the Keil ULINK™ USB-JTAG Adapter or Infineon Debug Access Server (DAS) compatible hardware.

ULINK supports Flash programming, single-stepping, real-time program execution with breakpoints, and access to memory and CPU registers. For more information, refer to www.keil.com/ulink.

ULINK requires that your target system has an OCDS connector. Alternatively, you may get started with OCDS-ready XC166 or XC800 evaluation boards from Keil. For more information, refer to www.keil.com/boards.
Keil is the world-wide leader in development tools for the Infineon XC800 and XC166 microcontrollers. Tools from Keil support all levels of developer, from the beginner just starting out to the professional applications engineer. Keil offers a wide range of products including evaluation boards and the ULINK USB-JTAG adapter for Flash programming and In-System Debugging. For more information, see www.keil.com/infineon

The Keil PK51 and PK166 Professional Developer’s Kits are complete software development environments for Infineon 8-bit and 16-bit microcontrollers. The kits include the tools you need to create, translate, and debug C and assembly source files. Like all Keil tools, these kits are easy to learn and easy to use yet powerful enough for the most demanding embedded applications. The integrated Device Database configures the tools options for each specific microcontroller. For a complete list of supported devices, refer to www.keil.com/dd

The Advanced RTOS is a real-time kernel for the XC166/C166 that simplifies the design and implementation of complex, time-critical applications. For more information, refer to www.keil.com/ar166

Keil Development Tools for Infineon XC800/XC166

Keil Professional Developer’s Kit

- µVision Project Manager
- ANSI C Compiler
- Macro Assembler
- Run-Time Libraries
- Linker/Locator
- µVision Debugger
- Device Simulation
- Target Hardware

Third-Party Interfaces

- Software Version Control System
- PC-LINT
- Extensive syntax checking with MISRA support
- UML 2.0
- with Logix Rhapsody
- GUI Library
- with Display Simulation
- CAN Connector
- for Device Simulation
- MATLAB/Simulink
- µVision Simulation Interface

Advanced Real-Time OS

- RTOS Kernel
- TCP/IP Suite
- TCP, UDP, PPP, SLIP, ARP, DNS Resolver,
  Ethernet, DHCP Client,
  HTTP Server with CGI,
  TFTP Server, SMTP Client
- Flash File System

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