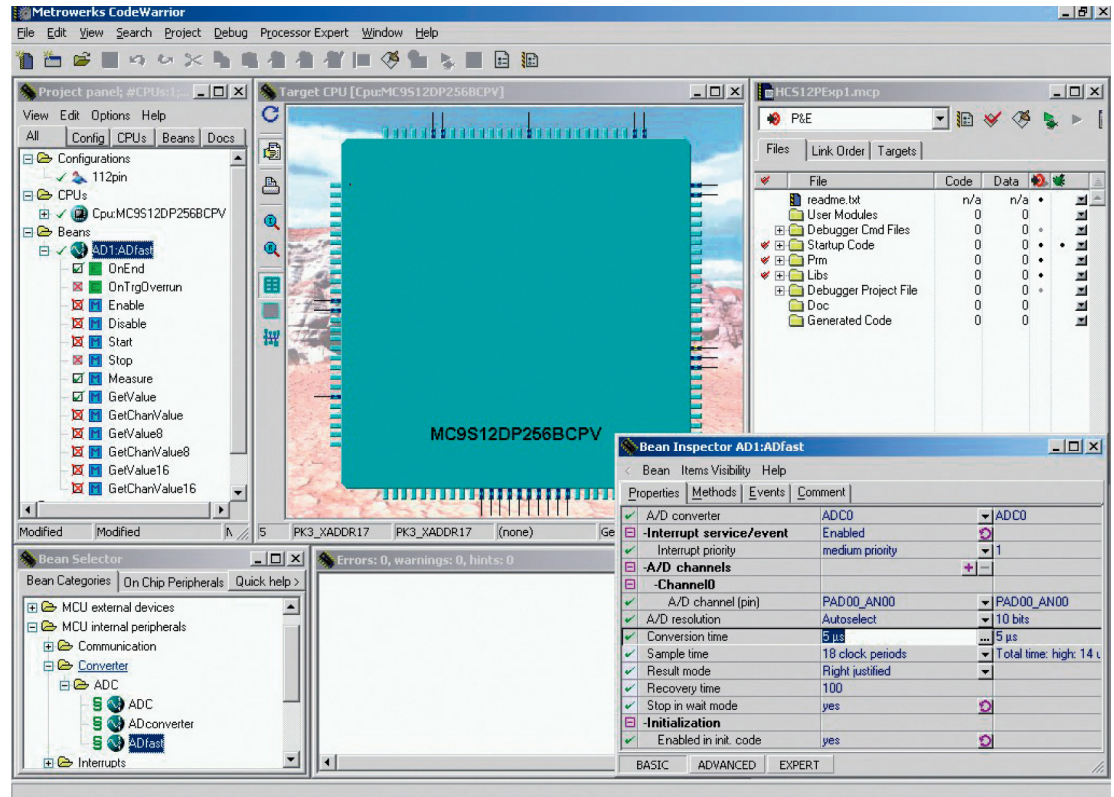# CodeWarrior Development Studio for HCS12(X) Microcontrollers V5.1

Overview

The comprehensive, highly visual CodeWarrior Development Studio for Freescale HCS12(X) Microcontrollers enables engineers to build and deploy HCS12 or HCS12X/XGATE systems quickly and easily. This tool suite provides the capabilities required by every engineer in the development cycle, from board bring-up to firmware development to final application development. With a common project-based development environment reuse becomes a natural by-product as each team builds on the work already completed by the previous team. Whether the application is targeted at consumer white goods, industrial control or automotive body controllers, the CodeWarrior environment provides you everything you need to exploit the capabilities of the HCS12 and HCS12X/XGATE architectures.

The award-winning CodeWarrior IDE goes well beyond basic code generation and debugging, streamlining applications design from the moment you open the box. It features an intuitive, state-of-the-art project manager and build system, a highly optimized compiler, graphical source-level debugger, integrated profiling capabilities, cycle-accurate instruction set simulator and more.

Features

- Sophisticated project manager
- Build system with optimizing C/C++/cC++/ EC++ compilers for HCS12 CPU, HCS12X CPU and XGATE module
- Macro-assembler (absolute and relocatable) supporting HCS12 CPU, HCS12X CPU and XGATE module
- Linker support for HCS12 CPU code, HCS12X CPU code, or HCS12X CPU and XGATE module code
- Graphical, source-level debugger support for HCS12 CPU or HCS12X CPU and XGATE module concurrently
- Flash programming support
- Cycle-accurate simulator with code coverage and profile analysis
- Data visualization and I/O stimulation
- C source code encryption support
- Processor Expert and Component Wizard

Get to Market Fast

Speed your time to market by creating, compiling, linking, assembling and debugging within a single, integrated development environment. Use our tightly integrated tools to speed your development time or plug in familiar third-party editors, compilers and debuggers. Skip the endless debug cycles at the end of a project and the frantic search through the silicon documentation to find the single bit that is set incorrectly, causing your application to crash. Just define the functionality you need for your application and Processor Expert within CodeWarrior Studio generates tested, optimized C-code tuned for your application and the particular HC(S)12 derivative you have chosen.

