8-/16-bit Microcontrollers

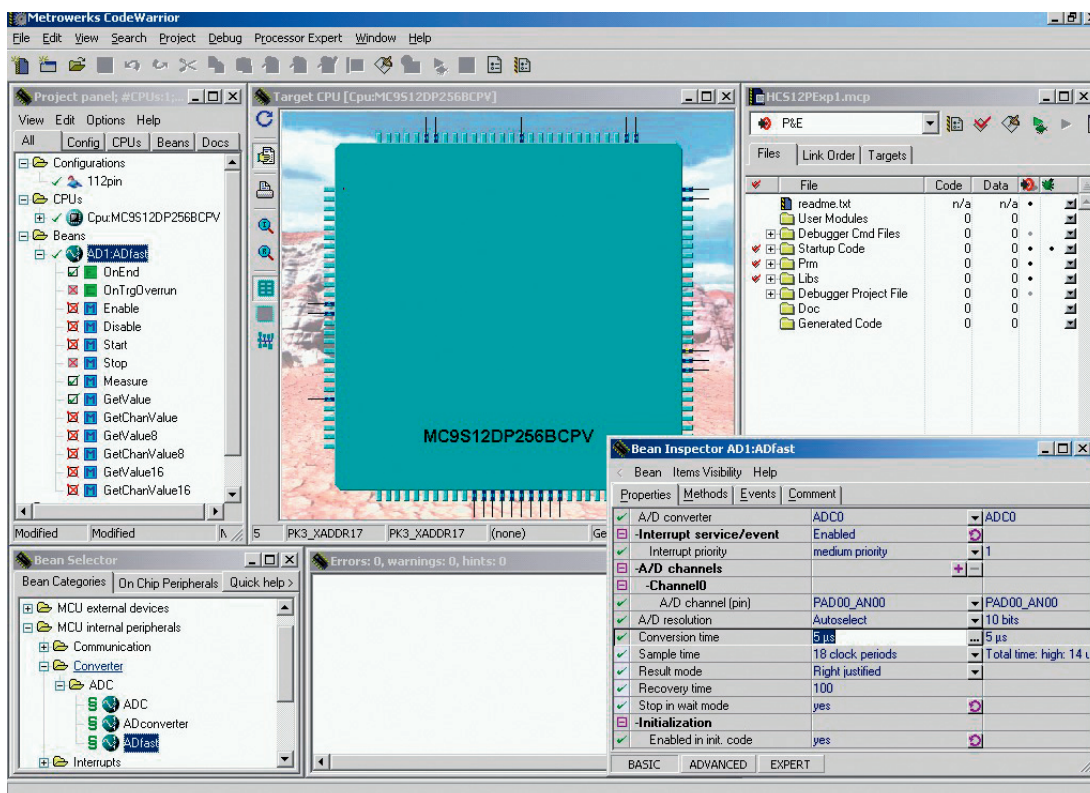# CodeWarrior™ Development Studio
for Freescale™ HCS12(X) Microcontrollers

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, a graphical, source-level debugger, integrated profiling capabilities, a 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 Bean Wizard from Unis

freescale™
semiconductor

Why develop applications with CodeWarrior tools?

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 68HC(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. So, you can 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.

Processor Expert from UNIS

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 Beans. 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.

Endless troubleshooting cycles are a thing of the past! 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.

Processor Expert also makes porting a breeze. 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 Include

- 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, which make your applications portable
- A knowledge base that is constantly checking CPU-dependent settings
- Automatic C-code generator
- Bean Wizard, which allows you to encapsulate your own software IP and build a library of reusable components

Build System

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

Features Include

- Industry-leading ANSI C/C++ and compact C++ compilers, which support EC++ guide-lines for embedded C++ development and generate ELF/DWARF files for execution and debugging
- More than 60 optimization strategies
- Compiler optimization menu that 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

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.

Feature	Benefit	Special Edition	Standard Edition	Professional Edition
IDE				
Project Wizard	Gets you up and programming fast.	Yes	Yes	Yes
Program Manager > Projects > Sub Projects	Eliminates confusing and often complex make files with visual preference panels.	Up to 32 files* No*	Unlimited Yes	Unlimited 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
Optimizing Compiler	Reduces code size and maximizes 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 - 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 reuse and maintenance of code through 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 - 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 Programming	Fully integrated flash programming improves the build-debug cycle because it automates your downloads.	Yes	Yes	Yes
Simulator	Reduces costs and eliminates possible hardware issues during development.	Yes	Yes	Yes
Data Visualization and I/O Stimulation	Let's you see how your program effects peripherals and responds to outside input.	1 components/ 3 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 > Basic Beans > Software Beans > Advanced Beans	Abstracts the hardware layer and generates optimized, microcontroller-specific code tailored to your application, so you can concentrate on design.	Yes	Yes Yes	Yes Yes Yes
Bean 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	Gives you 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

* Program Manager limitation removed when 64K compiler installed

Specifications

- IDE Version: 5.7
- Host Platforms: Windows® 98 SE/2000/XP
- Language support: Assembly, C/C++, cC++, EC++
- Build tools output formats: ELF/DWARF 2.0, Hiware, Freescale S-Record, Intel® hex, binary

Support Policy

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

System Requirements

- 200 MHz Intel Pentium® II processor or AMD-K6® class processor,
- Microsoft Windows® 98 SE (Second Edition)/2000/XP
- 128 MB of RAM, and CD-ROM drive
- Depending on host-target connection: parallel port, 9-pin serial port or USB port

Device Support

- MC9S12X families: A, D, DG, DP, DT
- MC9S12 families: A, B, C, D, DB, DG, DJ, DP, DT, E, GC, H, KG, KT, NE, T and U
- MC68HC812: A4
- MC68HC912 families: B, D, DG, DT

Board Support

- Freescale MC68HC9S12DP256 Evaluation Board
- Elektronik-Laden HCS12 T-Board
- Future Electronics 9S12 Badge Board
- Axiom CML125-DP256 Board
- Axiom MC9S12XDT512 Demo Board
- SofTec MC9S12XDP512 Evaluation Board
- M68EVB912C32
- M68EVB912DP256
- Technological Arts HCS12 Boards
- inDART-HCS12 Series Starter kits
- PK-HCS12 Series Starter kits

Host Connections

- USB Multilink 12
- Cyclone Pro
- SofTec BDM12
- Abatron BDI1000® (Professional Edition only)

Part Numbers

Products	Part#
CodeWarrior for HC12, Special Edition (also includes CodeWarrior for HC08, Special Edition)	CWX-HXX-SE
CodeWarrior for HC12, Standard Edition	CWS-H12-STDED-CX
CodeWarrior for HC12, Professional Edition	CWS-H12-PROED-CX
Upgrades	
HC12 64K C Compiler Upgrade	CWS-H12-C64K-CX
HC12 C++/cC++/EC++ Compiler Only Edition	CWS-HC12-CC-CX
HC12 Upgrade to Standard Edition	CWS-H12-STDED-UX
HC12 Upgrade to Professional Edition	CWS-H12-PROED-UX
Add-On Options for Standard Edition	
HC12 Enhanced Compiler Option	CWX-H12-ENHNC-KX
XGATE Tools Option	CWX-H12-XGATE-KX

Learn More: For current information about Freescale products and documentation, please visit **www.freescale.com**.

You can also find more information about Fast Track, Freescale's online support services center, at **www.freescale.com/fasttrack**.