Maximize Performance/Minimize Silicon Cost

Create the most highly optimized code in the market with our industry leading ANSI C/C++ and compact C++ compilers. These compilers are designed to take full advantage of the HCS12 and HCS12X/XGATE architectures, with more than 60 advanced optimization strategies specifically designed to boost performance and reduce code size. Extract maximum performance from lower cost silicon and reduce your overall product cost.

Develop Software Ahead of Hardware

Start software development immediately. The cycle-accurate simulator in CodeWarrior Development Studio provides the most powerful tool short of actual hardware. Long before hardware is available you can detect and repair design and requirement errors with the simulator and integrated data visualization, code coverage and profile analysis. These tools provide you with clear, meaningful insight into your program's run-time behavior. Armed with this data, you can tailor your application for optimum performance and reliability.

Build System

Develop applications with the smallest code size and fastest execution time.

- MISRA-C:2004 compliant
- Industry-leading ANSI C/C++ and compact C++ compilers, which support EC++ guidelines for embedded C++ development and generate ELF/DWARF files for execution and debugging
- More than 60 optimization strategies
- Compiler optimization menu allows you to easily define the optimization level with sliders for code density, execution speed, complexity, compilation time and information
- Macro assembler
- Linker dead-strips unused code

Graphical Source-Level Debugger

The CodeWarrior IDE includes a state-of-the-art source-level debugger with a wide array of sophisticated features that help you troubleshoot and repair your application faster. The debugger provides the power you need with the simplicity of a Windows® based point-and-click environment for fast and easy execution.

- Graphical display of complex data structures and expressions to speed run-time analysis
- Fast, flexible and comprehensive run-control capabilities for complete target control
- Precise breakpoints help solve sophisticated problems

Processor Expert

Processor Expert is a rapid application design tool (RAD) that combines easy-to-use component-based application creation with an expert knowledge system. CPU, on-chip peripherals, external peripherals and software functionality are encapsulated into components called Embedded Components. You can tailor each component's functionality to fit your application requirements by modifying the component's properties, methods and events. When you build the project, Processor Expert automatically generates highly optimized C-code and places the files into your CodeWarrior project.

In order to eliminate troubleshooting cycles, Processor Expert's knowledge base only provides valid choices and immediately flags potential resource conflicts, allowing you to resolve the problems during the initial design phase. For simplified porting, simply select the new MCU and Processor Expert maps the software and peripheral components that describe your application's functionality to the resources available on the new MCU. All you have to do is resolve any problems flagged by Processor Expert and you're finished.

Processor Expert Features

- An intuitive, graphical user interface, tightly integrated with CodeWarrior tools
- Ready-to-use, tested hardware and software components with complete documentation
- Hardware independence and inheritance, enabling portable applications
- A knowledge base that is constantly checking CPU-dependent settings
- Automatic C-code generator
- Components Wizard, which allows you to encapsulate your own software IP and build a library of reusable components

CodeWarrior Development Studio provides the capabilities required by every engineer in the development cycle, from board bring-up to firmware development to final application development.

Features	Benefit	Special Edition	Basic Edition	Standard Edition	Professional Edition
IDE					
Project Wizard	Gets you up and programming fast	Yes	Yes	Yes	Yes
Program Manager	Eliminates confusing and often complex make files with visual preference panels				
• Projects		Unlimited	Unlimited	Unlimited	Unlimited
• Sub Projects		Yes	Yes	Yes	Yes
Build Tools					
Macro Assembler	For specific optimizations only you can provide	HCS12(X): ASM Unlimited XGATE: ASM Unlimited	HCS12(X): ASM Unlimited XGATE: ASM Unlimited	HCS12(X): ASM Unlimited XGATE: ASM Unlimited	HCS12(X): ASM Unlimited XGATE: ASM Unlimited
Optimizing Compiler	Allows you to reduce code size and maximize the capabilities of the microcontroller to achieve top performance	HCS12(X): C 32K HCS12(X): C++ 1K XGATE: C 512 bytes XGATE: C++ 512 bytes	HCS12(X): C 64K HCS12(X): C++ 1K XGATE: C 512 bytes XGATE: C++ 512 bytes	HCS12(X): C Unlimited HCS12(X): C++ 1K XGATE: C Unlimited XGATE: C++ 512 bytes	XGATE: ASM Unlimited HCS12(X): C Unlimited HCS12(X): C++ Unlimited XGATE: C Unlimited XGATE: C++ Unlimited
Libmaker	Allows you to reuse and maintain your code in libraries			Yes	Yes
Debug Tools					
Source-Level Debugger	Speeds debug cycles by viewing the source code as it executes	HCS12(X): ASM Unlimited HCS12(X): C 32K HCS12(X): C++ 1K XGATE: ASM Unlimited XGATE: C 512 bytes XGATE: C++ 512 bytes	HCS12(X): ASM Unlimited HCS12(X): C 64K HCS12(X): C++ 1K XGATE: ASM Unlimited XGATE: C 512 bytes XGATE: C++ 512 bytes	HCS12(X): ASM Unlimited HCS12(X): C Unlimited HCS12(X): C++ 1K XGATE: ASM Unlimited XGATE: C Unlimited XGATE: C++ 512 bytes	HCS12(X): ASM Unlimited HCS12(X): C Unlimited HCS12(X): C++ Unlimited XGATE: ASM Unlimited XGATE: C Unlimited XGATE: C++ Unlimited
Flash Programmer	Fully integrated flash programming improves the build/debug cycle via download automation	Yes	Yes	Yes	Yes
Simulator	Reduces costs and eliminates possible hardware issues during development	Yes	Yes	Yes	Yes
Data Visualization and I/O Stimulation	Let's you see how your program effects peripherals and responds to outside input	One component/Three elements	One component/Three elements	Unlimited	Unlimited
Decoder	Allows you create listings of ELF files			Yes	Yes
OSEK Awareness	Ready to work with OSEK for RTOS-aware debug capabilities				Yes
Session Record and Play	Automates repetitive debug cycles during program validation				Yes
Advanced Tools					
Processor Expert	Abstracts the hardware layer and generates optimized, microcontroller-specific code tailored to your application so you can concentrate on design				
• Basic Component		Yes	Yes	Yes	Yes
• Software Component				Yes	Yes
• Advanced Component					Yes
Component Wizard	Allows you to create reusable software components, which can be easily retargeted to any Freescale hybrid, HC(S)08 or HCS12(X) microcontroller				Yes
Profile Analysis and Code Coverage	Provides visibility into your running program to allow fine tuning and better quality metrics				Yes
PC-Lint Plug-In	Ensures compliance with MISRA and other code quality and style guidelines				Yes

Specifications

- IDE Version: 5.9
- Host Platforms:
  - Windows® XP 32-bit and 64-bit (Professional Edition)
  - Windows Vista 32-bit and 64-bit (Business)
  - Windows Vista 32-bit (Home Premium)
  - Windows 7 32-bit and 64-bit (Professional Edition)
  - Windows 7 32-bit and 64-bit (Home Premium)
- Language support: Assembly, C/C++, cC++, EC++
- Build tools output formats: ELF/DWARF 2.0, Hiware, Freescale SRecord, Intel® hex, binary

Support Policy

- Online help and documentation
- 12-month maintenance contract (additional 12-month contracts available)
- Free 30-day evaluation license available

System Requirements

- PC with 1 GHz Intel® Pentium® compatible processor
- 512 MB of RAM (1 GB recommended) and CD-ROM drive
- Depending on host-target connection: 9-pin serial port, Ethernet Port or USB port

Device Support

- MC9S12X families: A, B, D, E, F, HY, HZ, S
- MC9S12 families: A, B, C, D, E, G, GN, GC, H, HA, HY, I, K, N, P, Q, T, U
- MC68HC812: A4
- MC68HC912 families: B, D, DG, DT

Host Connections

- USB Multilink from P&E Microcomputer Systems
- Cyclone PRO from P&E Microcomputer Systems
- Freescale Open Source BDM
- Serial Monitor
- SofTec BDM12
- Abatron BDI1000® (Professional Edition only)

CodeWarrior Development Studio for Microcontrollers is included in the CodeWarrior Development Tool Suites. To order the product, select the part number for the CodeWarrior Development Tool Suite that meets your needs.

Special Suite—CodeWarrior for Microcontrollers, Special Edition	
Special Edition	CWX-HXX-SE
Basic Suite—C Compiler Upgrade	
Perpetual	**$995**
• Node Locked	CWP-BASIC-NL
• Floating	CWP-BASIC-FL
• Tech Support *After first year*	CWT-BASIC $195
Annual Subscription	**$395**
• Node Locked	CWA-BASIC-NL
• Floating	CWA-BASIC-FL
Standard Suite—CodeWarrior for Microcontrollers, Standard Edition	
Perpetual	**$2495**
• Node Locked	CWP-STANDARD-NL
• Floating	CWP-STANDARD-FL
• Tech Support *After first year*	CWT-STANDARD $495
Annual Subscription	**$995**
• Node Locked	CWA-STANDARD-NL
• Floating	CWA-STANDARD-FL
Professional Suite—CodeWarrior for Microcontrollers, Professional Edition	
Perpetual	**$4995**
• Node Locked	CWP-PRO-NL
• Floating	CWP-PRO-FL
• Tech Support *After first year*	CWT-PRO $995
Annual Subscription	**$1995**
• Node Locked	CWA-PRO-NL
• Floating	CWA-PRO-FL

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